

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: 10T8/4F/8CCTS/UEB

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ23030020e

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

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Apr. 03, 2023



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Apr. 03, 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	10T8/4F/8CCTS/UEB (3000K Setting)	10T8/4F/8CCTS/UEB (3500K Setting)	10T8/4F/8CCTS/UEB (4000K Setting)
Luminous Efficacy (Lumens /Watt)	168.5	166.7	168.6
Total Luminous Flux (Lumens)	1682.9	1679.9	1686.2
Power (Watts)	9.99	10.08	10.00
Power Factor	0.9809	0.9803	0.9809
CCT (K)	3028	3449	3888
CRI	82.2	83.9	84.7
Stabilization Time (Light & Power)	50 mins	50 mins	50 mins
Note	3000K	3500K	4000K
Tested Model	10T8/4F/8CCTS/UEB (5000K Setting)	10T8/4F/8CCTS/UEB (6500K Setting)	
Luminous Efficacy (Lumens /Watt)	166.3	165.9	
Total Luminous Flux (Lumens)	1675.1	1659.3	
Power (Watts)	10.07	10.00	
Power Factor	0.9805	0.9807	
CCT (K)	5001	6322	
CRI	84.2	82.4	
Stabilization Time (Light & Power)	50 mins	50 mins	
Note	5000K	6500K	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Mar. 06, 2023
Date of Test	: Mar. 27, 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	: 10T8/4F/8CCTS/UEB
Electrical Ratings	: 120-277V, 50/60Hz, 10W Color- Tunable 3000K/3500K/4000K/5000K/6500K
Product Description	: Manufacturer of light source: Lumileds Holding B.V. Model of LED light source: L128-3080RA35003K2 (3000K) L128-6580RA35003K2 (6500K)

TEST RESULTS (3000K Setting)

Test ambient temperature was 26.0 °C.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

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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)	0.085	0.041
Power Factor	0.9809	0.9054
Test Power (W)	9.99	10.24
THD A%	17.76	21.63
Luminous Efficacy (lm/W)	168.5	165.0
Total Luminous Flux (lm)	1682.9	1689.5
Color Rendering Index (CRI)	82.2	
R9	6.9	
Correlated Color Temperature (CCT)(K)	3028	
Chromaticity Chroma x	0.4363	
Chromaticity Chroma y	0.4064	
Chromaticity Chroma u	0.2492	
Chromaticity Chroma v	0.3481	
Duv	0.0010	
Chromaticity Chroma u'	0.2492	
Chromaticity Chroma v'	0.5222	

Special Color Rendering Indices	
R1	80.4
R2	89.4
R3	96.7
R4	80.7
R5	80.1
R6	86.6
R7	83.9
R8	59.9
R9	6.9
R10	75.5
R11	80
R12	64.9
R13	82.4
R14	98.3

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

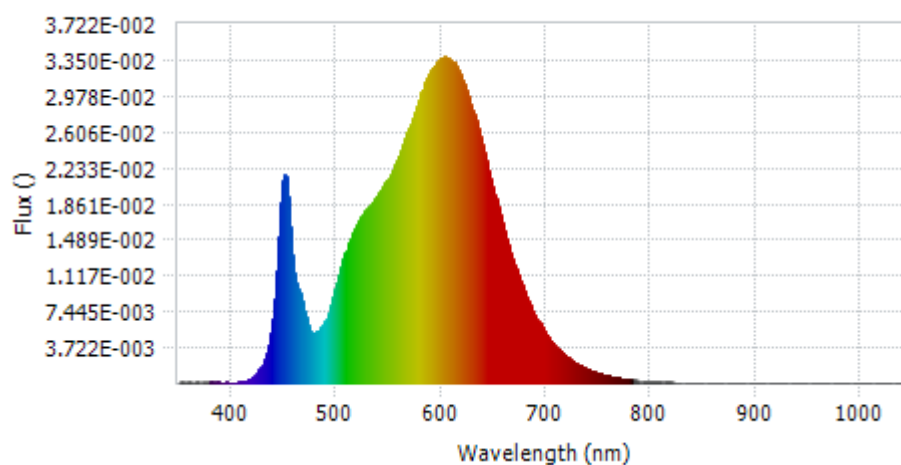
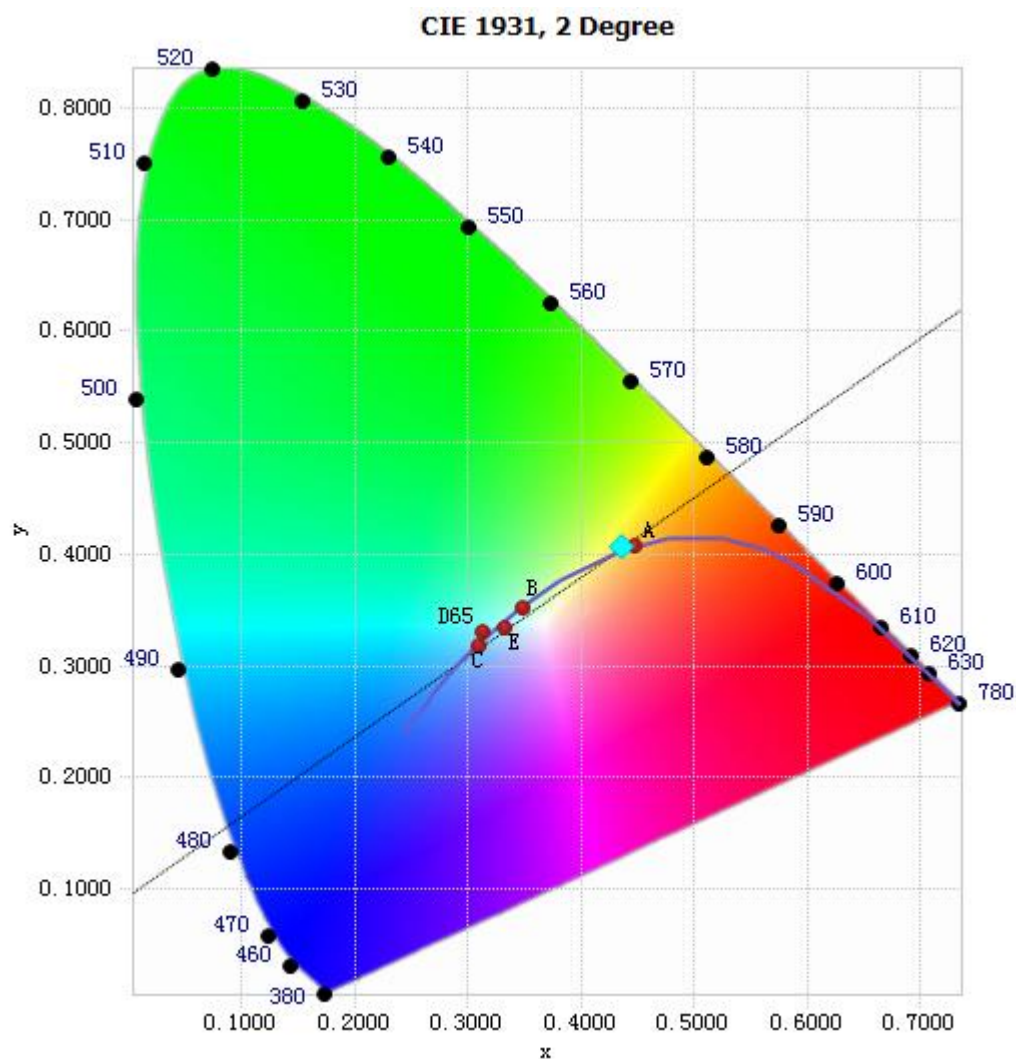


Chart 1: Spectral Power Distribution

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	5.60E-03	590	3.24E-02	695	5.95E-03
385	1.14E-04	490	6.46E-03	595	3.32E-02	700	5.10E-03
390	1.08E-04	495	8.06E-03	600	3.37E-02	705	4.35E-03
395	1.19E-04	500	1.01E-02	605	3.37E-02	710	3.71E-03
400	8.96E-05	505	1.21E-02	610	3.34E-02	715	3.15E-03
405	1.10E-04	510	1.38E-02	615	3.27E-02	720	2.71E-03
410	1.66E-04	515	1.54E-02	620	3.14E-02	725	2.32E-03
415	2.90E-04	520	1.64E-02	625	3.00E-02	730	1.96E-03
420	5.72E-04	525	1.74E-02	630	2.83E-02	735	1.66E-03
425	1.05E-03	530	1.82E-02	635	2.64E-02	740	1.42E-03
430	1.92E-03	535	1.88E-02	640	2.43E-02	745	1.21E-03
435	3.60E-03	540	1.95E-02	645	2.21E-02	750	1.02E-03
440	6.67E-03	545	2.04E-02	650	1.99E-02	755	8.69E-04
445	1.33E-02	550	2.12E-02	655	1.78E-02	760	7.43E-04
450	2.11E-02	555	2.24E-02	660	1.59E-02	765	6.38E-04
455	1.78E-02	560	2.36E-02	665	1.40E-02	770	5.38E-04
460	1.14E-02	565	2.50E-02	670	1.22E-02	775	4.61E-04
465	9.51E-03	570	2.65E-02	675	1.07E-02	780	3.93E-04
470	7.45E-03	575	2.81E-02	680	9.27E-03		
475	5.45E-03	580	2.96E-02	685	8.05E-03		
480	5.14E-03	585	3.13E-02	690	6.95E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4363, 0.4064)

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

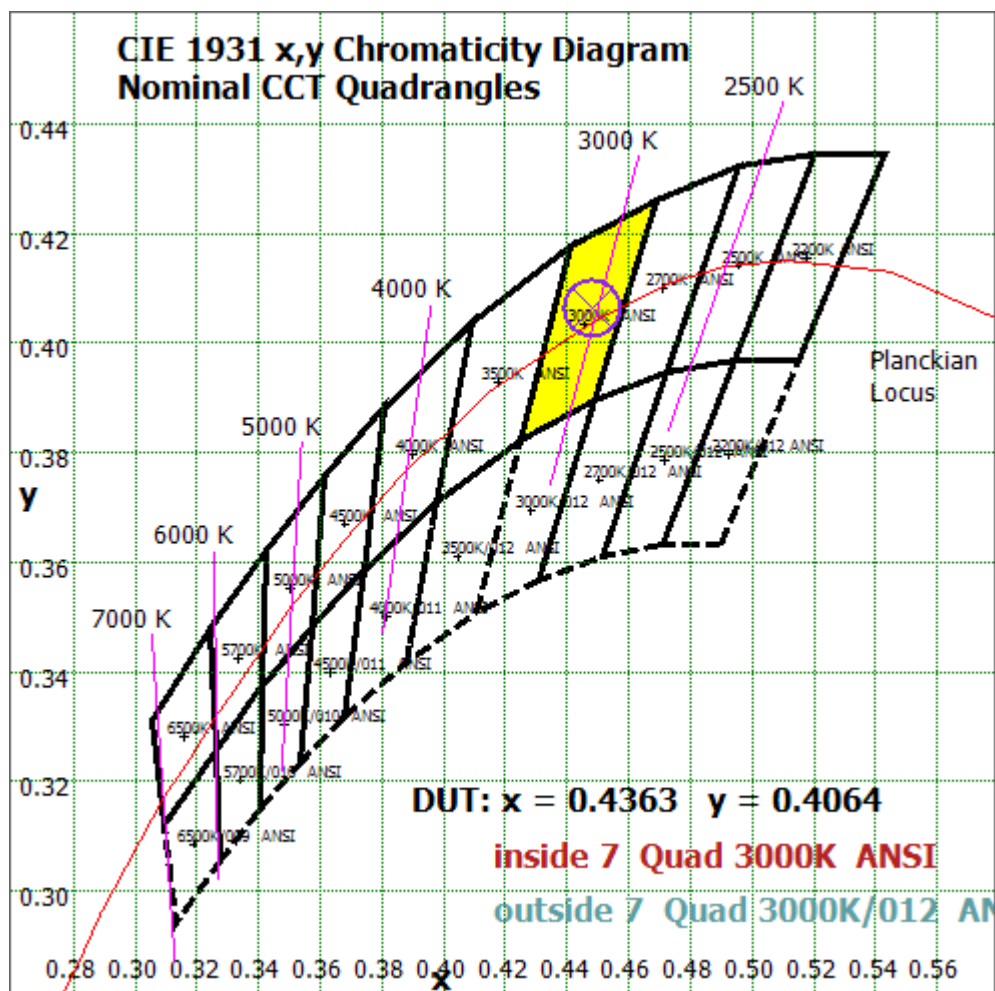


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

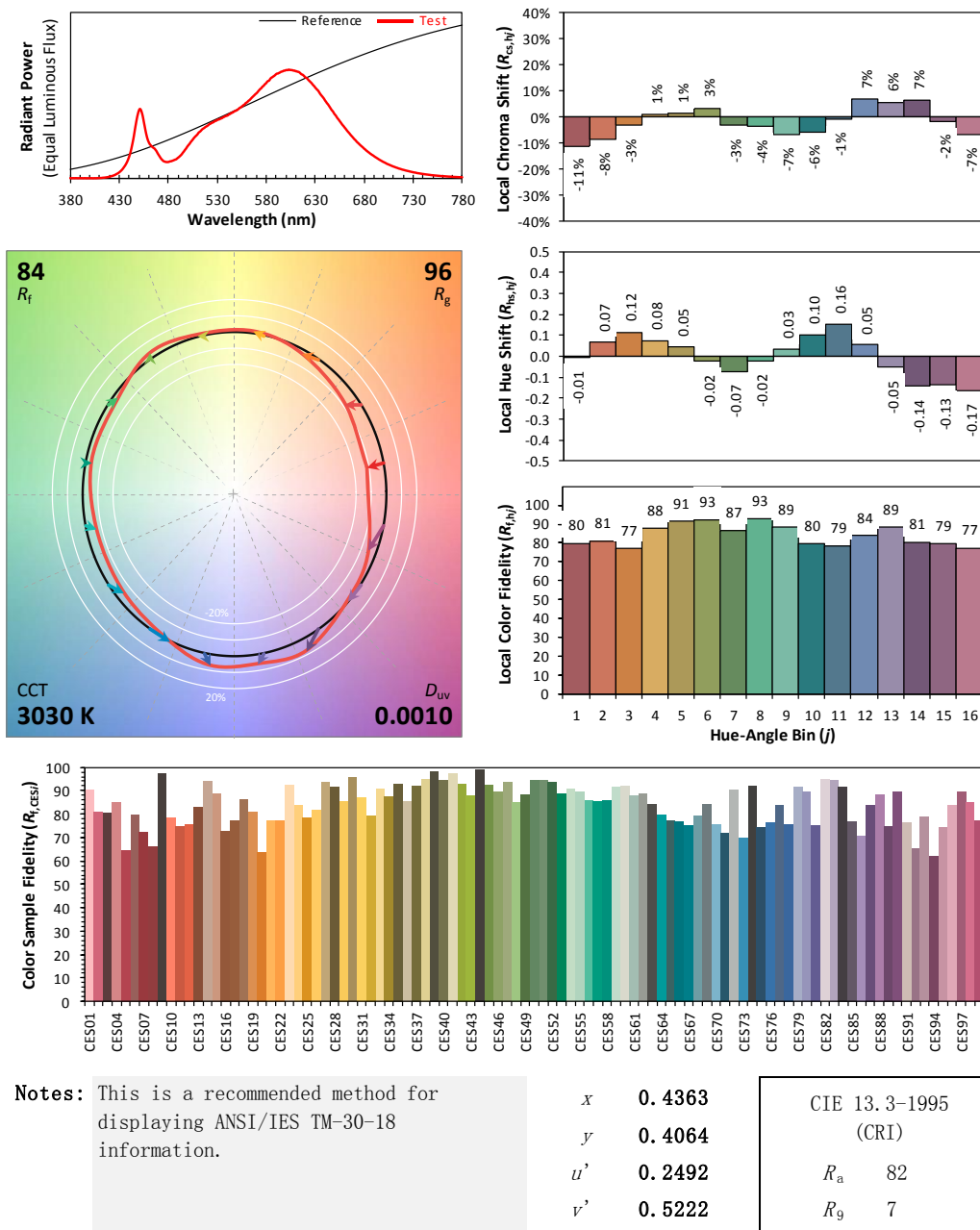
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/03/27

Model: 10T8/4F/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)	0.085
Power Factor	0.9806
Power (W)	10.02
Luminous Efficacy (lm/W)	169.2
Total Luminous Flux (lm)	1695.3
Beam Angle (°)	112.4 (0°-180°) / 212.2 (90°-270°)
Center Beam Candle Power (cd)	295
Maximum Beam Candle Power (cd)	296.6 (At: C=250.0, Gamma=5.5)
Spacing Criteria	1.31 (0°-180°) / 1.44 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	44.30%
Zonal Lumens in the 60 °-90 °Zone	27.01%
Zonal Lumens in the 90 °-120 °Zone	17.44%
Zonal Lumens in the 120 °-180 °Zone	11.25%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	27.936	1.65%
10- 20	80.944	4.77%
20- 30	125.836	7.42%
30- 40	158.583	9.35%
40- 50	176.954	10.44%
50- 60	180.759	10.66%
60- 70	171.761	10.13%
70- 80	153.637	9.06%
80- 90	132.557	7.82%
90-100	114.334	6.74%
100-110	98.2	5.79%
110-120	83.081	4.90%
120-130	68.149	4.02%
130-140	52.661	3.11%
140-150	37.495	2.21%
150-160	22.437	1.32%
160-170	8.537	0.50%
170-180	1.461	0.09%
Total	1695.3	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	751.012	44.30%
60- 90	457.955	27.01%
0-90	1208.97	71.31%
90- 180	486.355	28.69%
0- 180	1695.3	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

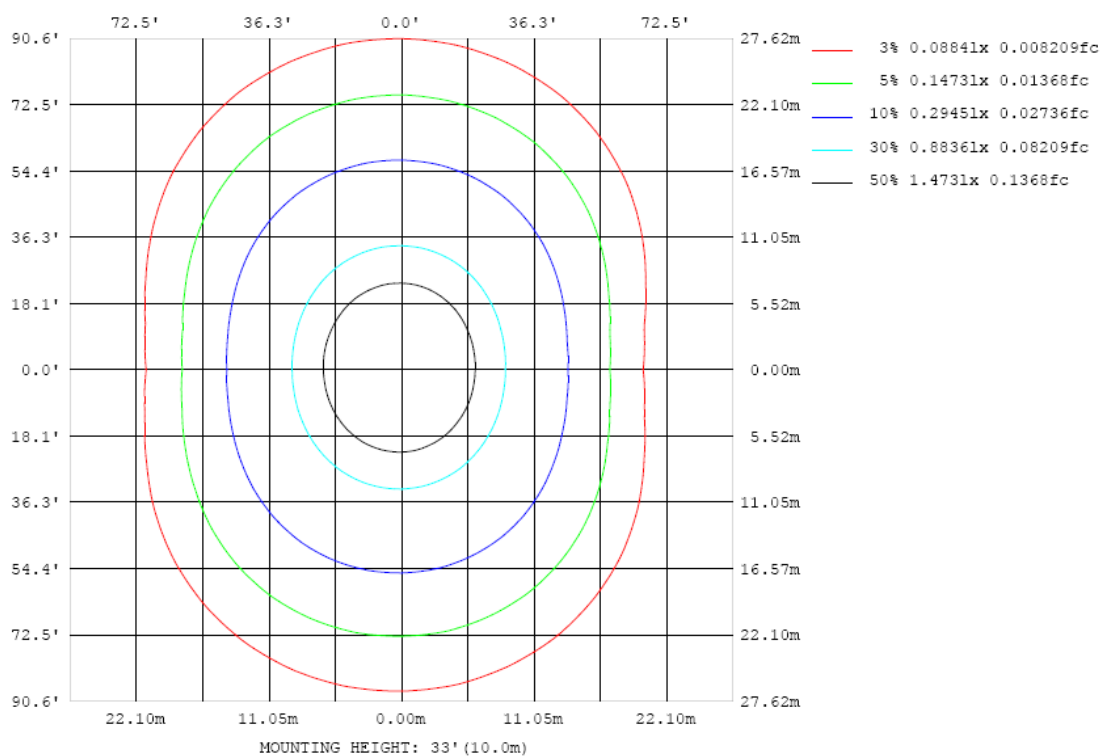


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

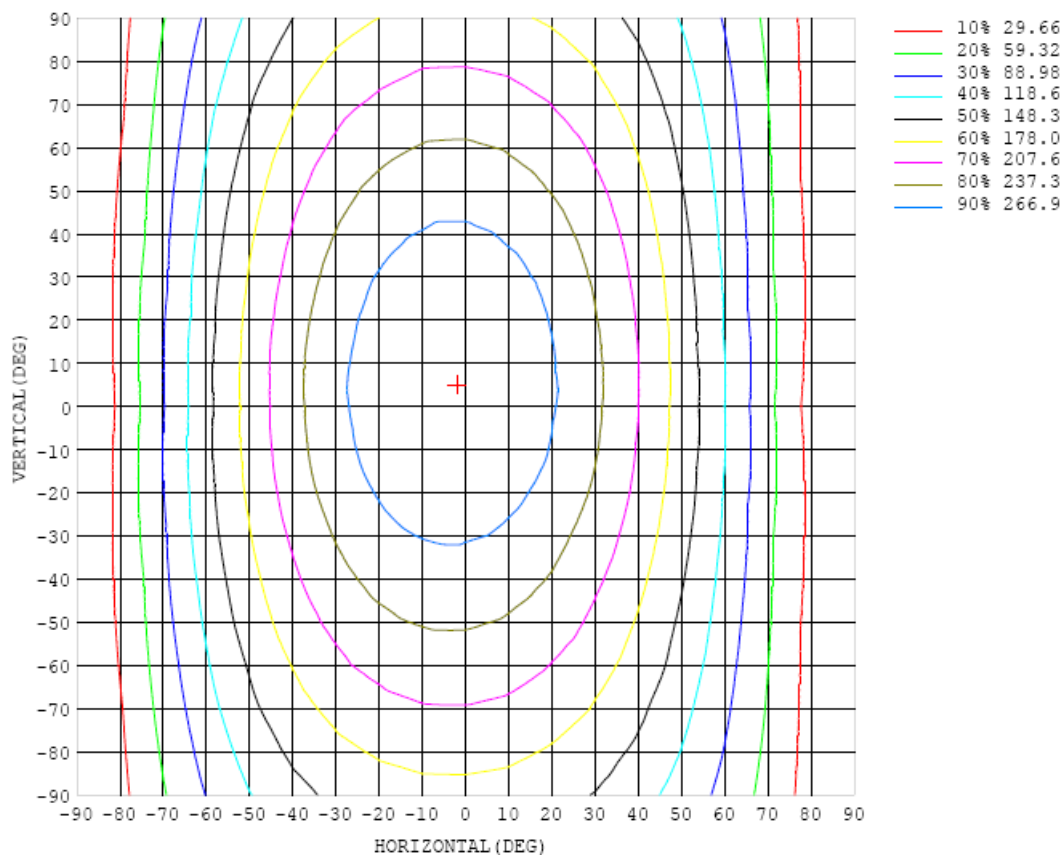


Chart 6: Isocandela Plot

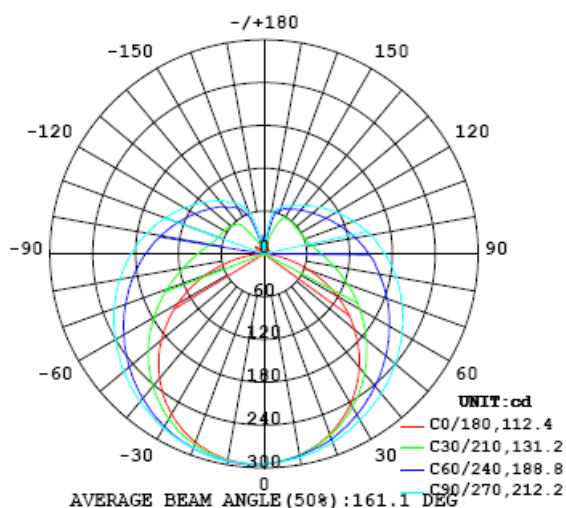


Chart 7: Polar Candela Distribution

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	295	295	295	295	295	295	295	295	295	295	295	295	295	295	295	295	295	295	295
5	292	291	291	291	291	291	291	292	291	292	292	293	293	293	293	294	294	294	295
10	287	286	286	286	286	287	287	289	289	290	290	291	291	291	291	292	291	292	293
15	279	278	278	279	280	281	282	284	285	286	287	287	287	287	287	287	287	288	288
20	269	268	269	270	272	274	276	278	280	281	282	282	282	282	281	281	280	280	281
25	257	256	257	260	262	265	269	271	274	275	276	277	276	275	273	273	271	270	271
30	243	242	244	248	252	255	260	264	267	269	270	270	269	267	264	262	260	259	259
35	226	226	230	234	239	245	251	256	261	262	264	263	261	258	254	250	247	244	245
40	207	208	213	219	227	234	242	248	253	256	256	255	252	248	242	236	232	229	228
45	187	189	195	203	213	223	232	239	245	248	249	247	243	237	229	222	215	210	208
50	165	168	176	187	199	211	223	231	237	240	241	238	234	226	217	206	197	190	188
55	143	147	157	171	186	200	213	222	229	232	232	230	224	215	203	190	177	169	165
60	119	124	138	155	172	189	203	213	221	223	224	221	214	203	189	173	158	146	140
65	93.0	100	118	140	160	178	193	204	212	215	215	211	204	192	176	157	138	122	114
70	67.3	76.8	99.4	124	149	167	183	195	203	206	206	202	194	180	163	142	118	97.5	87.3
75	42.3	55.0	82.5	111	137	157	174	185	193	197	197	192	184	169	151	127	99.0	73.5	61.0
80	20.1	36.7	68.1	99.0	126	148	164	176	185	188	188	183	173	159	139	113	81.9	51.3	35.4
85	4.04	24.0	57.2	88.9	116	139	156	167	175	179	178	173	163	149	128	100	67.7	33.5	13.5
90	0.25	17.7	49.4	80.6	108	130	147	158	166	169	169	163	155	139	117	90.1	56.9	22.1	1.07
95	0.24	14.2	43.9	73.5	99.9	121	138	150	158	160	159	155	145	130	108	81.4	49.6	17.6	0.66
100	0.39	15.0	40.2	68.0	92.8	113	130	141	149	152	151	146	136	121	100	74.3	45.1	17.4	0.97
105	0.81	17.8	38.9	63.8	86.8	106	122	133	140	143	142	137	127	112	93.0	69.1	42.9	19.9	1.60
110	1.96	21.3	39.5	60.7	81.5	99.3	114	125	131	134	133	128	119	105	86.7	65.2	42.4	23.8	2.75
115	4.82	25.5	41.1	59.3	77.3	93.6	107	117	123	125	124	119	111	97.8	81.5	62.4	43.2	28.4	4.86
120	8.21	28.8	41.2	58.8	74.3	88.3	100	109	115	117	116	111	103	91.7	77.3	60.8	44.6	33.2	8.67
125	8.65	25.9	45.3	58.6	71.7	83.9	94.3	102	107	109	108	104	96.7	86.4	73.8	60.1	46.7	37.0	13.3
130	6.50	19.8	47.5	57.7	69.8	80.0	89.0	95.5	100.0	102	101	97.1	90.8	81.7	71.4	59.7	49.5	38.2	16.2
135	5.98	19.5	49.8	58.7	68.2	76.8	84.2	89.8	93.6	94.9	94.3	90.8	85.5	78.0	69.2	59.4	52.9	33.1	12.3
140	7.17	22.8	52.7	59.0	66.1	73.9	80.1	84.6	87.8	88.8	88.1	85.4	80.9	74.8	66.7	59.6	54.4	30.9	9.49
145	9.84	20.2	44.5	58.8	65.5	70.6	76.5	80.1	82.5	83.3	82.7	80.5	76.8	71.3	66.0	59.6	53.0	30.0	7.70
150	9.33	9.31	37.9	58.3	64.5	68.9	72.3	75.3	77.8	78.3	77.9	76.0	72.8	69.4	64.4	59.6	50.2	23.4	5.29
155	9.55	4.57	25.6	49.6	61.3	66.1	69.6	71.6	73.1	73.6	73.1	71.9	70.2	66.5	62.4	58.6	43.2	15.7	6.58
160	17.2	9.10	11.2	30.7	51.6	62.2	65.1	66.9	68.7	69.2	68.9	67.4	65.4	63.4	61.1	52.9	32.2	15.0	8.10
165	12.3	7.69	9.29	12.5	25.1	43.1	57.9	63.5	64.4	64.4	64.1	63.7	62.8	59.8	51.1	37.6	21.7	12.0	8.44
170	18.7	7.85	10.4	9.60	8.80	12.4	21.4	34.5	44.3	48.0	48.4	46.7	43.5	36.2	26.4	19.3	14.0	10.8	7.24
175	17.5	10.7	8.51	10.4	11.6	9.76	6.82	4.92	7.71	12.2	14.0	13.9	13.0	12.9	12.9	12.0	9.70	7.61	8.91
180	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49

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		295	295	295	295	295	295	295	295	295	295	295	295	295	295	295	295	295	
5		295	295	296	296	296	296	296	296	295	295	295	295	294	294	293	292	292	
10		293	294	294	295	295	295	295	295	294	294	293	292	292	290	289	288	287	
15		289	290	290	291	293	293	293	293	293	292	290	289	287	284	282	281	280	
20		283	283	285	286	288	290	290	291	290	289	287	284	281	277	275	272	270	
25		273	275	277	280	283	285	287	288	286	284	282	279	274	269	265	261	259	
30		261	263	267	271	276	279	281	283	282	279	276	272	265	259	253	248	245	
35		247	251	255	261	268	273	275	278	276	274	270	264	256	248	240	233	229	
40		231	236	242	250	258	264	268	271	270	267	262	255	246	236	226	217	211	
45		212	219	228	238	248	256	261	264	263	261	254	246	235	223	210	199	191	
50		192	200	212	225	237	247	253	256	256	253	246	237	224	209	194	180	170	
55		170	181	195	211	225	237	244	248	248	245	238	227	213	196	177	160	147	
60		146	160	178	197	213	227	235	240	240	237	229	217	201	182	161	140	124	
65		121	139	161	183	202	217	226	232	232	228	220	207	190	169	145	120	100	
70		96.1	118	145	169	191	207	217	223	223	220	211	197	179	156	130	102	76.9	
75		71.1	99.0	129	157	179	197	207	214	215	211	202	188	169	145	116	84.7	55.6	
80		49.5	81.5	115	145	168	186	198	204	205	202	193	179	159	135	104	70.6	37.1	
85		31.6	68.3	103	134	158	176	188	195	196	192	183	170	150	125	94.7	60.6	24.6	
90		20.9	58.1	93.0	124	148	166	178	185	186	183	174	160	141	116	86.6	53.4	19.1	
95		15.0	50.2	84.4	115	138	157	168	175	176	173	165	152	133	109	80.5	49.3	18.5	
100		13.9	44.8	77.3	106	129	147	158	165	167	164	155	143	125	103	75.7	47.4	20.1	
105		15.4	42.6	71.6	98.9	121	138	149	155	157	154	147	135	118	96.7	72.2	47.1	22.6	
110		17.5	42.2	68.1	92.8	113	128	139	146	148	145	138	127	111	91.7	69.5	47.8	25.4	
115		18.7	42.5	66.2	87.5	106	120	130	137	138	136	129	119	105	87.2	67.8	48.9	26.6	
120		15.2	42.6	64.6	83.3	99.3	112	121	127	129	127	121	112	98.9	83.5	66.4	50.2	28.4	
125		10.6	40.8	64.2	79.6	93.5	105	113	119	120	119	113	105	93.7	80.4	66.4	50.6	28.5	
130		2.00	34.1	61.0	75.9	88.7	98.5	106	111	112	110	106	98.9	89.2	77.1	63.8	50.1	26.6	
135		4.20	29.2	58.0	72.5	83.6	92.8	98.8	103	104	103	99.3	93.3	84.1	73.5	63.5	42.7	19.5	
140		6.24	24.8	53.8	69.6	77.6	86.1	92.3	95.9	97.1	96.1	92.9	86.8	78.5	71.3	61.2	34.1	13.0	
145		8.29	12.0	37.3	64.0	74.6	79.3	83.3	86.7	87.8	87.0	84.5	80.8	75.3	66.2	55.8	25.6	10.3	
150		12.4	8.49	23.9	55.9	66.7	74.7	78.5	81.0	81.9	81.3	79.5	76.0	69.9	58.3	39.6	15.8	12.3	
155		14.7	13.4	14.2	29.2	56.2	63.0	70.9	74.0	74.6	74.4	72.2	65.5	55.0	45.5	19.7	11.3	14.4	
160		14.3	14.5	9.62	15.0	23.1	44.7	58.0	60.0	60.7	61.3	58.4	48.1	36.8	20.2	7.64	10.8	15.7	
165		12.0	16.0	15.4	11.2	12.5	14.8	17.5	24.1	27.8	27.5	22.9	16.9	10.1	9.42	9.13	10.2	15.1	
170		9.80	16.0	19.1	15.6	16.5	16.2	13.0	12.4	12.4	9.66	10.1	13.4	16.6	11.2	10.5	14.9	15.6	
175		16.6	15.3	10.2	15.3	21.9	25.7	27.2	25.0	0.00	18.8	20.8	22.7	19.4	18.0	14.0	17.0	20.8	
180		6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	6.49	

Table 7: Luminous Intensity Data

TEST RESULTS (3500K Setting)

Test ambient temperature was 26.0 °C.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.086	0.041
Power Factor	0.9803	0.9064
Test Power (W)	10.08	10.31
THD A%	17.92	20.71
Luminous Efficacy (lm/W)	166.7	163.4
Total Luminous Flux (lm)	1679.9	1685.0
Color Rendering Index (CRI)	83.9	
R9	14.7	
Correlated Color Temperature (CCT)(K)	3449	
Chromaticity Chroma x	0.4067	
Chromaticity Chroma y	0.3885	
Chromaticity Chroma u	0.2375	
Chromaticity Chroma v	0.3404	
Duv	-0.0013	
Chromaticity Chroma u'	0.2375	
Chromaticity Chroma v'	0.5106	

Special Color Rendering Indices	
R1	82.8
R2	90.5
R3	95.7
R4	82.7
R5	82.6
R6	87
R7	85.3
R8	64.6
R9	14.7
R10	77.2
R11	82.1
R12	64.1
R13	84.8
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

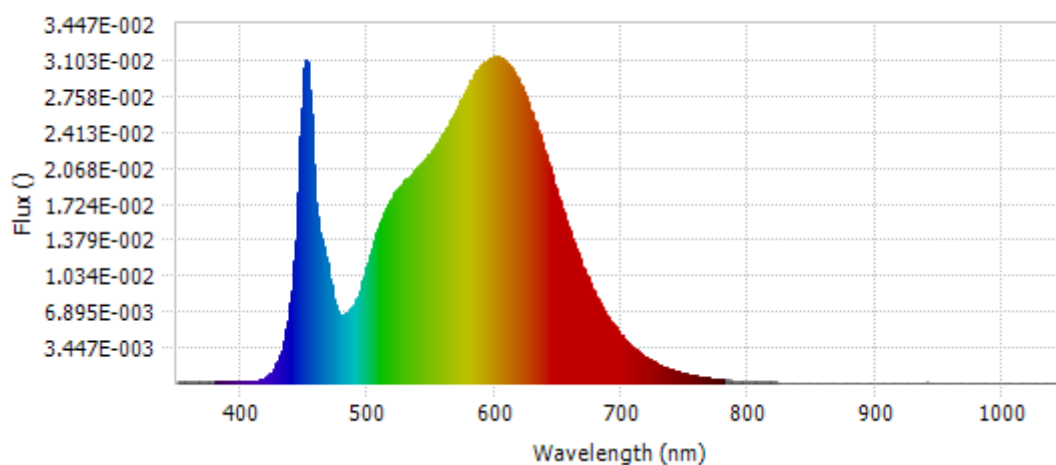
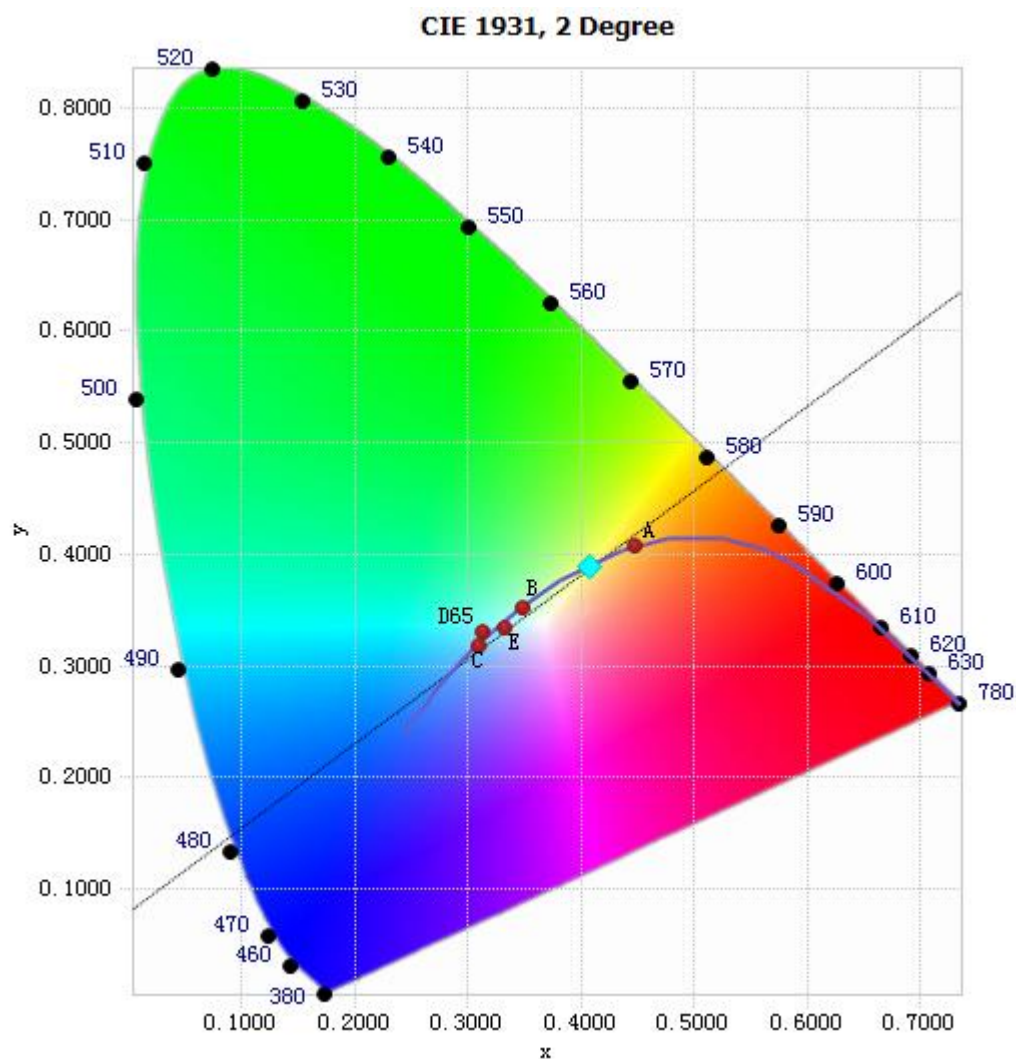


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.41E-04	485	6.97E-03	590	3.06E-02	695	5.35E-03
385	1.35E-04	490	7.74E-03	595	3.11E-02	700	4.58E-03
390	1.30E-04	495	9.44E-03	600	3.13E-02	705	3.92E-03
395	1.36E-04	500	1.16E-02	605	3.11E-02	710	3.33E-03
400	1.18E-04	505	1.36E-02	610	3.07E-02	715	2.84E-03
405	1.20E-04	510	1.54E-02	615	2.99E-02	720	2.43E-03
410	1.99E-04	515	1.70E-02	620	2.86E-02	725	2.07E-03
415	3.36E-04	520	1.79E-02	625	2.73E-02	730	1.77E-03
420	6.28E-04	525	1.89E-02	630	2.56E-02	735	1.50E-03
425	1.25E-03	530	1.96E-02	635	2.39E-02	740	1.27E-03
430	2.40E-03	535	2.01E-02	640	2.20E-02	745	1.08E-03
435	4.60E-03	540	2.07E-02	645	2.00E-02	750	9.21E-04
440	8.86E-03	545	2.15E-02	650	1.79E-02	755	7.91E-04
445	1.83E-02	550	2.21E-02	655	1.60E-02	760	6.79E-04
450	3.02E-02	555	2.30E-02	660	1.43E-02	765	5.65E-04
455	2.59E-02	560	2.40E-02	665	1.26E-02	770	4.90E-04
460	1.60E-02	565	2.52E-02	670	1.10E-02	775	4.23E-04
465	1.31E-02	570	2.62E-02	675	9.57E-03	780	3.59E-04
470	1.01E-02	575	2.75E-02	680	8.35E-03		
475	7.15E-03	580	2.87E-02	685	7.22E-03		
480	6.51E-03	585	2.98E-02	690	6.25E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4067, 0.3885)

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

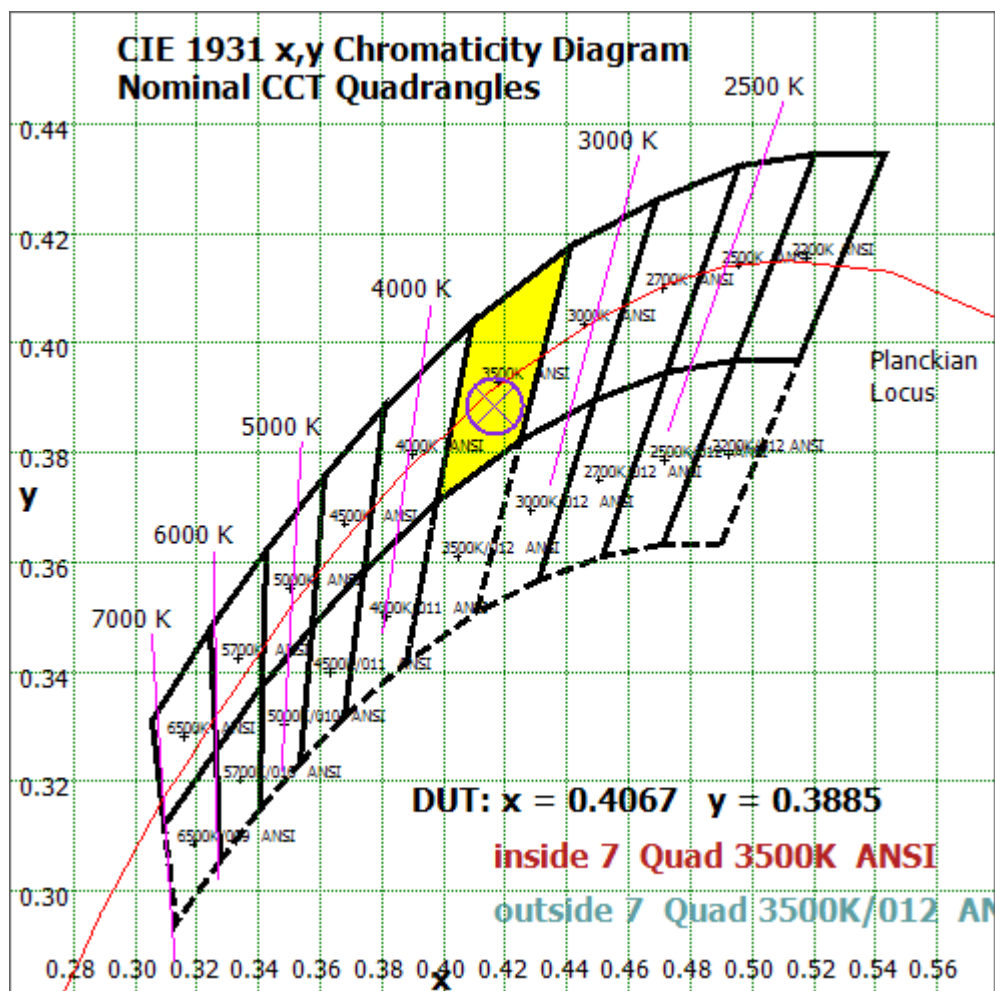


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

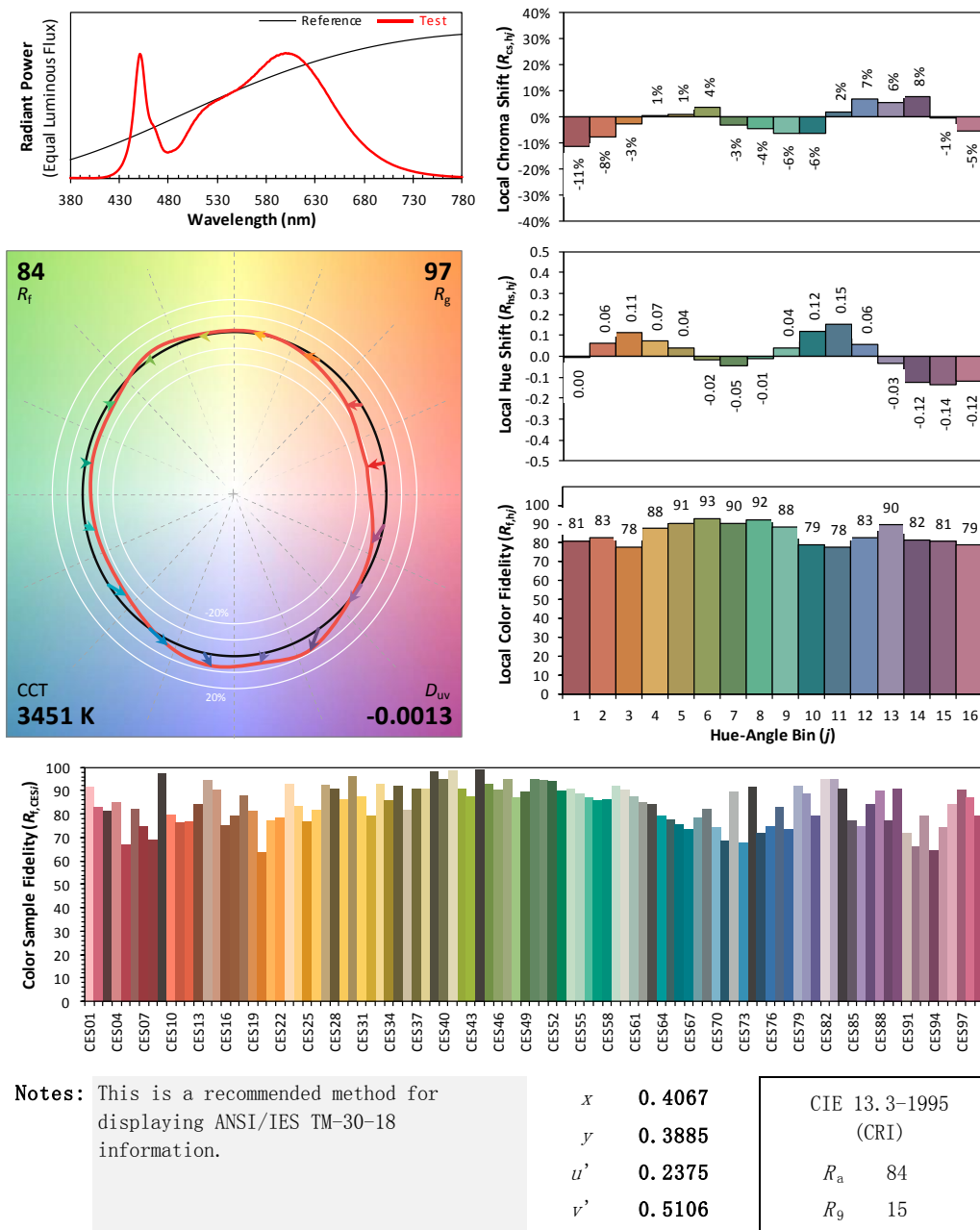
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/03/27

Model: 10T8/4F/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)	0.086
Power Factor	0.9804
Power (W)	10.10
Luminous Efficacy (lm/W)	167.4
Total Luminous Flux (lm)	1690.9
Beam Angle (°)	112.5 (0°-180°) / 212.9 (90°-270°)
Center Beam Candle Power (cd)	294
Maximum Beam Candle Power (cd)	294.7 (At: C=200.0, Gamma=3.5)
Spacing Criteria	1.30 (0°-180°) / 1.43 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	44.26%
Zonal Lumens in the 60 °-90 °Zone	27.01%
Zonal Lumens in the 90 °-120 °Zone	17.45%
Zonal Lumens in the 120 °-180 °Zone	11.27%

Table 10: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	27.846	1.65%
10- 20	80.672	4.77%
20- 30	125.408	7.42%
30- 40	158.051	9.35%
40- 50	176.361	10.43%
50- 60	180.155	10.65%
60- 70	171.224	10.13%
70- 80	153.262	9.06%
80- 90	132.309	7.82%
90-100	114.118	6.75%
100-110	98.071	5.80%
110-120	82.955	4.91%
120-130	68.01	4.02%
130-140	52.54	3.11%
140-150	37.366	2.21%
150-160	22.381	1.32%
160-170	8.675	0.51%
170-180	1.54	0.09%
Total	1690.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	748.493	44.26%
60- 90	456.795	27.01%
0-90	1205.29	71.28%
90- 180	485.656	28.72%
0- 180	1690.9	100%

Table 11: Zonal Lumen

Illuminance Plots- Goniophotometer Method

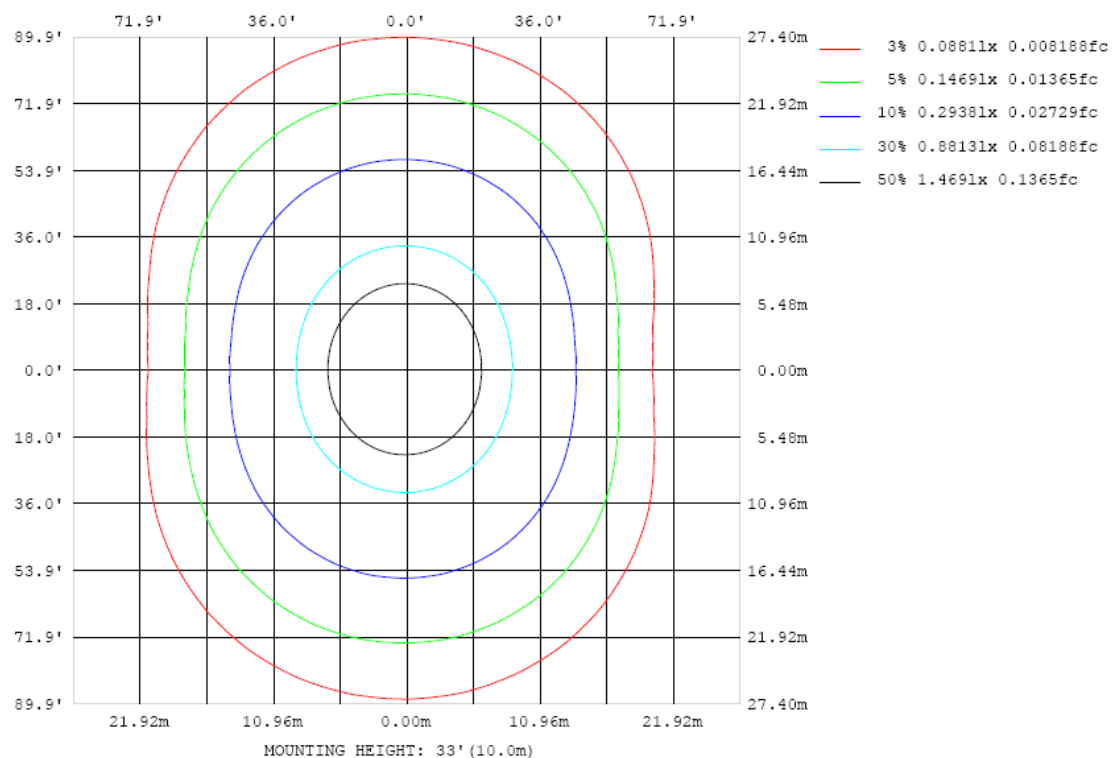


Chart 12: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

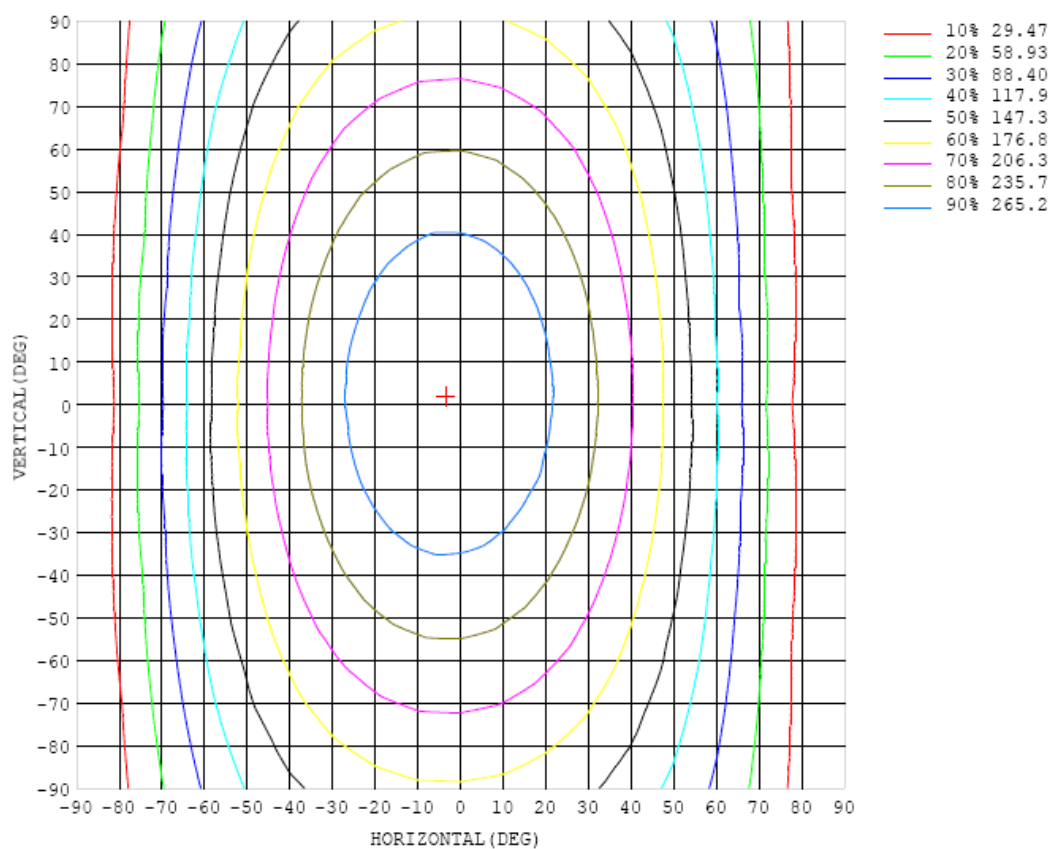


Chart 13: Isocandela Plot

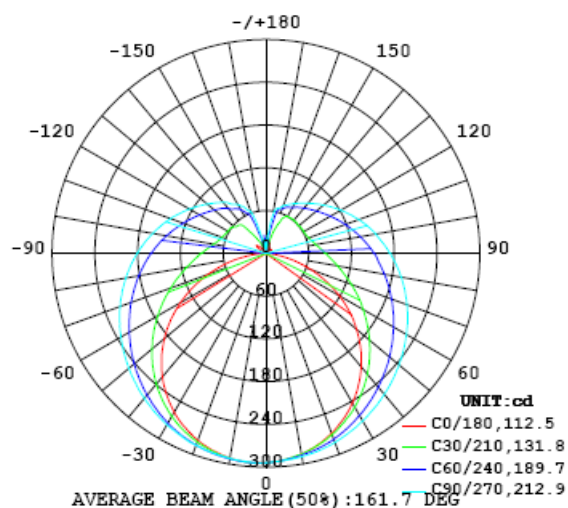


Chart 14: Polar Candela Distribution

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	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294
5	291	291	291	291	291	291	291	291	292	292	292	292	292	292	293	293	294	294	294
10	286	286	286	286	286	287	288	289	289	290	290	291	291	291	291	291	291	291	292
15	279	278	279	279	281	282	283	285	286	287	287	288	288	288	287	286	286	286	287
20	269	268	269	271	274	275	278	280	281	282	283	284	283	283	281	280	279	279	279
25	257	257	258	261	265	267	271	273	276	277	278	278	277	276	274	272	270	269	269
30	242	243	245	249	254	258	262	267	270	271	272	272	270	268	265	262	259	257	258
35	226	227	231	236	242	248	254	259	263	265	266	265	263	259	254	250	246	243	243
40	208	209	214	221	229	237	245	251	256	258	259	258	254	249	243	237	231	227	226
45	188	190	196	206	216	226	236	243	248	251	252	250	245	238	231	222	215	209	207
50	166	169	177	190	202	215	226	235	241	244	244	241	236	228	217	206	197	189	186
55	143	148	158	173	189	204	217	226	233	236	236	233	226	216	204	190	177	168	163
60	119	125	139	157	176	193	207	217	224	228	228	224	216	205	190	174	158	146	139
65	93.2	101	119	142	163	182	197	208	216	219	219	215	206	194	177	157	138	122	113
70	67.5	77.7	101	127	152	171	187	199	207	211	210	206	196	183	164	142	118	97.0	86.5
75	42.4	55.9	83.8	114	140	161	178	190	198	202	201	196	186	172	153	127	98.9	73.0	60.4
80	20.2	37.4	69.7	102	130	153	169	181	189	193	192	187	176	161	141	113	82.0	51.1	35.1
85	4.09	24.7	58.8	91.9	120	143	159	172	180	183	183	177	166	152	130	101	67.9	33.3	13.5
90	0.26	18.5	51.3	83.7	111	134	152	163	171	174	173	168	157	142	120	91.3	57.4	22.0	1.06
95	0.27	15.1	45.8	76.7	104	126	143	155	162	165	164	158	149	133	111	82.9	50.3	17.7	0.67
100	0.48	15.9	42.2	71.2	96.8	118	134	146	154	156	156	150	140	124	103	76.2	46.1	17.8	1.01
105	0.99	18.8	40.8	66.9	90.6	111	126	138	145	148	147	141	131	116	95.6	71.0	44.0	20.4	1.76
110	2.26	22.3	41.4	63.8	85.3	104	118	129	136	139	137	132	122	108	89.3	67.2	43.6	24.4	3.10
115	5.38	26.5	42.9	62.0	80.9	97.6	111	121	127	130	129	123	114	101	84.1	64.4	44.4	29.1	5.48
120	8.94	29.7	43.1	61.4	77.4	92.2	104	113	119	121	120	115	107	94.8	79.7	62.8	45.7	33.8	9.69
125	9.42	27.8	46.9	61.1	74.7	87.4	98.1	106	111	113	112	108	99.9	89.3	76.3	62.0	47.8	37.5	14.6
130	6.75	21.9	49.3	60.2	72.6	83.2	92.5	99.5	104	105	104	101	93.7	84.6	73.6	61.5	50.5	39.2	17.5
135	5.71	21.5	51.1	60.9	70.7	79.8	87.4	93.3	97.1	98.3	97.5	94.0	88.2	80.5	71.3	60.9	53.6	35.3	13.4
140	7.05	25.6	54.0	60.8	68.0	76.7	82.9	87.8	90.9	92.0	91.1	88.2	83.4	77.1	68.8	60.9	55.2	33.5	9.93
145	9.49	22.9	47.5	60.6	67.2	72.9	79.0	82.9	85.4	86.1	85.4	83.1	79.1	73.4	67.7	60.9	53.7	32.9	7.85
150	8.50	10.5	41.4	60.2	66.3	70.7	74.4	78.0	80.2	80.7	80.2	78.3	74.7	71.0	66.0	60.6	52.2	26.6	5.23
155	9.69	5.31	30.8	53.7	63.3	67.9	71.4	73.6	75.1	75.5	75.0	73.8	71.8	68.0	63.5	59.7	46.8	18.7	6.73
160	15.5	8.57	13.2	35.8	55.5	64.1	66.5	68.8	70.7	71.1	70.8	69.2	66.7	64.1	62.1	55.6	36.4	17.6	8.45
165	11.5	8.45	9.75	14.1	30.3	48.9	61.5	65.2	65.6	65.6	65.4	64.7	63.9	61.8	54.5	41.9	25.1	13.7	8.24
170	15.2	7.02	11.0	9.20	9.36	15.4	27.7	41.3	49.9	52.2	52.3	50.7	47.2	41.2	31.3	22.6	16.2	12.2	7.82
175	14.0	9.34	9.85	11.3	10.9	8.83	6.14	5.65	10.7	16.3	16.5	15.5	16.1	15.5	13.7	13.1	11.2	8.74	7.48
180	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17

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	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294		
5	294	294	295	295	295	294	294	294	294	293	293	293	293	292	292	292	292		
10	292	292	292	292	293	293	293	293	292	291	291	290	289	288	288	287	287		
15	287	288	288	289	290	290	290	291	290	289	288	287	285	283	281	280	279		
20	280	281	282	283	285	286	287	287	287	285	284	282	279	276	273	271	270		
25	270	272	274	276	279	282	283	283	282	281	278	275	271	267	263	260	258		
30	258	261	264	268	272	275	277	278	278	276	272	268	263	257	251	247	244		
35	244	248	252	258	263	268	271	273	272	270	266	260	253	246	238	232	228		
40	228	232	239	246	254	260	264	266	266	263	259	252	243	233	224	216	210		
45	209	215	225	234	243	251	256	259	258	256	250	242	232	220	208	198	190		
50	189	197	209	221	232	241	248	251	251	248	242	233	221	207	192	179	169		
55	167	178	192	207	221	231	239	243	243	240	233	223	209	193	176	159	147		
60	144	157	175	193	209	222	230	235	235	232	224	213	198	180	159	139	124		
65	119	136	159	179	197	211	221	226	226	223	215	203	187	166	143	120	99.8		
70	94.6	116	142	166	186	202	211	217	218	214	206	194	176	154	128	101	76.3		
75	70.1	97.1	127	153	175	191	202	208	209	205	197	184	166	143	115	83.6	55.2		
80	48.8	80.0	113	141	164	181	192	199	199	196	188	174	156	132	103	69.9	36.6		
85	31.3	66.9	101	130	153	171	183	189	190	187	179	165	147	122	92.7	59.3	24.0		
90	20.7	56.5	90.8	120	144	161	173	179	181	177	169	156	138	114	84.8	52.1	18.5		
95	14.7	48.6	81.9	111	134	151	163	169	171	168	160	147	129	106	78.3	47.7	17.7		
100	13.5	43.1	74.7	103	125	142	153	160	161	159	151	139	121	99.5	73.5	45.7	19.1		
105	14.7	40.7	69.1	95.2	116	133	144	150	152	149	142	130	114	93.5	69.8	45.2	21.2		
110	16.6	40.2	66.0	89.2	108	124	134	141	142	140	133	122	107	88.4	67.0	45.9	23.7		
115	15.9	39.8	63.5	84.1	102	116	125	131	133	131	125	115	101	84.2	66.1	46.9	24.1		
120	17.1	41.0	61.8	79.7	95.4	108	117	122	124	122	117	108	95.3	80.6	64.8	47.9	26.2		
125	9.72	37.8	61.4	76.3	89.9	101	109	114	116	114	109	101	90.2	77.4	63.9	48.7	26.8		
130	2.19	31.7	58.2	72.8	85.2	94.5	101	106	108	106	102	95.2	85.9	74.3	61.3	47.6	25.1		
135	4.36	25.7	55.4	69.3	80.1	89.1	94.8	98.9	100	99.1	95.5	89.8	81.0	71.0	61.2	40.1	19.1		
140	5.86	22.6	51.3	66.8	74.6	82.3	88.7	92.3	93.5	92.6	89.4	83.3	75.8	68.9	58.8	31.7	13.5		
145	8.77	10.7	33.0	61.5	71.6	76.4	80.3	83.4	84.4	83.8	81.7	78.0	72.9	63.5	52.6	22.0	11.3		
150	12.6	9.65	20.8	50.5	63.6	70.4	75.1	78.1	78.8	78.6	76.5	72.3	66.2	54.2	36.8	13.4	13.3		
155	13.9	13.5	13.0	24.4	52.8	61.7	65.4	69.1	70.7	70.1	67.2	62.7	52.0	42.2	17.1	10.7	15.4		
160	12.0	14.6	9.77	14.2	19.7	37.8	53.1	59.6	61.5	60.8	55.1	44.4	32.5	17.5	7.23	11.6	16.6		
165	10.5	15.8	16.3	12.7	11.5	14.5	16.4	20.9	23.7	23.3	19.2	14.6	9.10	11.2	7.85	12.5	15.7		
170	9.09	11.9	19.4	17.1	15.9	17.6	15.2	13.9	13.2	10.1	12.8	16.0	14.6	10.4	13.2	15.0	17.3		
175	12.9	18.0	12.2	10.5	18.2	22.9	24.1	25.6	0.00	23.6	23.1	19.7	18.4	14.7	15.3	19.2	19.7		
180	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17		

Table 13: Luminous Intensity Data

TEST RESULTS (4000K Setting)

Test ambient temperature was 26.0 °C.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.085	0.041
Power Factor	0.9809	0.9059
Test Power (W)	10.00	10.26
THD A%	17.75	20.67
Luminous Efficacy (lm/W)	168.6	165.1
Total Luminous Flux (lm)	1686.2	1693.5
Color Rendering Index (CRI)	84.7	
R9	19.2	
Correlated Color Temperature (CCT)(K)	3888	
Chromaticity Chroma x	0.3839	
Chromaticity Chroma y	0.3746	
Chromaticity Chroma u	0.2282	
Chromaticity Chroma v	0.3341	
Duv	-0.0020	
Chromaticity Chroma u'	0.2282	
Chromaticity Chroma v'	0.5012	

Special Color Rendering Indices	
R1	84
R2	90.6
R3	94.6
R4	83.8
R5	83.6
R6	86.2
R7	86.7
R8	68
R9	19.2
R10	77
R11	83.2
R12	61.7
R13	85.8
R14	97.1

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

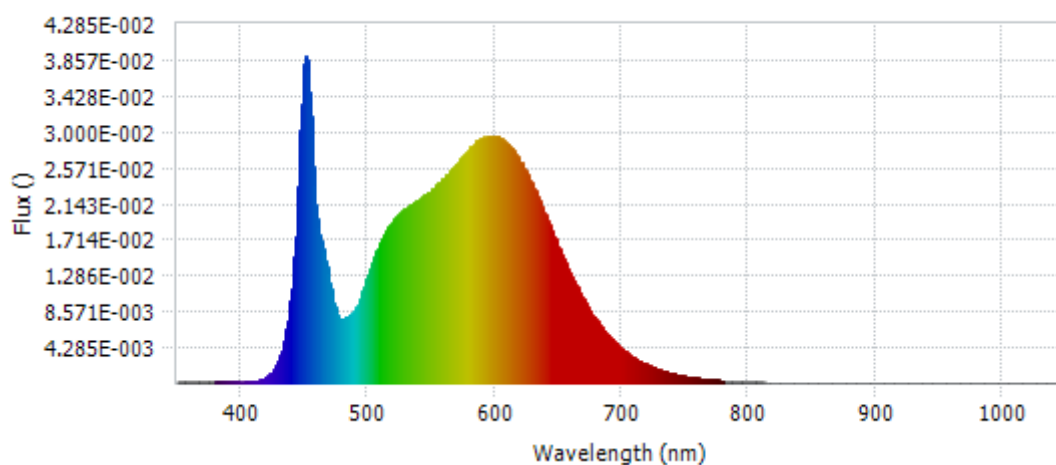
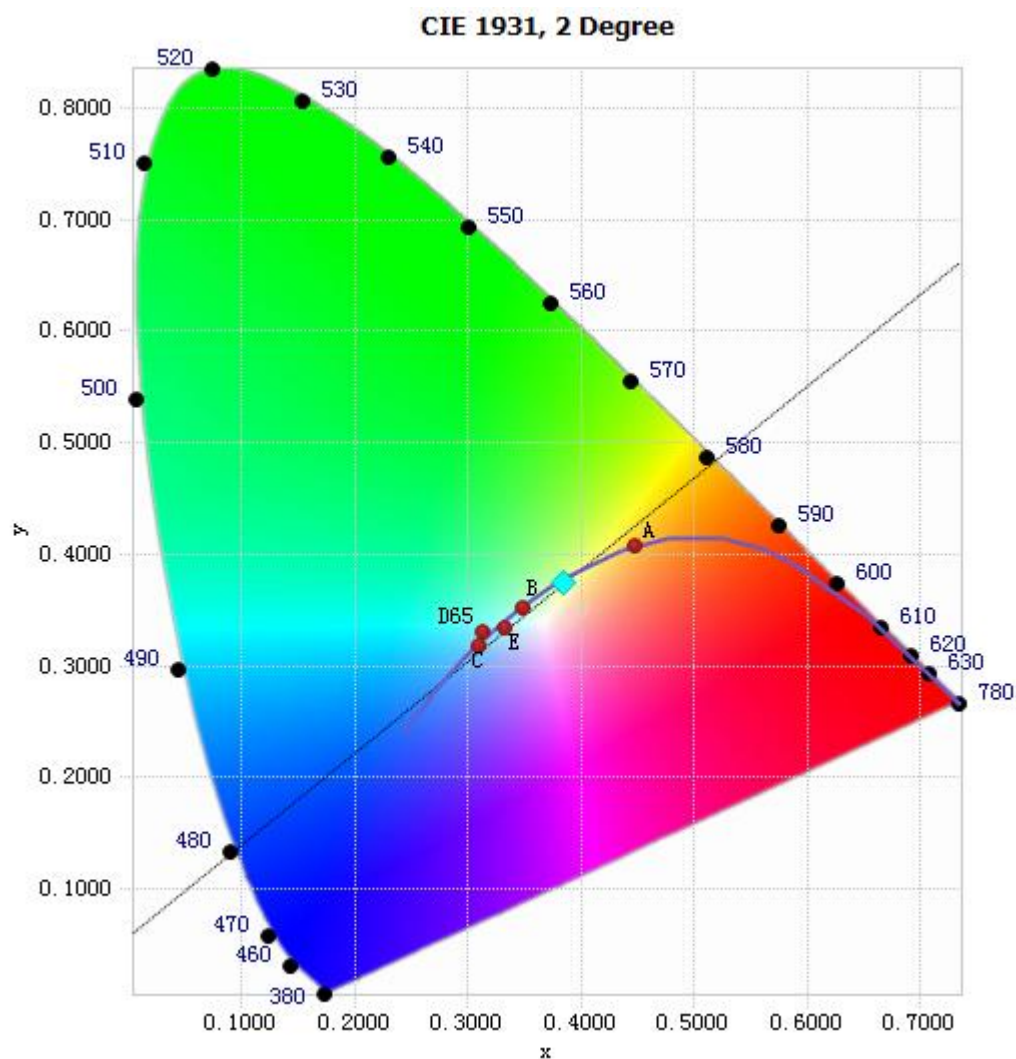


Chart 15: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.79E-04	485	8.04E-03	590	2.93E-02	695	4.86E-03
385	1.68E-04	490	8.87E-03	595	2.95E-02	700	4.17E-03
390	1.66E-04	495	1.06E-02	600	2.95E-02	705	3.56E-03
395	1.44E-04	500	1.29E-02	605	2.92E-02	710	3.03E-03
400	1.40E-04	505	1.51E-02	610	2.85E-02	715	2.58E-03
405	1.28E-04	510	1.68E-02	615	2.77E-02	720	2.21E-03
410	2.17E-04	515	1.85E-02	620	2.64E-02	725	1.88E-03
415	3.82E-04	520	1.94E-02	625	2.51E-02	730	1.60E-03
420	7.74E-04	525	2.02E-02	630	2.35E-02	735	1.37E-03
425	1.50E-03	530	2.09E-02	635	2.19E-02	740	1.16E-03
430	2.91E-03	535	2.14E-02	640	2.01E-02	745	9.90E-04
435	5.76E-03	540	2.19E-02	645	1.82E-02	750	8.43E-04
440	1.13E-02	545	2.25E-02	650	1.64E-02	755	7.27E-04
445	2.34E-02	550	2.30E-02	655	1.46E-02	760	6.12E-04
450	3.80E-02	555	2.37E-02	660	1.30E-02	765	5.32E-04
455	3.19E-02	560	2.45E-02	665	1.15E-02	770	4.51E-04
460	1.97E-02	565	2.54E-02	670	9.96E-03	775	3.89E-04
465	1.60E-02	570	2.62E-02	675	8.70E-03	780	3.27E-04
470	1.21E-02	575	2.71E-02	680	7.56E-03		
475	8.48E-03	580	2.80E-02	685	6.55E-03		
480	7.69E-03	585	2.88E-02	690	5.67E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3839, 0.3746)

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

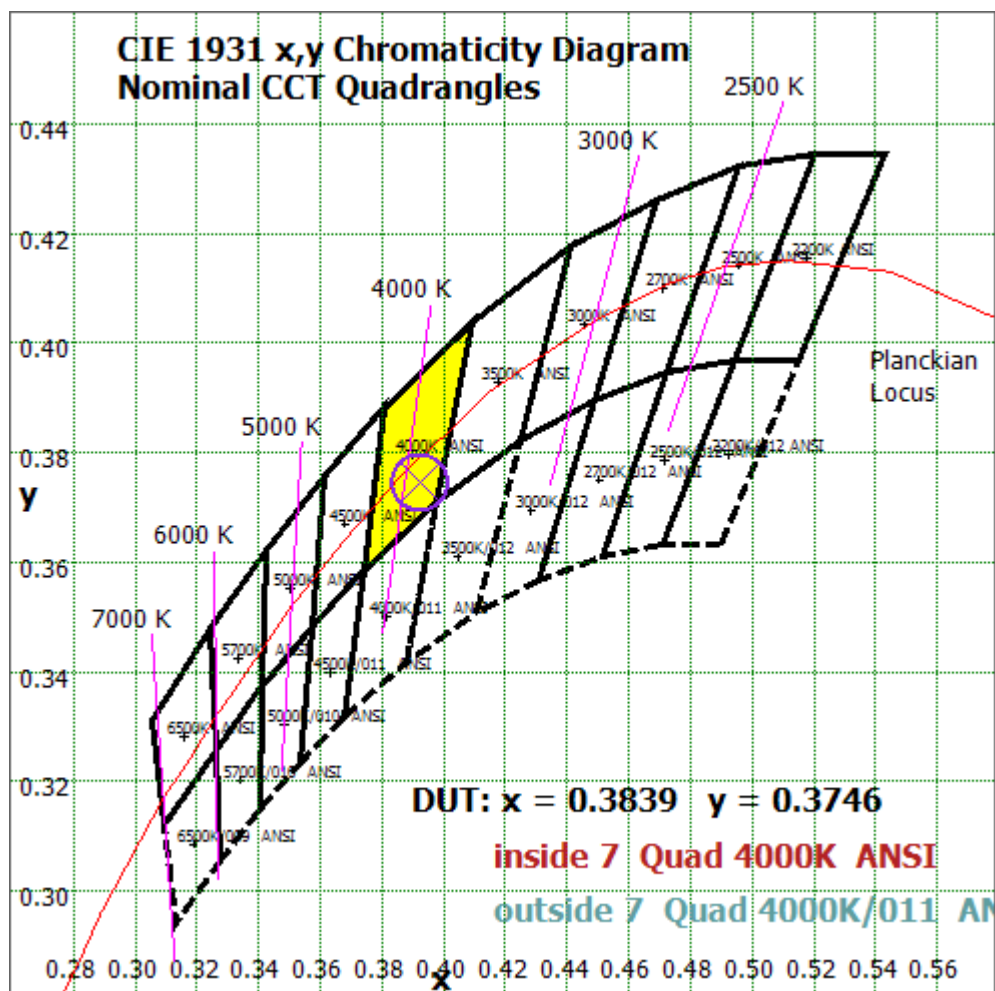


Chart17: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

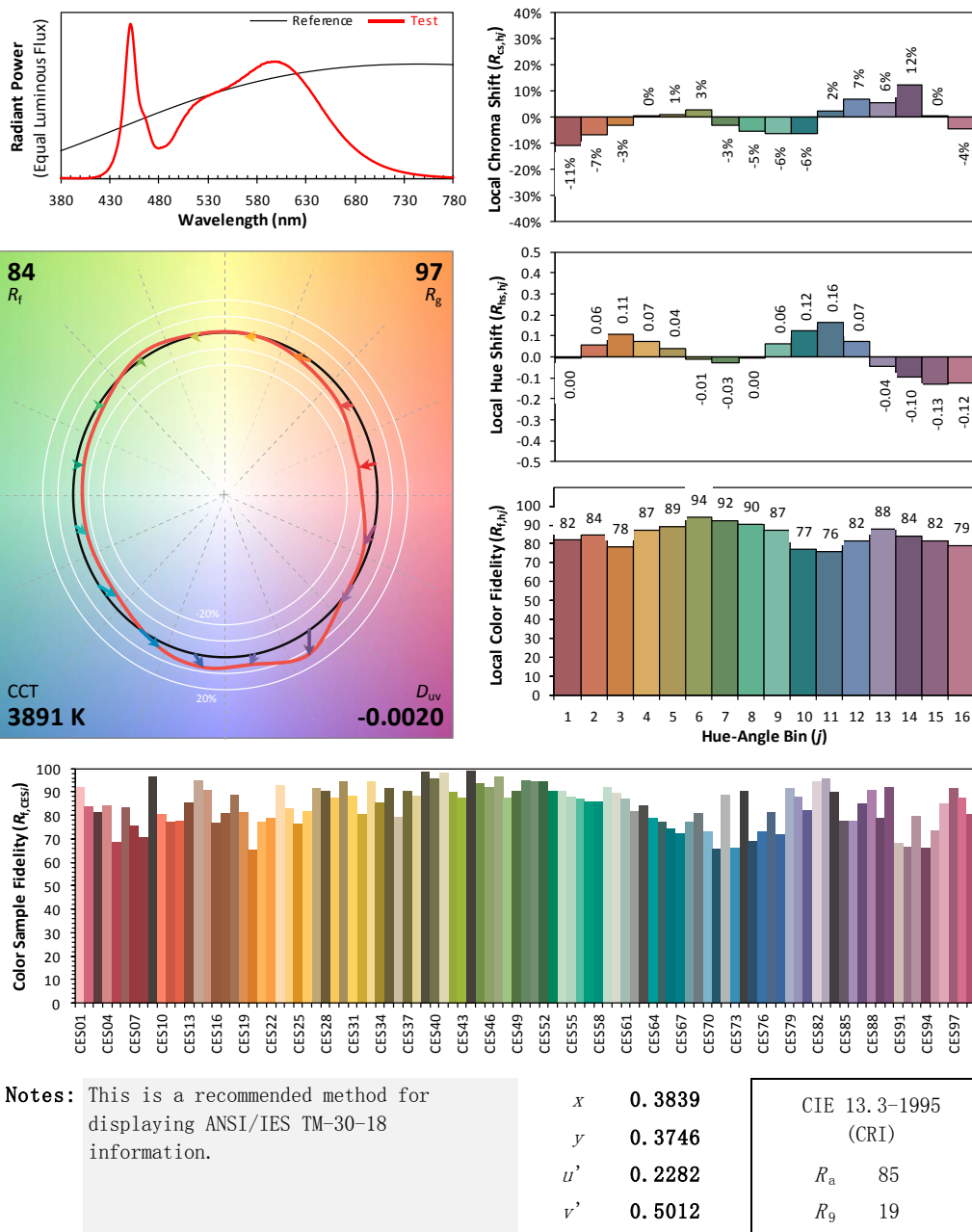
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/03/27

Model: 10T8/4F/8CCTS/UEB



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)	0.085
Power Factor	0.9806
Power (W)	10.03
Luminous Efficacy (lm/W)	169.3
Total Luminous Flux (lm)	1697.6
Beam Angle (°)	112.6 (0°-180°) / 213.4 (90°-270°)
Center Beam Candle Power (cd)	294
Maximum Beam Candle Power (cd)	295.8 (At: C=220.0, Gamma=5.0)
Spacing Criteria	1.30 (0°-180°) / 1.44 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	44.19%
Zonal Lumens in the 60 °-90 °Zone	27.02%
Zonal Lumens in the 90 °-120 °Zone	17.49%
Zonal Lumens in the 120 °-180 °Zone	11.30%

Table 16: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	27.877	1.64%
10- 20	80.787	4.76%
20- 30	125.628	7.40%
30- 40	158.386	9.33%
40- 50	176.846	10.42%
50- 60	180.747	10.65%
60- 70	171.868	10.12%
70- 80	153.903	9.07%
80- 90	132.93	7.83%
90-100	114.749	6.76%
100-110	98.639	5.81%
110-120	83.453	4.92%
120-130	68.483	4.03%
130-140	52.99	3.12%
140-150	37.731	2.22%
150-160	22.683	1.34%
160-170	8.553	0.50%
170-180	1.388	0.08%
Total	1697.6	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	750.271	44.19%
60- 90	458.701	27.02%
0-90	1208.97	71.21%
90- 180	488.669	28.79%
0- 180	1697.6	100%

Table 17: Zonal Lumen

Illuminance Plots- Goniophotometer Method

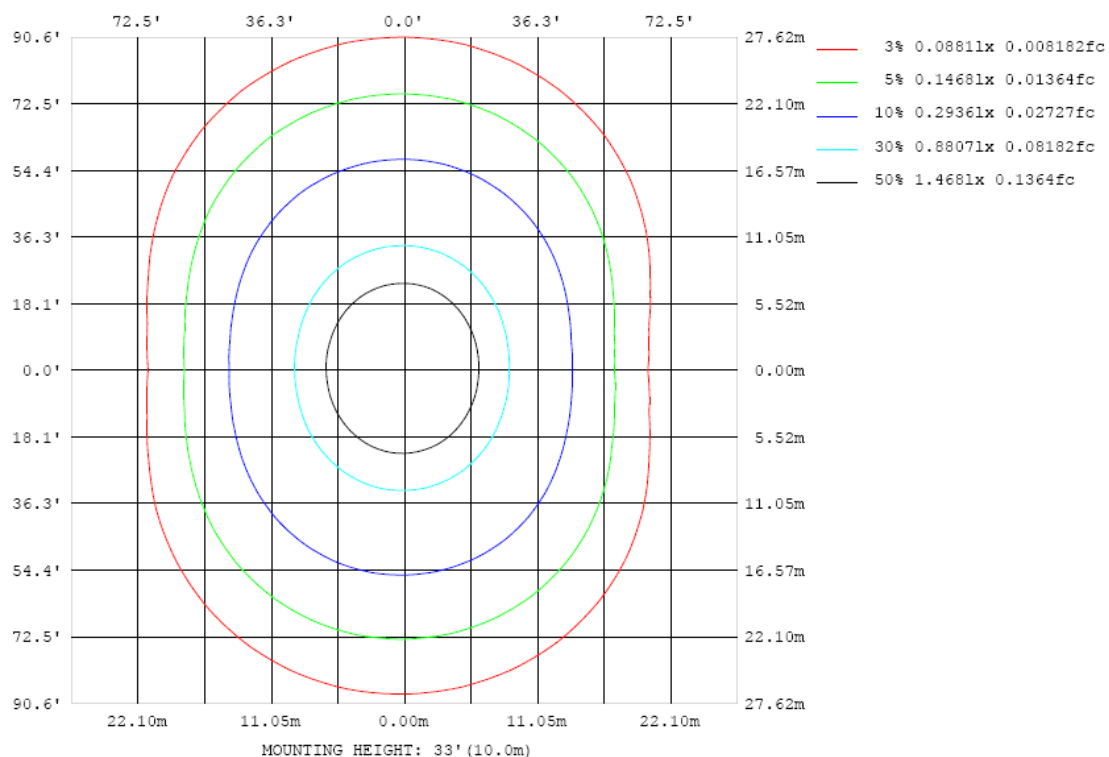


Chart 19: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

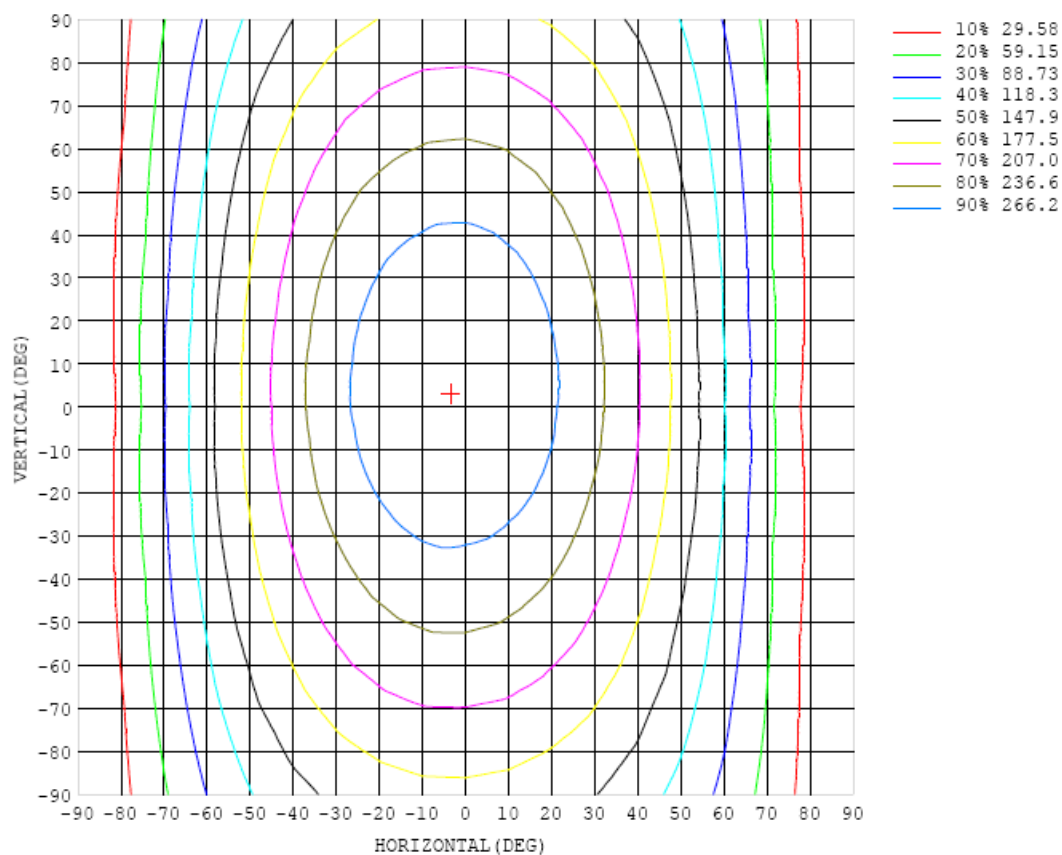


Chart 20: Isocandela Plot

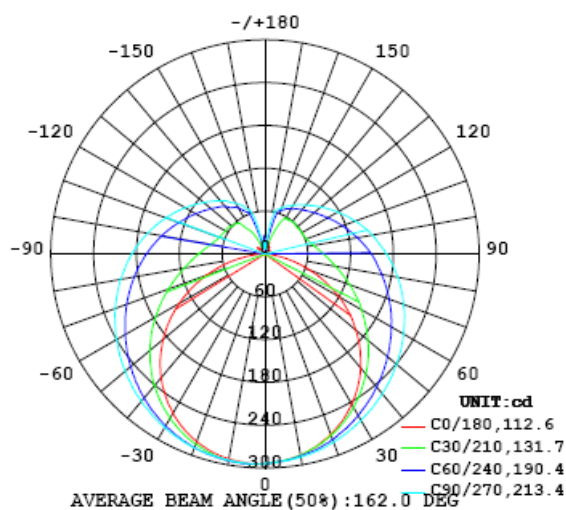


Chart 21: Polar Candela Distribution

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	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294
5	292	291	291	291	291	291	291	291	291	291	292	292	292	293	293	293	294	293	294
10	286	285	285	286	286	287	287	289	288	289	290	290	290	290	290	290	290	291	291
15	279	278	279	279	280	282	283	284	285	286	287	287	287	286	286	285	286	286	287
20	269	269	269	270	273	275	277	278	280	281	282	282	282	281	280	279	279	279	280
25	258	257	258	260	263	266	270	271	273	275	277	276	275	274	272	271	270	269	270
30	243	243	245	248	252	257	261	265	267	269	270	269	268	265	263	261	258	257	258
35	227	227	231	235	240	246	253	257	261	263	263	263	260	257	252	248	245	243	243
40	209	210	214	220	228	236	243	249	253	256	257	255	251	247	241	235	230	227	226
45	188	190	196	204	215	225	234	240	246	248	249	247	242	236	228	220	213	209	207
50	166	169	177	188	201	214	224	231	238	240	241	238	233	225	215	205	195	188	186
55	144	149	158	172	188	202	214	223	229	232	233	230	223	213	202	189	176	167	163
60	119	125	139	156	174	191	204	214	221	224	225	221	213	202	188	172	156	145	139
65	93.5	101	119	141	162	180	195	205	213	216	216	211	203	191	174	156	137	121	113
70	67.6	77.7	100	126	151	169	185	196	204	207	207	202	193	179	161	141	117	96.5	86.6
75	42.5	55.9	83.4	113	139	159	176	187	194	198	198	193	183	168	150	126	97.7	72.3	60.5
80	20.1	37.3	69.0	101	128	150	166	177	186	189	188	183	173	158	138	112	80.6	50.5	35.3
85	4.00	24.6	58.1	90.6	118	141	157	169	176	180	179	173	163	149	127	99.5	66.7	32.7	13.5
90	0.26	18.2	50.3	81.9	110	132	149	160	167	170	170	164	155	139	117	89.2	56.1	21.6	1.04
95	0.24	14.5	44.6	74.8	101	123	140	152	158	161	160	155	145	129	108	80.6	48.9	17.1	0.58
100	0.34	15.2	40.8	69.0	94.3	115	132	143	150	153	152	146	136	120	99.6	73.8	44.6	17.0	0.80
105	0.67	18.0	39.5	64.7	88.2	108	123	134	141	144	143	137	127	112	92.4	68.6	42.4	19.5	1.25
110	1.66	21.3	40.0	61.7	83.0	101	115	126	132	135	134	128	119	105	86.3	64.8	41.9	23.4	2.06
115	4.41	25.4	41.5	60.1	78.6	95.0	108	118	124	126	125	120	111	97.7	81.2	62.2	42.8	27.9	3.67
120	7.69	28.4	41.4	59.4	75.3	89.5	102	110	115	118	117	112	103	91.6	76.9	60.7	44.0	32.6	6.91
125	8.64	24.9	45.5	59.3	72.6	85.0	95.3	103	108	110	109	104	96.8	86.3	73.7	60.0	46.3	36.1	11.3
130	7.32	17.4	47.5	58.0	70.8	81.2	90.0	96.3	101	102	101	97.4	90.8	81.8	71.1	59.3	49.3	36.7	14.1
135	7.08	15.7	49.7	59.2	69.0	77.7	85.2	90.6	94.3	95.5	94.6	91.3	85.6	78.0	69.0	59.3	52.7	30.3	11.9
140	8.57	18.1	51.4	59.3	66.8	74.7	81.0	85.3	88.4	89.4	88.4	85.6	81.0	74.8	66.7	59.5	53.8	26.9	9.97
145	11.1	16.7	41.9	58.4	66.0	71.2	77.1	80.7	83.2	83.8	83.2	80.9	77.0	71.3	66.0	59.1	51.6	24.7	8.34
150	10.9	7.56	31.4	57.8	64.6	69.3	72.8	75.4	78.0	78.7	78.2	75.9	73.0	69.5	63.7	59.5	46.3	17.8	6.02
155	12.5	5.39	19.3	44.5	60.0	66.1	69.9	72.0	73.3	74.0	73.7	72.4	70.0	65.7	62.3	57.0	36.8	12.3	7.34
160	17.8	10.9	8.46	24.3	46.7	60.7	65.2	66.6	68.0	68.5	68.2	66.9	65.1	63.5	59.9	47.1	26.4	12.5	8.17
165	15.4	9.11	9.78	9.26	18.7	33.5	50.9	62.3	64.4	64.4	64.2	63.5	61.7	56.0	45.5	29.8	17.2	9.42	8.85
170	18.3	13.7	7.83	11.2	9.58	9.23	13.4	22.9	34.3	41.9	42.7	40.1	34.5	27.7	21.0	15.4	12.1	8.26	8.53
175	20.1	19.2	11.9	6.78	9.09	10.7	10.1	7.87	7.84	10.1	13.0	14.8	14.3	13.1	11.0	8.67	7.27	10.7	17.8
180	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1

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	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294		
5	295	295	295	296	296	295	295	295	295	294	294	294	293	293	293	292	292		
10	292	293	294	294	294	294	294	294	293	294	293	292	290	289	289	288	287		
15	288	288	290	290	291	292	292	292	292	290	288	286	285	283	281	280			
20	281	282	284	285	287	289	289	289	288	286	284	281	278	275	272	271			
25	271	273	276	279	281	284	285	286	285	282	278	274	269	265	262	259			
30	259	262	266	270	274	278	280	281	281	279	276	271	266	259	253	248	245		
35	245	248	254	260	266	271	274	276	276	274	270	264	256	248	241	234	229		
40	229	233	241	249	257	264	267	270	270	267	263	255	246	236	226	217	212		
45	211	216	226	237	247	255	260	263	263	261	255	246	236	223	211	199	192		
50	190	199	211	224	236	246	252	256	256	253	247	237	224	210	195	181	170		
55	168	179	194	210	224	236	243	248	248	246	238	227	213	196	178	161	148		
60	145	159	177	196	213	226	235	240	240	238	230	217	202	183	162	141	125		
65	120	138	160	183	201	216	225	231	232	229	221	208	191	170	146	121	101		
70	95.7	118	144	169	190	206	216	222	223	220	212	198	180	157	131	102	77.3		
75	71.3	98.3	129	156	179	196	207	213	214	211	202	189	170	146	117	84.9	55.9		
80	49.6	81.3	115	145	168	186	197	204	205	202	193	180	160	135	105	70.7	37.1		
85	31.8	68.0	103	134	158	176	188	194	196	193	184	170	151	126	95.2	60.8	24.5		
90	21.2	58.1	93.0	124	148	166	178	185	186	183	175	161	142	117	87.4	53.6	19.0		
95	15.5	50.4	84.4	115	138	156	168	175	177	174	166	152	134	110	81.1	49.5	18.5		
100	14.3	45.1	77.3	107	129	147	158	165	167	164	157	144	126	103	76.3	47.6	20.2		
105	15.8	42.7	71.7	99.2	121	138	149	156	157	155	147	135	119	97.4	72.7	47.3	23.0		
110	18.1	42.3	68.0	92.9	113	129	139	146	148	146	139	127	112	92.3	70.1	48.0	26.1		
115	17.3	42.4	66.2	87.7	106	120	130	136	139	137	130	120	105	87.9	68.3	49.2	27.3		
120	19.4	43.6	64.6	83.3	99.5	112	122	128	129	128	122	112	99.5	84.1	67.0	50.5	29.8		
125	12.3	42.6	63.9	79.7	93.8	105	113	119	121	119	114	106	94.2	80.9	67.0	51.2	30.6		
130	3.18	37.8	61.0	76.4	88.7	98.6	106	111	112	111	107	99.2	89.7	77.8	64.3	51.2	29.4		
135	4.64	32.6	59.6	72.4	84.0	92.9	98.8	103	104	104	99.7	93.6	85.0	73.9	64.1	45.5	22.3		
140	5.67	30.3	56.5	69.4	77.9	87.0	92.5	96.0	97.3	96.7	93.5	87.7	79.1	71.7	62.7	40.2	14.5		
145	7.08	15.0	42.7	65.9	74.1	79.4	83.7	87.7	89.2	88.4	85.0	81.1	75.9	66.7	56.7	31.9	9.93		
150	11.1	8.68	32.3	57.5	67.6	74.5	78.6	81.3	82.2	81.8	79.9	76.2	70.5	60.4	45.1	20.7	11.4		
155	14.1	12.8	16.4	39.0	61.4	66.0	70.1	73.9	75.1	75.0	72.1	67.0	59.0	50.0	28.2	12.1	13.6		
160	15.2	13.1	9.78	17.6	32.7	53.4	63.1	66.2	66.9	67.5	63.8	53.5	43.4	28.2	10.4	9.40	15.0		
165	14.6	16.3	13.9	9.69	14.6	17.3	25.0	32.9	37.3	37.0	31.0	24.2	16.1	7.99	11.3	7.77	15.6		
170	11.9	19.5	16.7	16.3	16.2	11.6	11.2	12.0	12.7	9.38	8.08	9.11	13.3	14.7	9.92	13.3	15.0		
175	13.2	10.6	17.7	24.7	25.4	20.9	16.5	13.4	7.28	4.89	11.0	13.3	18.6	19.8	19.0	15.8	15.5		
180	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1		

Table 19: Luminous Intensity Data

TEST RESULTS (5000K Setting)

Test ambient temperature was 26.0 °C.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.086	0.041
Power Factor	0.9805	0.9069
Test Power (W)	10.07	10.31
THD A%	17.96	20.34
Luminous Efficacy (lm/W)	166.3	163.2
Total Luminous Flux (lm)	1675.1	1682.1
Color Rendering Index (CRI)	84.2	
R9	17.5	
Correlated Color Temperature (CCT)(K)	5001	
Chromaticity Chroma x	0.3449	
Chromaticity Chroma y	0.3508	
Chromaticity Chroma u	0.2116	
Chromaticity Chroma v	0.3228	
Duv	-0.0003	
Chromaticity Chroma u'	0.2116	
Chromaticity Chroma v'	0.4843	

Special Color Rendering Indices	
R1	83.6
R2	88.9
R3	91.6
R4	84.6
R5	83.8
R6	83.5
R7	87.4
R8	70.5
R9	17.5
R10	72.8
R11	84.1
R12	60.2
R13	85.1
R14	95.4

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

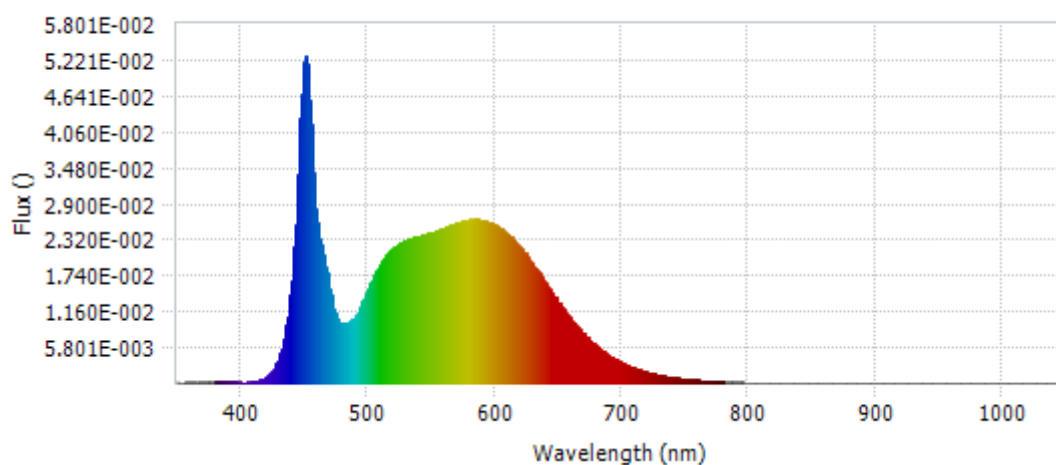
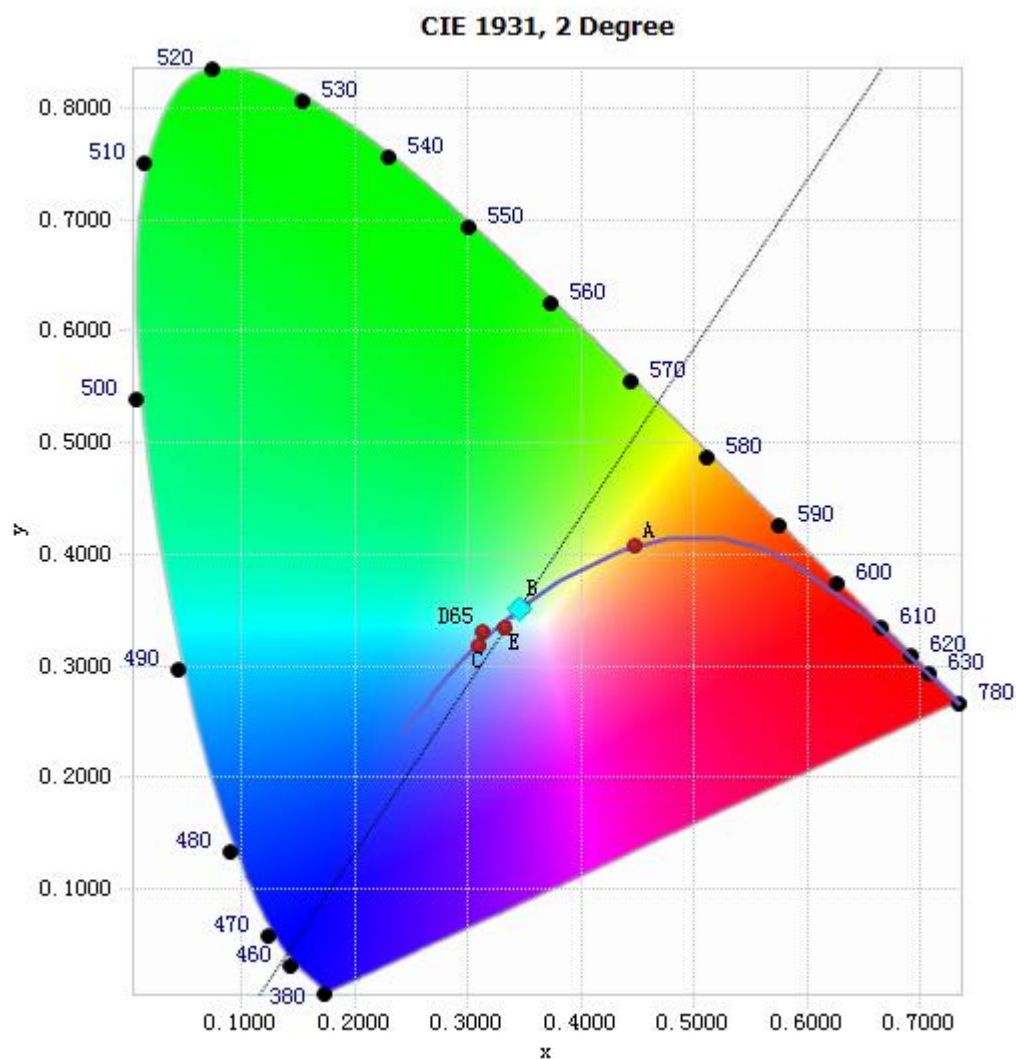


Chart 22: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.05E-04	485	9.86E-03	590	2.64E-02	695	3.88E-03
385	2.08E-04	490	1.08E-02	595	2.61E-02	700	3.33E-03
390	1.82E-04	495	1.27E-02	600	2.56E-02	705	2.85E-03
395	1.85E-04	500	1.52E-02	605	2.50E-02	710	2.44E-03
400	1.64E-04	505	1.74E-02	610	2.42E-02	715	2.08E-03
405	1.63E-04	510	1.92E-02	615	2.31E-02	720	1.76E-03
410	2.57E-04	515	2.09E-02	620	2.19E-02	725	1.52E-03
415	5.24E-04	520	2.18E-02	625	2.07E-02	730	1.29E-03
420	1.03E-03	525	2.26E-02	630	1.92E-02	735	1.11E-03
425	2.11E-03	530	2.31E-02	635	1.77E-02	740	9.44E-04
430	4.19E-03	535	2.33E-02	640	1.62E-02	745	7.96E-04
435	8.31E-03	540	2.37E-02	645	1.46E-02	750	6.89E-04
440	1.64E-02	545	2.41E-02	650	1.31E-02	755	5.90E-04
445	3.37E-02	550	2.43E-02	655	1.17E-02	760	5.00E-04
450	5.20E-02	555	2.47E-02	660	1.04E-02	765	4.34E-04
455	4.17E-02	560	2.51E-02	665	9.13E-03	770	3.75E-04
460	2.60E-02	565	2.55E-02	670	7.96E-03	775	3.12E-04
465	2.08E-02	570	2.58E-02	675	6.93E-03	780	2.73E-04
470	1.52E-02	575	2.61E-02	680	6.07E-03		
475	1.07E-02	580	2.62E-02	685	5.23E-03		
480	9.60E-03	585	2.65E-02	690	4.52E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3449, 0.3508)

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

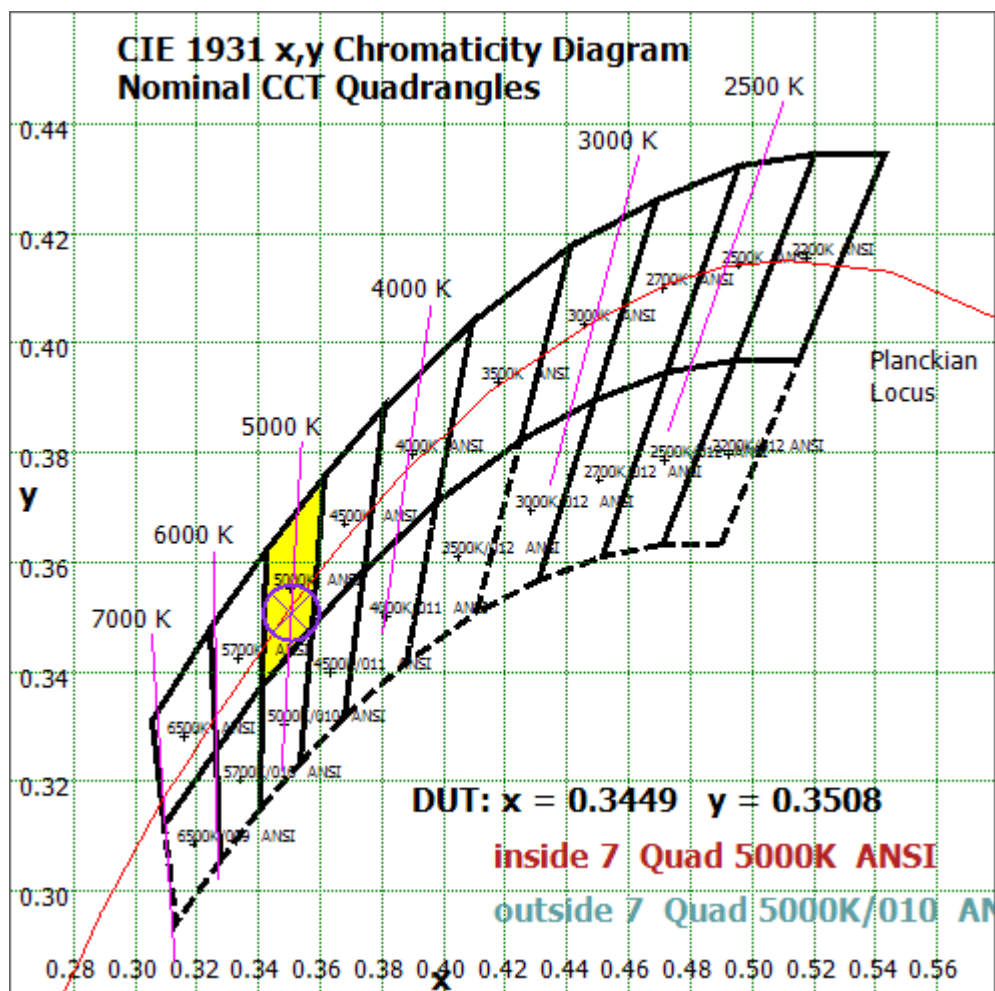


Chart 24: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

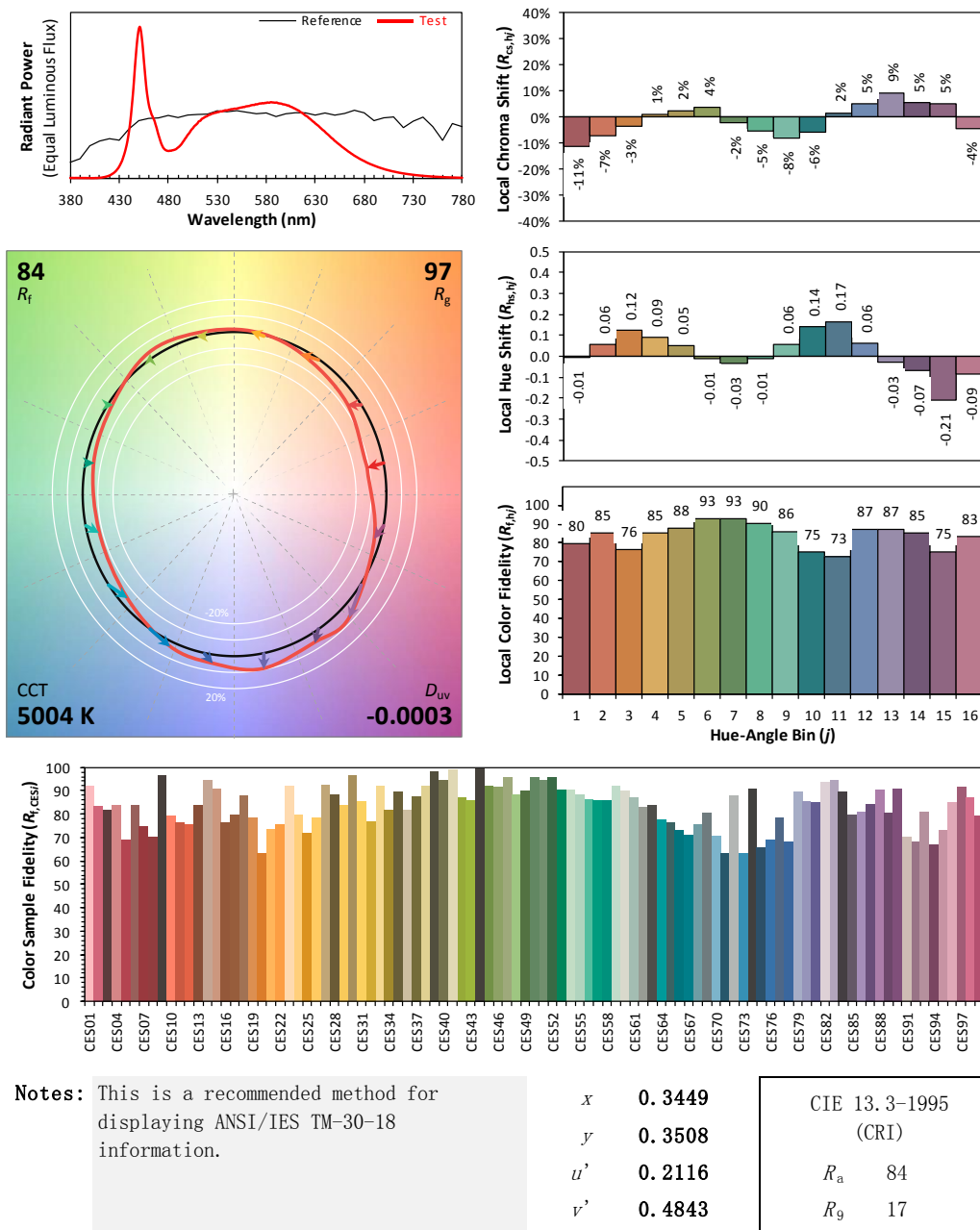
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/03/27

Model: 10T8/4F/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)	0.086
Power Factor	0.9803
Power (W)	10.10
Luminous Efficacy (lm/W)	167.2
Total Luminous Flux (lm)	1689.0
Beam Angle (°)	112.7 (0°-180°) / 214.4 (90°-270°)
Center Beam Candle Power (cd)	291
Maximum Beam Candle Power (cd)	293.0 (At: C=240.0, Gamma=5.0)
Spacing Criteria	1.30 (0°-180°) / 1.44 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	44.07%
Zonal Lumens in the 60 °-90 °Zone	27.04%
Zonal Lumens in the 90 °-120 °Zone	17.55%
Zonal Lumens in the 120 °-180 °Zone	11.34%

Table 22: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	27.618	1.64%
10- 20	80.052	4.74%
20- 30	124.526	7.37%
30- 40	157.114	9.30%
40- 50	175.529	10.39%
50- 60	179.564	10.63%
60- 70	170.92	10.12%
70- 80	153.243	9.07%
80- 90	132.531	7.85%
90-100	114.512	6.78%
100-110	98.475	5.83%
110-120	83.356	4.94%
120-130	68.401	4.05%
130-140	52.915	3.13%
140-150	37.669	2.23%
150-160	22.646	1.34%
160-170	8.545	0.51%
170-180	1.392	0.08%
Total	1689.0	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	744.403	44.07%
60- 90	456.694	27.04%
0-90	1201.1	71.11%
90- 180	487.911	28.89%
0- 180	1689.0	100%

Table 23: Zonal Lumen

Illuminance Plots- Goniophotometer Method

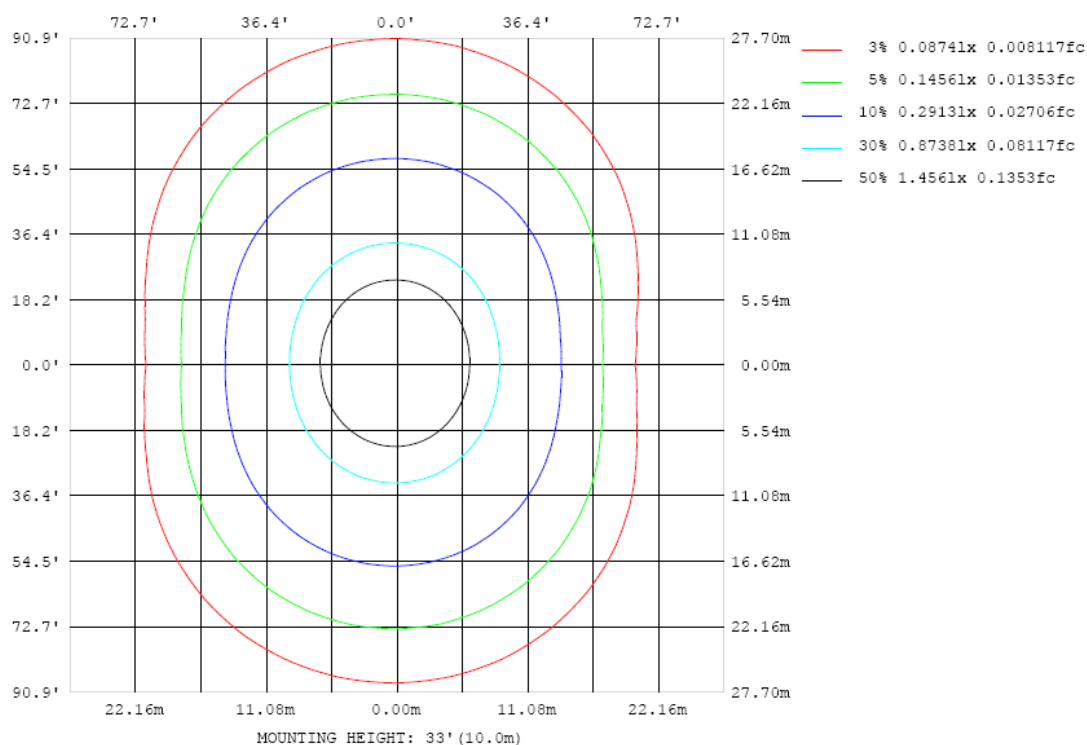


Chart 26: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

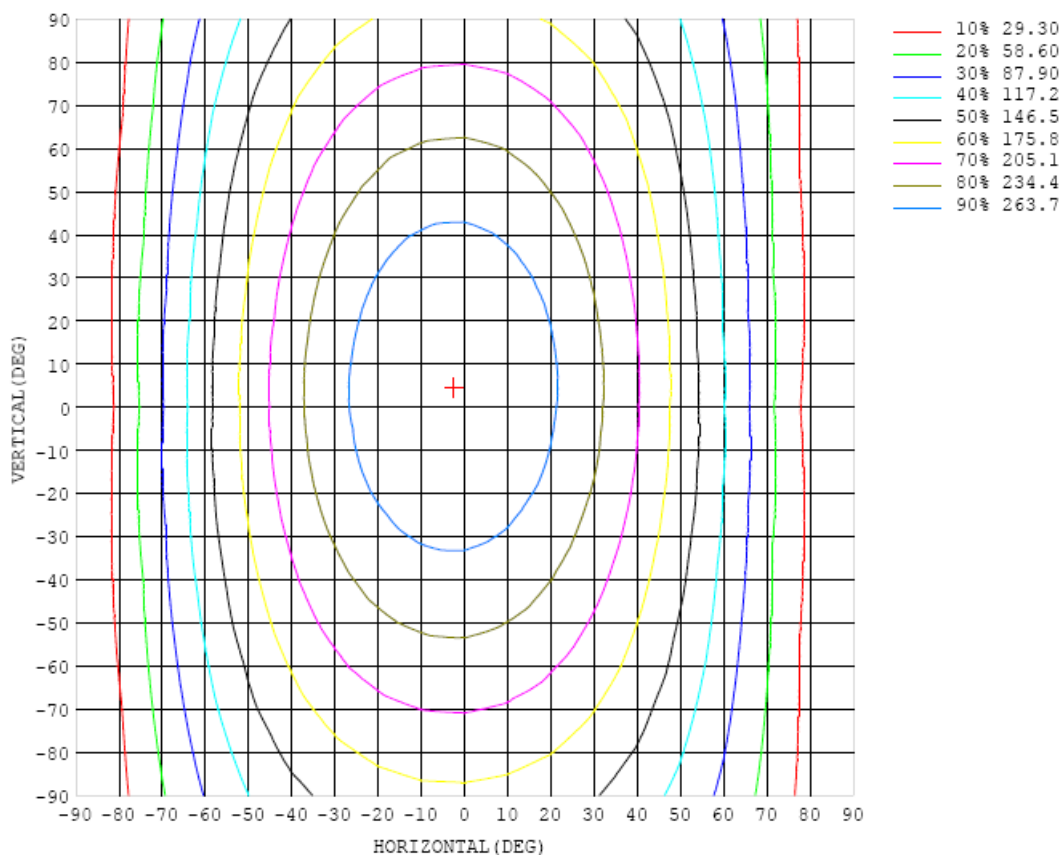


Chart 27: Isocandela Plot

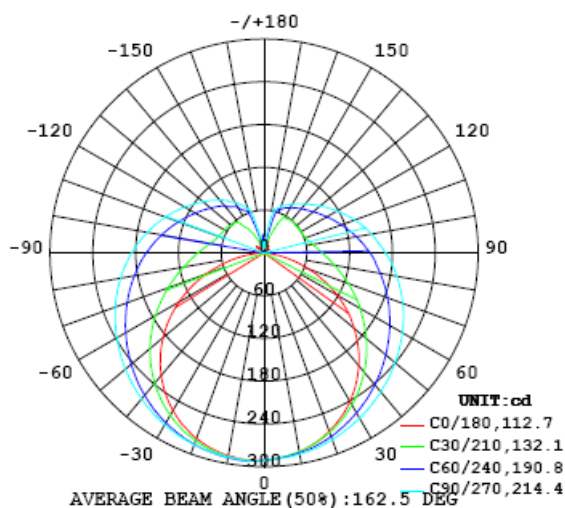


Chart 28: Polar Candela Distribution

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	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
5	289	288	288	288	288	288	288	288	289	289	289	290	290	290	290	290	290	291	291
10	283	283	283	283	284	284	285	286	287	287	287	288	288	288	288	288	288	288	289
15	276	276	276	276	278	279	280	282	283	283	284	284	285	284	284	283	283	283	284
20	267	266	267	268	270	272	274	276	278	279	279	280	279	279	278	277	276	276	277
25	255	254	256	258	261	264	267	270	272	273	274	274	273	272	271	269	267	267	268
30	241	241	243	246	250	254	259	263	266	268	268	268	266	264	262	259	257	255	255
35	224	225	228	233	238	245	251	256	259	261	262	261	258	255	251	247	244	241	241
40	206	207	212	218	226	234	242	248	252	255	255	254	250	245	240	234	229	225	225
45	186	188	194	203	213	223	232	240	245	247	248	246	241	235	227	219	212	207	206
50	165	168	176	187	200	212	223	231	237	240	240	237	232	224	214	204	194	187	185
55	143	147	157	171	186	201	213	223	229	232	232	229	222	213	201	188	175	166	162
60	118	124	138	155	173	190	203	214	221	224	223	220	213	202	188	171	156	144	138
65	92.8	100	118	140	160	179	194	205	212	215	215	211	203	191	174	156	136	120	112
70	67.0	76.9	99.4	126	149	168	184	196	203	207	206	202	193	179	161	141	116	96.0	86.0
75	42.1	55.2	82.6	112	138	158	175	187	194	198	197	192	183	168	150	126	97.5	72.1	60.0
80	19.9	36.9	68.5	100	127	150	166	178	185	189	188	183	173	158	138	112	80.8	50.4	35.2
85	3.96	24.3	57.7	90.2	118	140	157	169	176	180	179	173	163	149	127	99.6	66.8	32.7	13.3
90	0.25	18.0	50.1	81.7	109	131	149	160	167	171	169	164	155	139	117	89.5	56.3	21.6	1.04
95	0.24	14.4	44.5	74.6	101	123	140	152	158	161	160	156	145	130	108	81.0	49.2	17.2	0.59
100	0.34	15.2	40.8	69.1	94.2	115	131	143	150	153	152	146	136	121	100.0	74.2	44.8	17.1	0.81
105	0.67	18.0	39.5	64.9	88.1	108	123	134	141	144	143	137	127	113	92.8	68.9	42.6	19.6	1.26
110	1.64	21.4	40.1	61.9	83.0	101	115	126	132	135	134	129	119	105	86.7	65.1	42.2	23.6	2.07
115	4.40	25.5	41.7	60.3	78.6	95.0	108	118	124	126	125	120	111	98.0	81.5	62.4	43.0	28.1	3.75
120	7.75	28.6	41.6	59.6	75.3	89.6	101	110	116	118	117	112	104	92.0	77.4	60.9	44.4	32.9	6.84
125	8.78	25.4	45.6	59.5	72.7	85.0	95.4	103	108	110	109	104	97.0	86.8	74.0	60.3	46.4	36.4	11.2
130	7.43	17.8	47.7	58.5	70.7	81.1	90.1	96.8	101	103	101	97.6	91.1	82.2	71.6	59.7	49.5	37.2	14.1
135	7.17	15.8	49.8	59.4	69.0	77.8	85.1	90.9	94.5	95.9	94.8	91.3	85.9	78.2	69.3	59.4	52.8	30.8	11.9
140	8.57	18.2	52.1	59.4	66.7	74.7	81.0	85.7	88.5	89.7	88.7	85.8	81.3	75.0	66.9	59.7	54.1	27.2	9.98
145	11.1	17.1	42.6	58.5	65.9	71.1	77.2	80.9	83.1	84.1	83.3	81.0	77.3	71.6	66.2	59.3	52.1	25.2	8.38
150	11.2	7.90	32.0	57.9	64.5	69.2	72.8	75.8	78.2	79.0	78.3	76.1	73.2	69.7	63.9	59.6	47.1	18.5	5.79
155	11.7	4.62	20.0	45.0	60.0	66.2	69.9	72.2	73.5	74.1	73.6	72.4	70.2	66.0	62.4	57.4	37.7	12.8	7.06
160	17.7	10.9	8.86	24.9	47.0	60.6	65.3	66.8	68.1	68.7	68.3	67.0	65.2	63.6	60.3	48.1	27.0	12.5	8.05
165	15.2	8.00	9.81	9.69	19.3	34.2	51.8	62.6	64.4	64.5	64.2	63.6	62.2	57.0	46.6	31.0	17.6	9.91	8.95
170	18.5	13.0	8.01	11.1	9.26	9.71	13.6	23.8	35.9	43.2	43.8	41.5	36.0	28.4	21.8	15.5	12.3	8.18	8.27
175	20.5	18.3	11.0	8.06	9.75	10.9	10.1	7.64	7.47	9.71	12.6	14.5	14.3	13.3	11.4	9.01	7.14	9.85	17.3
180	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7

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	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291		
5	291	292	292	292	293	293	293	292	292	292	292	291	291	291	290	289	289		
10	289	290	291	291	291	292	291	291	291	290	290	289	288	286	286	286	284		
15	285	286	286	287	288	289	290	289	289	288	287	285	283	281	280	279	277		
20	278	279	280	282	284	286	287	287	286	285	283	281	278	275	272	270	268		
25	269	270	273	276	279	281	283	283	283	281	279	275	271	267	263	259	256		
30	257	259	263	267	272	275	278	279	279	276	273	268	263	257	251	246	243		
35	243	246	252	258	264	269	273	273	273	271	267	261	254	246	238	232	227		
40	227	231	239	247	254	261	266	268	267	265	260	253	244	234	224	215	209		
45	209	215	225	234	244	252	258	261	261	258	252	244	233	221	209	198	190		
50	189	197	209	222	234	243	250	253	254	251	244	235	222	208	193	179	169		
55	167	178	193	208	222	234	242	246	246	243	236	226	211	195	177	160	147		
60	144	157	176	195	211	224	233	238	238	235	228	216	200	181	160	140	123		
65	120	137	159	181	200	214	224	230	230	227	219	206	190	169	145	120	99.9		
70	94.6	117	143	168	189	204	216	221	222	218	210	197	179	156	130	101	76.5		
75	70.8	97.7	128	155	178	194	206	212	213	210	201	188	169	145	116	84.4	55.4		
80	49.2	80.8	114	144	167	185	197	203	204	201	192	178	159	135	105	70.6	36.9		
85	31.6	67.6	103	133	157	175	187	194	195	192	183	169	150	125	94.8	60.6	24.5		
90	21.1	57.7	92.7	123	147	165	178	184	185	182	174	160	141	117	87.0	53.5	19.1		
95	15.4	50.1	84.1	114	138	156	168	174	176	173	165	151	133	109	80.8	49.3	18.5		
100	14.2	44.8	77.0	106	129	146	158	165	166	164	156	143	125	103	76.1	47.4	20.3		
105	15.6	42.5	71.4	98.4	120	137	148	155	157	154	147	135	118	97.1	72.4	47.1	22.9		
110	17.9	42.1	67.6	92.3	112	128	139	146	147	145	138	127	111	91.9	69.7	47.8	26.1		
115	16.6	42.2	66.0	87.2	105	119	130	136	138	136	129	119	105	87.5	68.0	49.0	27.0		
120	19.4	43.4	64.3	82.8	99.1	112	121	127	129	127	121	112	99.0	83.8	67.6	50.3	29.5		
125	11.6	42.3	63.7	79.3	93.3	105	113	118	120	119	113	105	93.8	80.6	66.7	51.1	30.4		
130	2.95	36.5	60.5	76.0	88.4	98.0	106	110	112	110	106	98.7	89.2	77.5	64.0	50.9	29.0		
135	4.57	33.5	59.8	71.9	83.5	92.2	98.6	103	104	103	99.2	93.1	84.6	73.6	63.9	45.0	21.8		
140	5.54	30.1	55.3	68.5	77.5	86.4	92.4	95.8	96.8	96.1	93.0	87.3	78.6	71.3	62.1	39.3	13.6		
145	7.02	14.1	43.3	66.3	74.0	79.0	83.5	87.2	88.9	87.6	84.6	80.7	75.6	66.7	56.4	31.3	9.53		
150	11.1	8.42	31.7	57.5	67.2	73.4	78.5	81.2	81.9	81.4	79.6	75.6	70.0	60.0	44.3	19.9	11.4		
155	14.2	13.1	15.9	38.0	61.7	65.7	68.9	72.6	74.0	73.5	71.2	67.1	59.0	49.3	26.9	11.7	13.9		
160	15.0	13.2	9.78	17.0	31.7	52.4	62.7	66.4	67.8	67.7	63.4	52.9	42.4	26.8	10.4	9.27	14.9		
165	14.4	16.2	14.4	9.73	14.3	16.4	23.9	31.5	35.8	35.5	29.7	23.0	14.8	7.94	11.5	7.14	15.5		
170	12.6	19.3	17.2	16.1	16.5	11.8	11.2	12.1	12.7	9.40	7.87	9.45	13.7	14.2	10.1	13.1	14.6		
175	14.2	10.4	16.2	24.2	26.3	22.3	17.4	13.9	7.44	4.81	11.3	14.1	19.8	19.6	18.1	15.3	15.8		
180	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7		

Table 25: Luminous Intensity Data

TEST RESULTS (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)	0.085	0.041
Power Factor	0.9807	0.9061
Test Power (W)	10.00	10.26
THD A%	17.91	20.96
Luminous Efficacy (lm/W)	165.9	162.4
Total Luminous Flux (lm)	1659.3	1666.0
Color Rendering Index (CRI)	82.4	
R9	8.7	
Correlated Color Temperature (CCT)(K)	6322	
Chromaticity Chroma x	0.3156	
Chromaticity Chroma y	0.3327	
Chromaticity Chroma u	0.1985	
Chromaticity Chroma v	0.3138	
Duv	0.0036	
Chromaticity Chroma u'	0.1985	
Chromaticity Chroma v'	0.4707	

Special Color Rendering Indices	
R1	80.8
R2	86.4
R3	89.1
R4	82.7
R5	81.3
R6	80.2
R7	88.3
R8	70.7
R9	8.7
R10	66.9
R11	81.8
R12	53.8
R13	82.4
R14	94.3

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

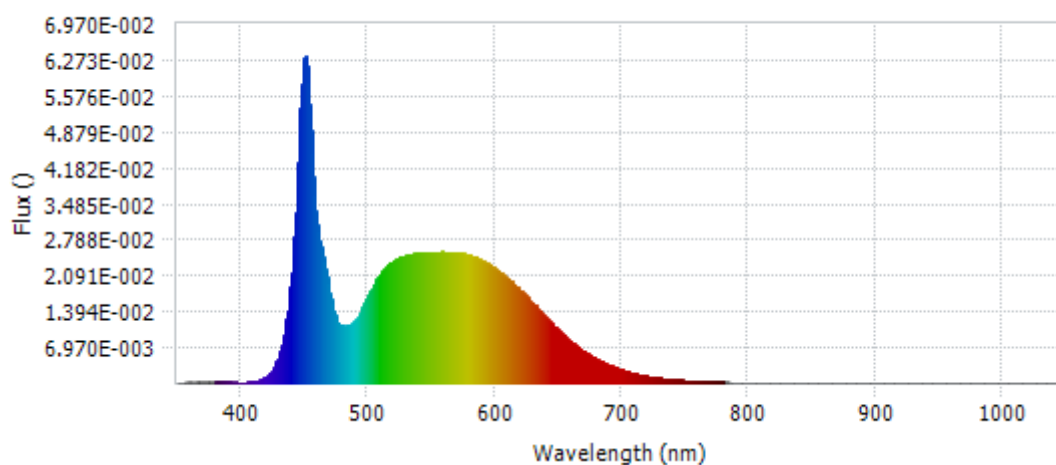
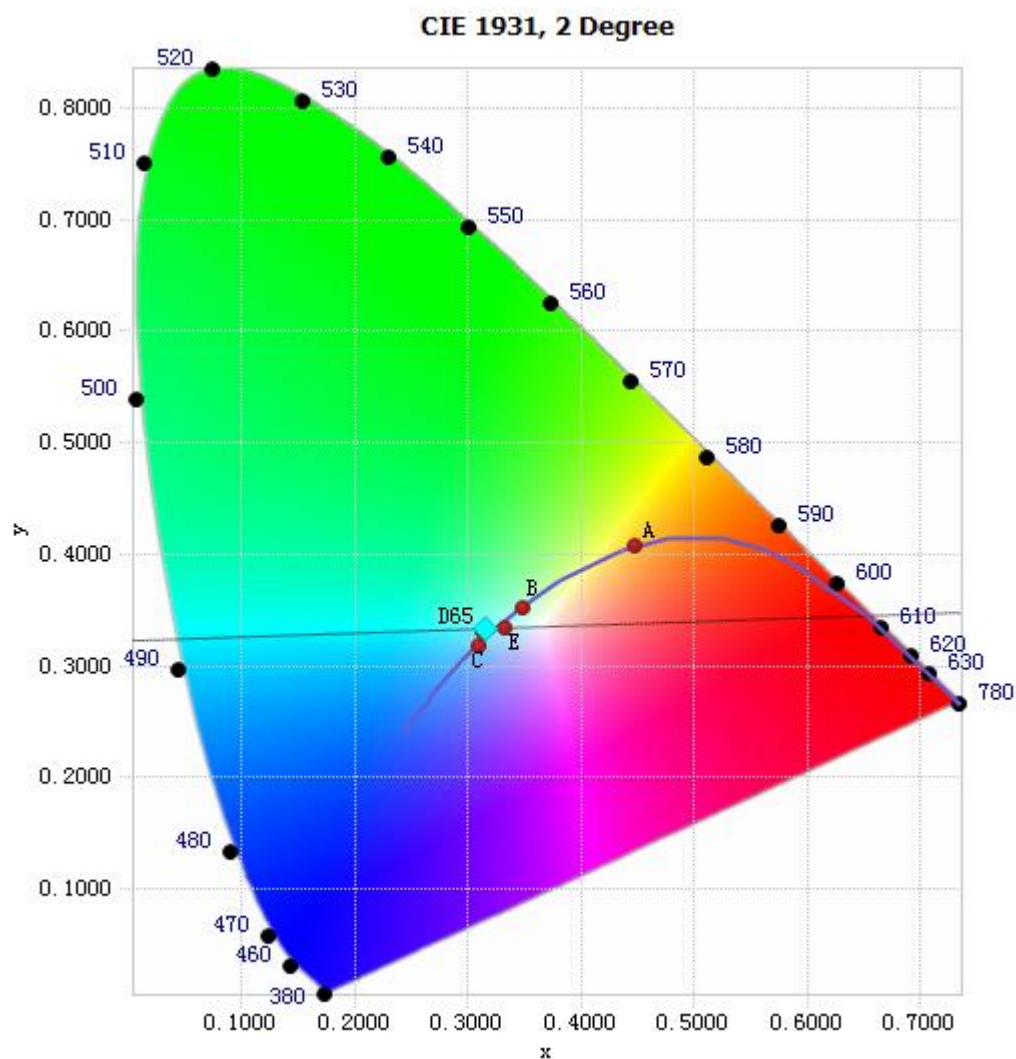


Chart 29: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.39E-04	485	1.13E-02	590	2.39E-02	695	3.05E-03
385	2.40E-04	490	1.22E-02	595	2.32E-02	700	2.61E-03
390	2.34E-04	495	1.44E-02	600	2.24E-02	705	2.24E-03
395	2.08E-04	500	1.70E-02	605	2.14E-02	710	1.91E-03
400	1.60E-04	505	1.93E-02	610	2.04E-02	715	1.63E-03
405	1.98E-04	510	2.12E-02	615	1.93E-02	720	1.41E-03
410	3.43E-04	515	2.29E-02	620	1.80E-02	725	1.21E-03
415	6.70E-04	520	2.36E-02	625	1.68E-02	730	1.02E-03
420	1.36E-03	525	2.44E-02	630	1.55E-02	735	8.95E-04
425	2.78E-03	530	2.48E-02	635	1.42E-02	740	7.54E-04
430	5.54E-03	535	2.50E-02	640	1.29E-02	745	6.48E-04
435	1.09E-02	540	2.52E-02	645	1.16E-02	750	5.56E-04
440	2.14E-02	545	2.54E-02	650	1.03E-02	755	4.75E-04
445	4.29E-02	550	2.54E-02	655	9.22E-03	760	4.06E-04
450	6.31E-02	555	2.55E-02	660	8.14E-03	765	3.54E-04
455	4.90E-02	560	2.55E-02	665	7.16E-03	770	3.09E-04
460	3.09E-02	565	2.55E-02	670	6.24E-03	775	2.60E-04
465	2.45E-02	570	2.53E-02	675	5.44E-03	780	2.25E-04
470	1.76E-02	575	2.51E-02	680	4.73E-03		
475	1.23E-02	580	2.49E-02	685	4.11E-03		
480	1.11E-02	585	2.45E-02	690	3.55E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3156, 0.3327)

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

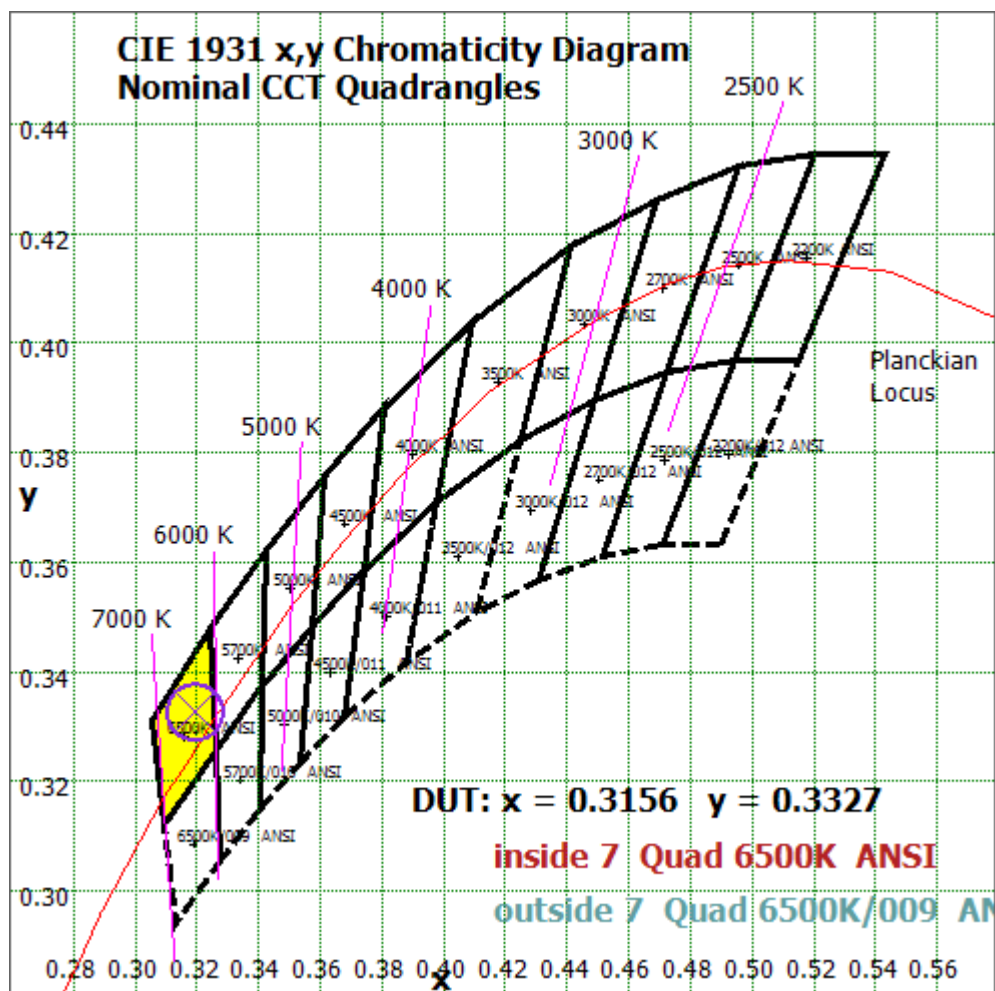


Chart 31: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

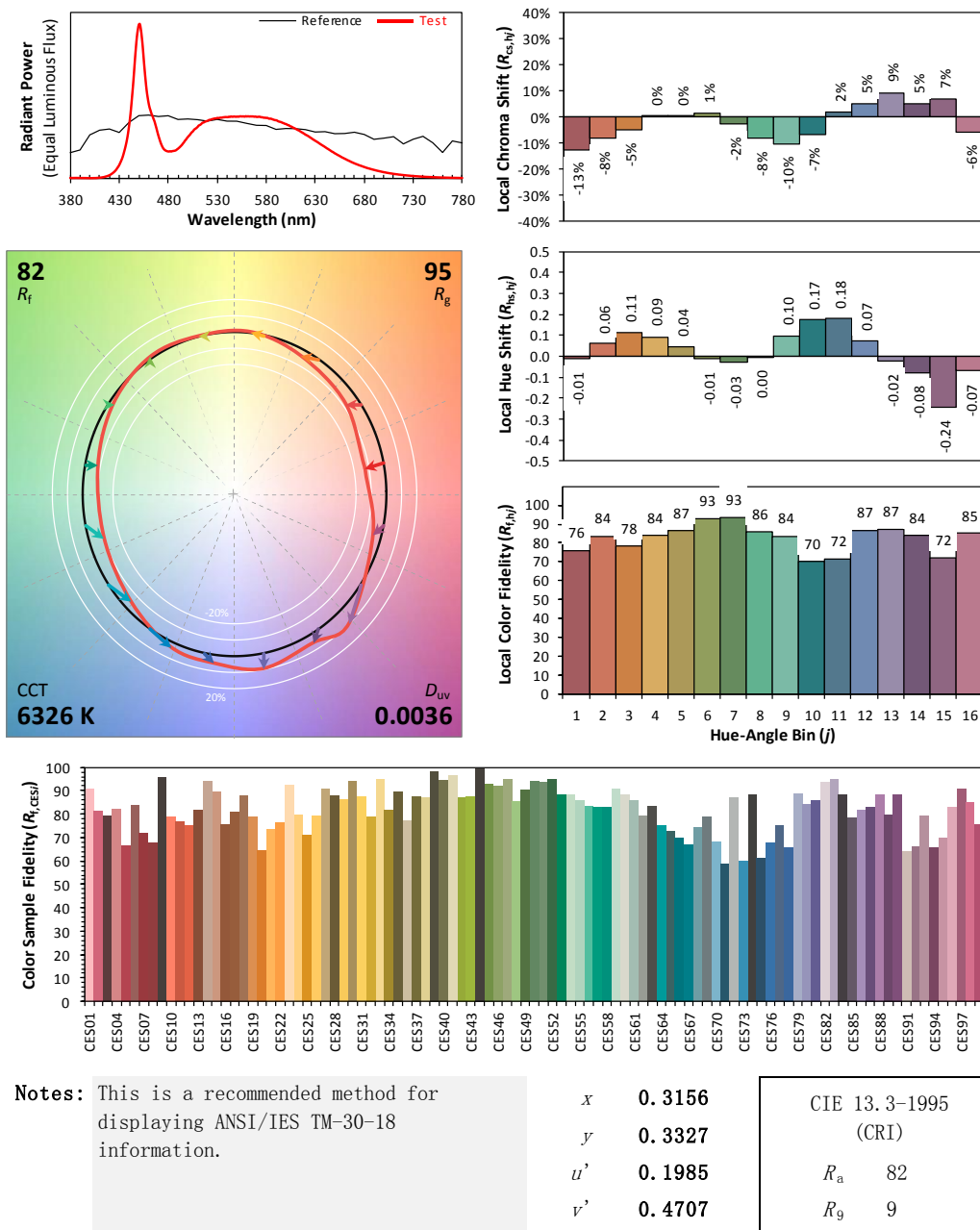
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/03/27

Model: 10T8/4F/8CCTS/UEB



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

x 0.3156
 y 0.3327
 u' 0.1985
 v' 0.4707

CIE 13.3-1995
(CRI)
 R_a 82
 R_9 9

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)	0.085
Power Factor	0.9805
Power (W)	10.04
Luminous Efficacy (lm/W)	166.2
Total Luminous Flux (lm)	1669.0
Beam Angle (°)	112.7 (0°-180°) / 215.7 (90°-270°)
Center Beam Candle Power (cd)	286
Maximum Beam Candle Power (cd)	288.0 (At: C=220.0, Gamma=5.0)
Spacing Criteria	1.31 (0°-180°) / 1.45 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	43.97%
Zonal Lumens in the 60 °-90 °Zone	27.06%
Zonal Lumens in the 90 °-120 °Zone	17.60%
Zonal Lumens in the 120 °-180 °Zone	11.37%

Table 28: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	27.184	1.63%
10- 20	78.81	4.72%
20- 30	122.648	7.35%
30- 40	154.829	9.28%
40- 50	173.107	10.37%
50- 60	177.265	10.62%
60- 70	168.858	10.12%
70- 80	151.572	9.08%
80- 90	131.211	7.86%
90-100	113.455	6.80%
100-110	97.602	5.85%
110-120	82.64	4.95%
120-130	67.811	4.06%
130-140	52.447	3.14%
140-150	37.313	2.24%
150-160	22.417	1.34%
160-170	8.454	0.51%
170-180	1.383	0.08%
Total	1669.0	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	733.843	43.97%
60- 90	451.641	27.06%
0-90	1185.48	71.03%
90- 180	483.522	28.97%
0- 180	1669.0	100%

Table 29: Zonal Lumen

Illuminance Plots- Goniophotometer Method

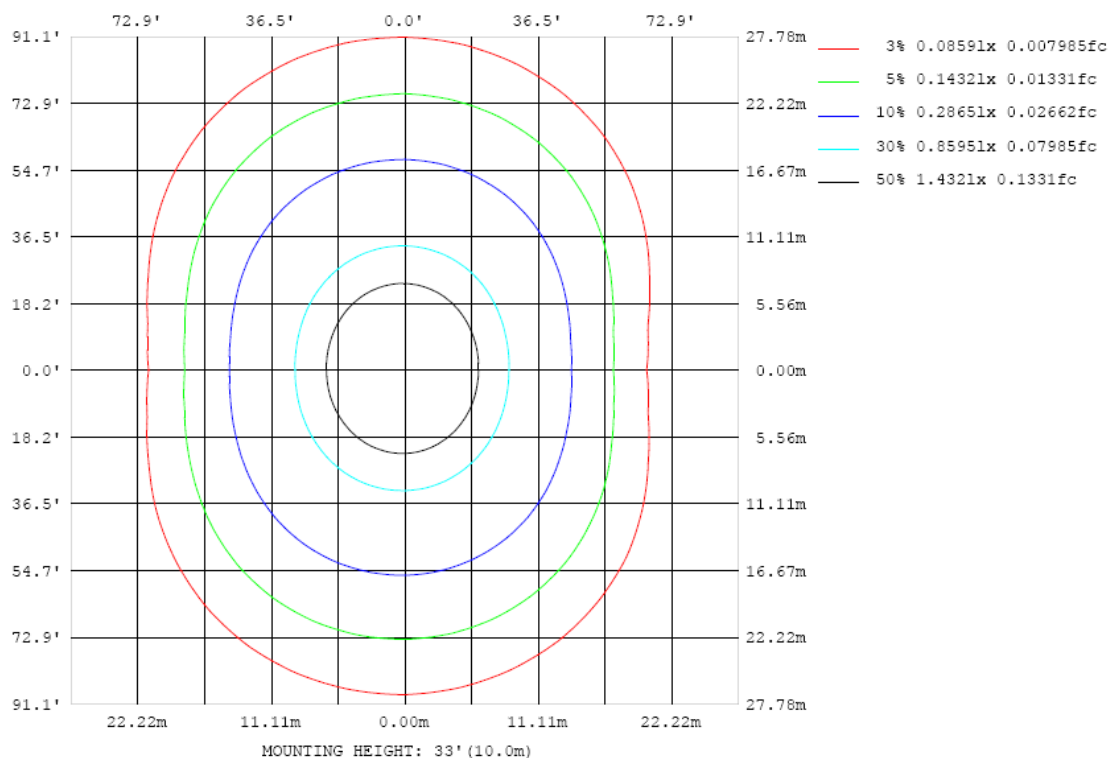


Chart 33: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

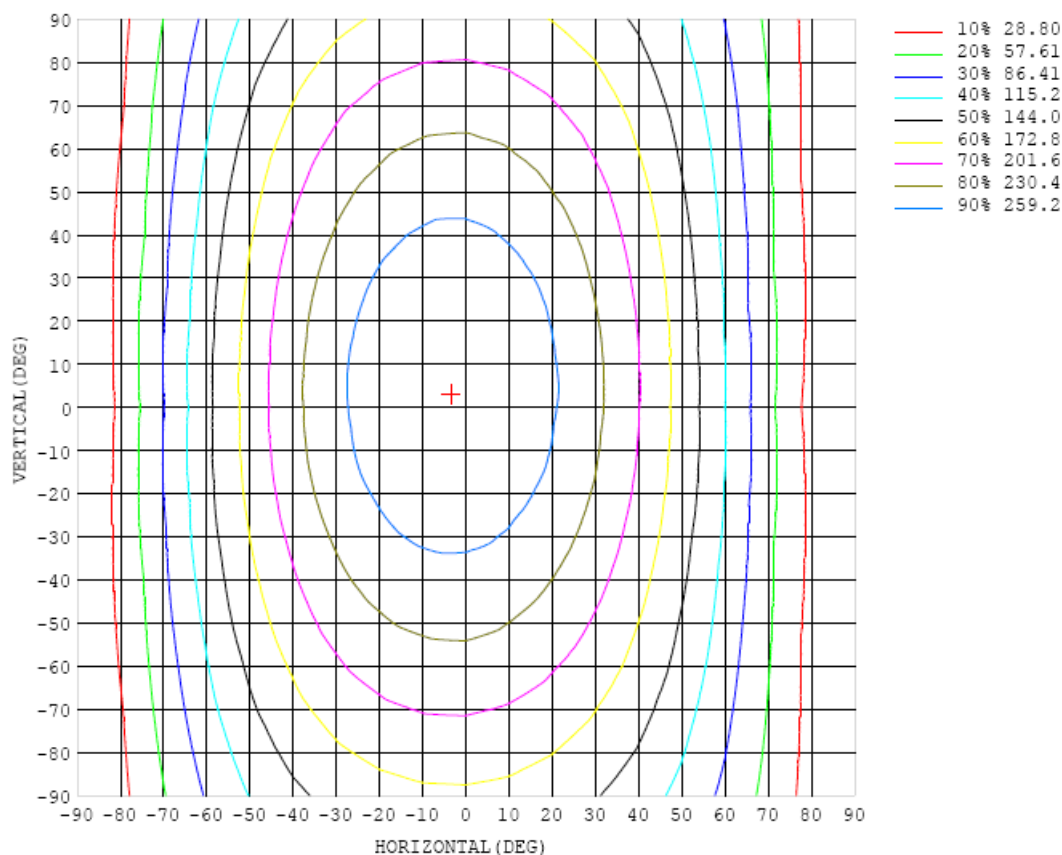


Chart 34: Isocandela Plot

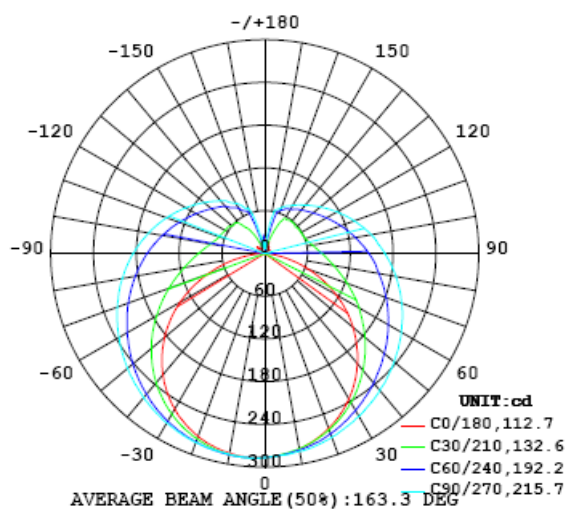


Chart 35: Polar Candela Distribution

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	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286
5	284	284	283	283	283	283	284	284	284	284	285	285	285	286	286	286	286	287	287
10	279	278	278	278	279	280	280	281	282	282	283	283	283	283	284	284	284	284	285
15	271	271	271	272	273	274	276	277	278	279	280	280	280	280	280	280	280	280	280
20	261	261	262	264	265	267	269	271	273	275	275	276	276	275	274	274	273	273	273
25	250	249	251	254	256	259	262	265	268	269	270	270	270	269	267	266	265	264	264
30	236	235	238	242	246	250	255	259	262	264	264	264	263	261	258	256	254	252	252
35	220	220	224	228	234	240	246	251	255	258	258	257	256	252	248	244	241	239	238
40	202	203	208	214	222	230	237	243	248	251	251	250	247	243	237	231	227	223	222
45	182	184	190	199	209	219	228	235	241	244	244	243	239	233	225	217	211	206	204
50	161	164	172	183	196	208	219	227	233	237	237	235	229	222	212	202	193	186	183
55	139	144	154	167	183	197	209	218	226	229	229	226	220	211	199	186	174	165	161
60	115	121	135	153	170	186	200	210	217	221	221	218	211	200	186	170	155	143	137
65	90.4	98.0	116	137	157	176	190	202	209	213	212	209	201	189	173	155	136	120	112
70	65.3	75.1	97.4	123	147	166	181	193	200	204	204	200	191	178	160	140	116	95.5	85.5
75	41.1	54.0	81.1	110	135	156	172	184	192	195	195	191	181	167	149	125	97.1	71.9	60.0
80	19.4	36.2	67.3	98.1	125	147	163	175	183	187	186	181	172	157	137	111	80.3	50.2	35.3
85	3.90	23.8	56.7	88.4	116	138	155	166	174	177	177	172	162	148	126	99.2	66.5	32.6	13.3
90	0.25	17.7	49.2	80.1	107	129	146	157	165	168	168	163	154	138	116	89.0	56.0	21.6	1.07
95	0.24	14.2	43.6	73.4	99.4	121	137	149	157	159	158	154	144	129	107	80.5	48.9	17.1	0.61
100	0.34	15.0	40.1	67.9	92.7	113	129	141	148	152	150	145	135	120	99.3	73.8	44.6	17.1	0.83
105	0.67	17.8	38.9	63.7	86.7	106	121	132	139	143	141	136	126	112	92.2	68.6	42.4	19.5	1.29
110	1.62	21.1	39.5	60.9	81.6	99.4	114	124	131	134	132	127	118	104	86.1	64.7	42.0	23.5	2.10
115	4.41	25.1	41.0	59.2	77.5	93.4	106	116	122	125	124	119	110	97.5	80.9	62.1	42.8	28.0	3.75
120	7.74	28.2	41.0	58.7	74.2	88.3	99.9	109	114	117	115	111	103	91.3	76.7	60.6	44.1	32.8	6.89
125	8.69	24.9	44.9	58.6	71.6	83.7	93.9	102	107	109	108	104	96.3	86.0	73.5	59.9	46.2	36.3	11.3
130	7.33	17.5	46.9	57.6	69.8	79.9	88.6	95.3	99.6	102	100	96.5	90.3	81.5	70.9	59.3	49.2	37.1	14.1
135	7.03	15.5	48.9	58.5	68.0	76.6	83.9	89.6	93.3	94.8	93.7	90.4	85.1	77.7	68.9	59.1	52.6	30.7	12.0
140	8.38	17.9	51.1	58.5	65.6	73.6	79.8	84.4	87.5	88.7	87.6	84.9	80.5	74.4	66.5	59.3	53.8	27.2	10.1
145	10.8	16.7	41.8	57.6	65.0	70.1	76.1	79.7	82.2	83.2	82.4	80.2	76.5	71.1	65.7	58.9	51.8	25.1	8.43
150	10.8	7.69	31.3	56.9	63.6	68.2	71.8	74.8	77.3	78.1	77.4	75.5	72.5	69.1	63.4	59.3	46.8	18.3	5.89
155	11.6	4.82	19.4	44.0	59.0	65.3	69.0	71.1	72.6	73.4	72.8	71.7	69.6	65.4	62.0	56.9	37.3	12.7	7.25
160	17.1	10.6	8.49	24.2	45.9	59.6	64.4	65.9	67.5	68.0	67.5	66.3	64.7	63.2	59.8	47.6	26.9	12.6	8.20
165	14.9	8.28	9.54	9.35	18.7	33.7	50.8	61.6	63.8	63.9	63.6	63.0	61.6	56.3	46.1	30.6	17.6	9.73	9.01
170	17.9	12.9	7.93	10.9	9.30	9.40	13.3	23.2	35.0	42.5	43.2	40.9	35.5	28.2	21.5	15.6	12.2	8.14	8.37
175	19.9	18.3	11.2	8.00	9.46	10.5	9.82	7.45	7.39	9.71	12.6	14.3	14.3	13.2	11.1	8.74	7.11	10.2	17.3
180	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4

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		286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	
5		287	287	287	288	288	288	288	288	288	287	287	286	286	286	285	284	284	
10		286	286	287	287	287	287	287	287	287	286	285	284	283	282	281	280	279	
15		281	282	283	284	284	285	285	285	285	284	282	280	279	276	274	274	273	
20		275	276	277	279	280	281	282	283	283	281	279	276	273	270	267	264	263	
25		265	267	270	273	275	277	279	280	279	277	274	271	266	262	257	254	252	
30		254	257	261	265	269	272	274	275	275	273	269	264	258	252	246	241	238	
35		241	244	249	255	261	266	269	270	270	267	262	257	250	241	233	227	222	
40		225	230	237	244	251	258	262	264	264	261	256	249	240	229	220	211	205	
45		207	213	223	233	242	250	255	258	258	254	249	240	229	217	205	194	186	
50		187	196	208	220	232	241	248	251	251	247	241	231	219	204	189	175	165	
55		166	177	192	207	221	232	239	244	244	240	233	222	208	191	173	156	143	
60		143	157	175	193	210	223	231	236	236	233	224	213	197	178	157	137	121	
65		119	136	159	180	199	213	222	228	228	224	216	203	186	165	142	118	97.5	
70		94.3	116	143	167	188	203	214	219	220	216	207	194	176	153	127	99.2	74.7	
75		70.5	97.6	128	155	177	194	205	211	212	207	199	185	166	142	114	82.6	54.1	
80		49.0	80.9	114	144	167	184	195	202	203	199	190	176	157	132	103	69.5	36.0	
85		31.7	68.1	103	133	157	174	186	192	194	190	181	167	148	123	93.2	59.4	23.9	
90		21.2	57.9	92.9	123	147	165	177	183	184	181	172	158	139	115	85.4	52.5	18.6	
95		15.5	50.3	84.2	114	138	155	167	173	175	171	163	150	131	108	79.4	48.5	18.2	
100		14.2	45.1	77.4	106	129	146	157	164	165	162	154	141	124	101	74.8	46.7	19.9	
105		15.7	42.7	71.7	98.6	120	137	148	154	156	153	145	133	117	95.5	71.3	46.4	22.5	
110		17.9	42.3	68.0	92.3	112	128	138	145	146	144	137	125	110	90.4	68.7	47.1	25.5	
115		16.9	42.4	66.1	87.3	105	119	129	135	137	135	128	118	104	86.3	67.8	48.3	26.5	
120		19.9	43.6	64.4	82.8	98.9	112	121	126	128	126	120	111	97.9	82.6	66.6	49.6	29.1	
125		11.8	42.3	63.8	79.5	93.3	104	112	118	120	117	112	104	92.7	79.5	65.9	50.4	30.1	
130		3.09	35.9	60.5	76.2	88.2	97.8	105	109	111	110	105	97.8	88.3	76.4	63.1	50.3	28.9	
135		4.49	33.9	59.8	71.9	83.5	92.0	97.9	102	103	102	98.3	92.4	83.6	72.5	63.1	44.2	21.5	
140		5.55	30.3	54.7	68.3	77.4	86.0	91.7	95.2	96.5	95.2	92.2	86.5	77.7	70.3	61.2	38.9	13.5	
145		7.05	14.2	43.6	66.0	73.5	78.8	82.9	86.7	88.2	87.0	83.8	79.9	74.9	66.3	55.5	30.9	9.40	
150		11.2	8.36	31.7	57.9	66.5	73.0	77.8	80.6	81.4	80.7	78.6	74.8	69.0	59.1	43.7	19.8	11.1	
155		14.3	13.1	16.0	38.0	61.8	65.7	68.2	71.2	72.7	72.0	69.9	66.5	58.2	48.4	26.7	11.5	13.4	
160		15.2	13.2	9.72	17.1	31.5	52.3	62.5	66.4	67.8	67.4	62.9	52.1	41.8	26.4	10.2	9.04	14.5	
165		14.7	16.4	14.3	9.60	14.4	16.4	23.5	31.2	35.6	35.1	29.2	22.6	14.8	7.78	11.1	7.04	15.0	
170		12.3	19.5	17.2	16.3	16.3	11.6	11.0	11.9	12.7	9.59	7.80	9.15	13.2	14.2	9.90	12.8	14.3	
175		13.5	10.4	16.7	24.2	25.8	21.7	17.0	13.7	7.28	7.85	11.1	13.6	19.1	19.4	18.2	15.1	15.2	
180		13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	

Table 31: Luminous Intensity Data

ISTMT Test Results (3000K Setting)

Test ambient temperature was 24.7 °C.

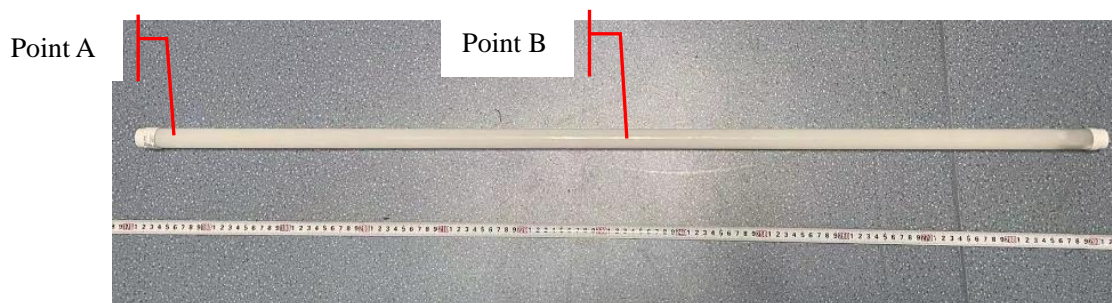
Test orientation was light down.

Model of light source: L128-3080RA35003K2

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	10.12	32.7	36.3	38.3
277.0	10.58	33.5	37.2	38.2

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 the specified range are not allowed.
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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 ***

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