



**IESNA
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Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:

Cree Lighting (C-Lite)

4401 Silicon Drive, Durham, NC 27703-8475 USA

For products:

Direct Linear Ambient Luminaires

Models No.:

C-WR-B-WLIN4-53L-SCCT-xx-xx

Test Date: Apr. 8, 2021 to Apr. 9, 2021

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Template No.: LC-RT-PL-046 Rev.1.3

Test Note: N/A

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May. 5, 2021

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May. 5, 2021

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1. General

1.1 Product Information

Brand Name	Cree Lighting (C-Lite)
Category	Indoor
General Application	Linear Ambient
Primary Use	Direct Linear Ambient Luminaires
Model Number	C-WR-B-WLIN4-53L-SCCT-xx-xx
Rated Inputs	AC120-277V, 50/60Hz
Rated Power	45W
Rated Light output	4801lm/5320lm/5361lm
Declared CCT	3000K, 4000K, 5000K
Power Supply	BQE46G-0900-48-PV-S1S2
LED Package, Array or Module	Model: 01.JT.AJ2835W80P03, manufactured by ShenZhen JuFei Optoelectronics Co., Ltd.
Dimming	Continuous Dimming
Integral Controls	Yes
Controls Controllability	No
Receipt Samples	1 unit
Sample Code of lab.	210403107002
Date of Receipt Samples	Apr. 3, 2021
Note	This is a color tunable product, 3000K, 4000K and 5000K were selected for the test.

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377- 2017	Specifications for the Chromaticity of Solid State Lighting Products
ANSI/IES TM-30-18*	IES Method for Evaluating Light Source Color Rendition
ANSI C82.77-2002	Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

Note:

*For reference only and not in the scope of NVLAP.

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-987	APW-120N	2020-12-23	2021-12-22
AC Power supply	LC-I-989	APW-120N	2020-12-23	2021-12-22
Power analyzer	LC-I-928	WT210	2020-12-25	2021-12-24
Power analyzer	LC-I-954	WT210	2020-12-25	2021-12-24
Multimeter	LC-I-972	Fluke 17B	2020-07-20	2021-07-19
Photometric colorimetric electric system** (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp***	LC-PL-I-011	D204C	2020-07-14	2021-07-13
Luminous Flux Standard Lamp****	LC-PL-I-003	24V100W	2020-07-14	2021-07-13
Goniophotometer(with mirror)	LC-I-902	GMS2000	2021-04-22	2022-04-21
Wireless temperature transmitter	LC-I-PL-009	DWLR-DLR	2020-12-24	2021-12-23
Wireless temperature transmitter	LC-I-PL-008	DWLR-DLR	2020-12-24	2021-12-23

Note:

** Bandwidth of spectroradiometer is 1 nm.

*** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

**** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

2. Test conducted and method

The luminaire was operated at least 2 hours to reach stabilization and temperature equilibrium before test.

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$; the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within ± 0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Electrical Instrumentation

The calibration uncertainties of the instruments for AC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC power meter was less than 0.5 percent (95 % confidence interval, $k=2$).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured by both sphere-spectroradiometer system and type C goniophotometer system.

Light intensity distribution was measured by a type C goniophotometer (with mirror) which can keep the sample in burn position when the tests conduct, and the total luminous flux was calculated from the intensity data by software automatically.

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the total luminous flux was calculated from these by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result		
	3000K	4000K	5000K
Input Voltage & Frequency	120.02 V~60Hz	120.03 V~60Hz	120.03 V~60Hz
Input Current(A)	0.349	0.341	0.350
Total Power(W)	41.56	40.64	41.65
Power Factor	0.992	0.992	0.992
I-THD	9.5 %	8.6 %	9.5 %
Off-state Power(W)	-	-	-

3.2 Photometric data

Criteria Item	Result		
	3000K	4000K	5000K
Total Lumens(lm)	4801.00	5320.08	5361.96
Luminous Length(ft)	4	4	4
Lumens per Foot(lm/ft)	1200.25	1330.02	1340.49
Luminaire Efficacy(lm/W)	115.52	130.91	128.74
Correlated Color Temperature (CCT)(K)	2896	3747	4885
Color Rendering Index (CRI)	83.4	86.7	85.7
R ₉	10	24	20
R _f	85	86	85
R _g	97	97	96
R _{cs,h1}	-11%	-10%	-11%
Chromaticity Coordinate (x,y)	0.4411, 0.3999	0.3894, 0.3748	0.3486, 0.3562
Chromaticity Coordinate (u',v')	0.2551, 0.5203	0.2318, 0.5021	0.2120, 0.4874
Duv	-0.0022	-0.0034	0.0009
Zone Lumens between 0-60°	72.90%	-	-

3.3 Color Rendering Details

3000K:

R1	R2	R3	R4	R5	R6	R7	R8
82	93	95	82	83	91	82	59
R9	R10	R11	R12	R13	R14	R15	-
10	83	82	77	85	98	75	-

4000K:

R1	R2	R3	R4	R5	R6	R7	R8
87	94	96	85	87	91	86	68
R9	R10	R11	R12	R13	R14	R15	-
24	85	85	70	89	99	81	-

5000K:

R1	R2	R3	R4	R5	R6	R7	R8
85	91	95	84	84	87	89	71
R9	R10	R11	R12	R13	R14	R15	-
20	78	84	60	87	98	80	-

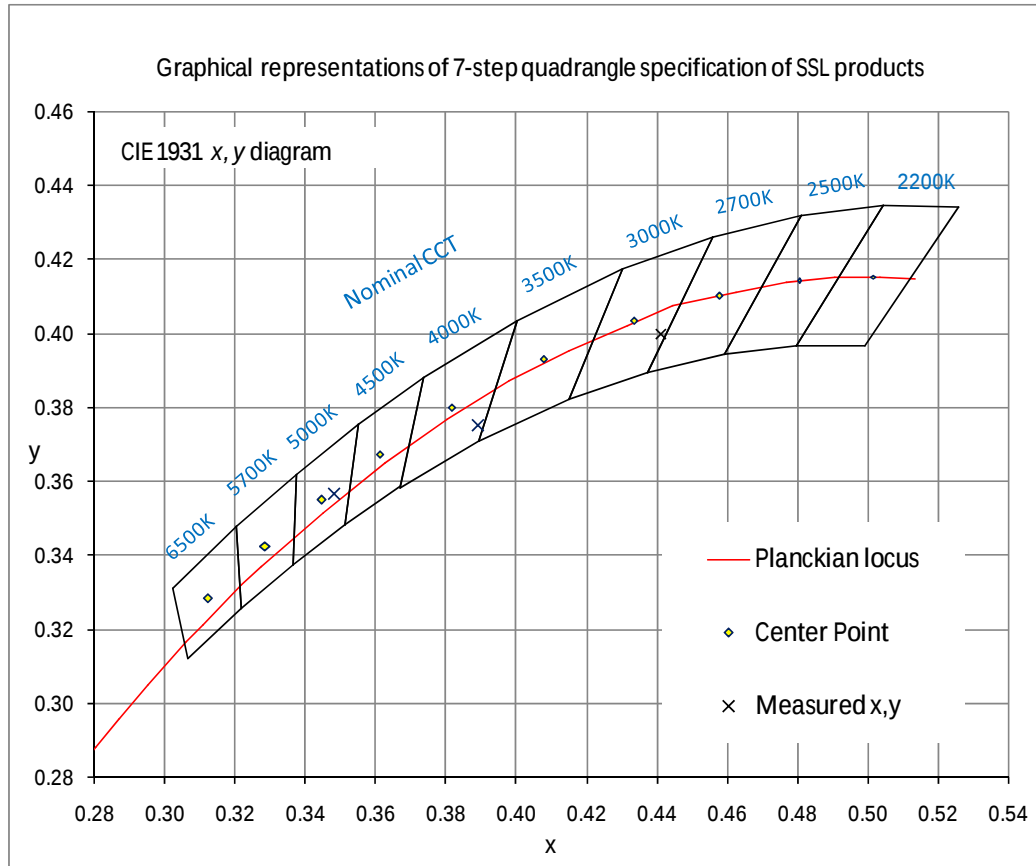
3.4 Electrical data on 277V

Criteria Item	Result		
	3000K	4000K	5000K
Input Voltage & Frequency	276.97 V~60Hz	277.04 V~60Hz	277.03 V~60Hz
Input Current(A)	0.170	0.166	0.171
Total Power(W)	41.45	40.34	41.52
Power Factor	0.879	0.877	0.879
I-THD	11.8 %	11.7 %	11.9 %

Note: N/A

4. Test Data

4.1 ANSI Chromaticity Quadrangles Diagram



4.2 ANSI/IES TM-30-18 Color Rendition

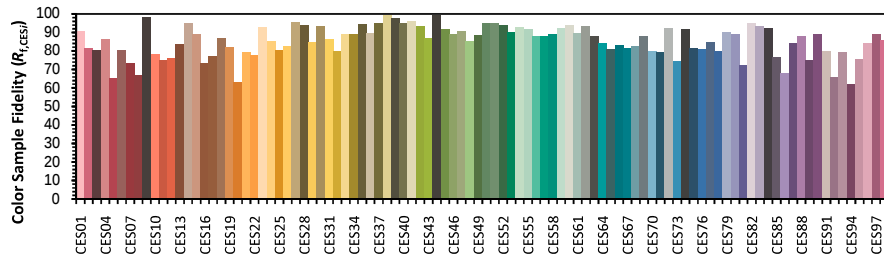
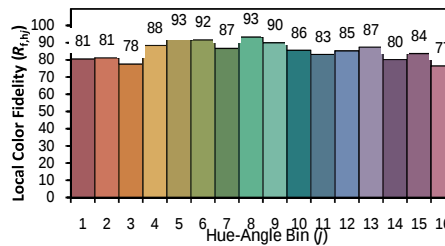
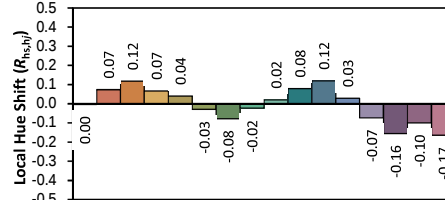
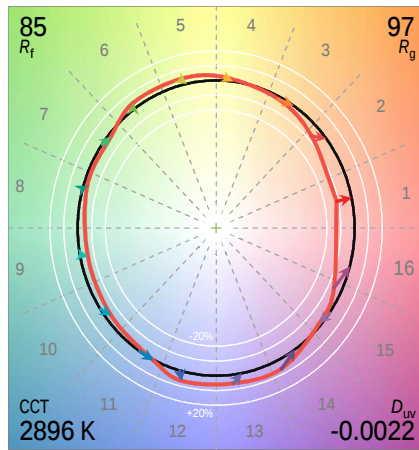
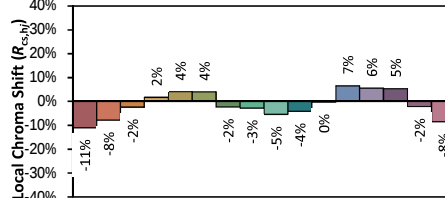
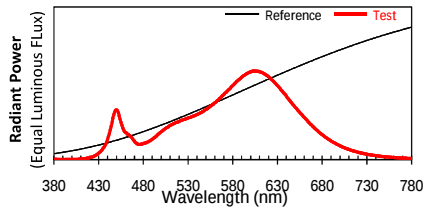
ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: Cree Lighting (C-Lite)

Date: 2021/5/5

Model: C-WR-B-WLIN4-53L-SCCT-xx-xx (3000K)



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

 x 0.4411

 y 0.3999

 u' 0.2551

 v' 0.5203

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

4.2 ANSI/IES TM-30-18 Color Rendition – Cont.

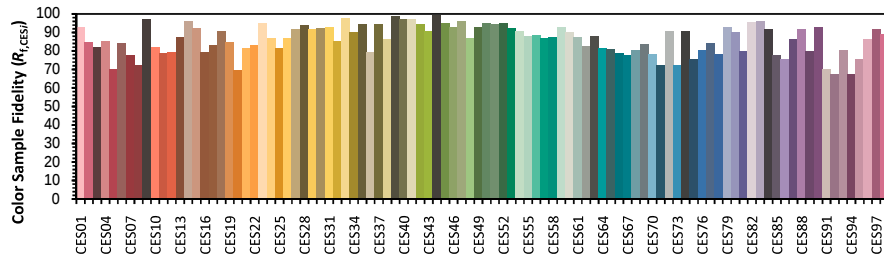
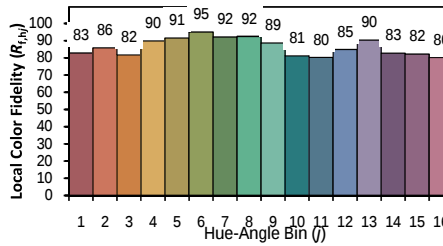
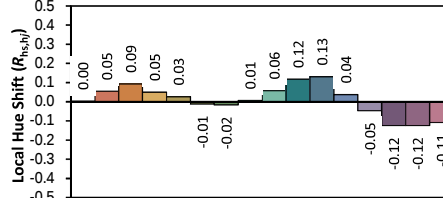
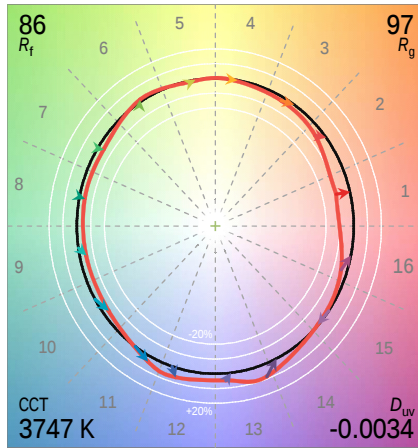
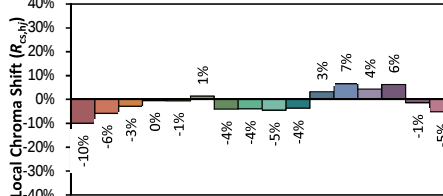
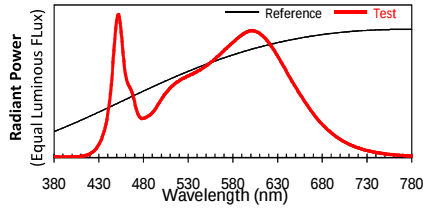
ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: Cree Lighting (C-Lite)

Date: 2021/5/5

Model: C-WR-B-WLIN4-53L-SCCT-xx-xx (4000K)



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

x 0.3894
 y 0.3748
 u' 0.2318
 v' 0.5021

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

4.2 ANSI/IES TM-30-18 Color Rendition – Cont.

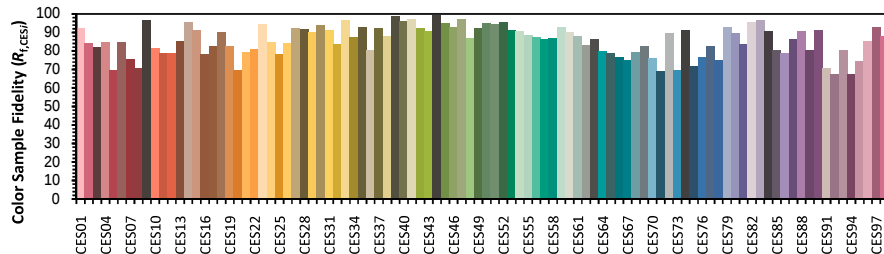
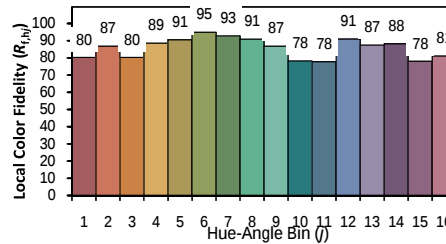
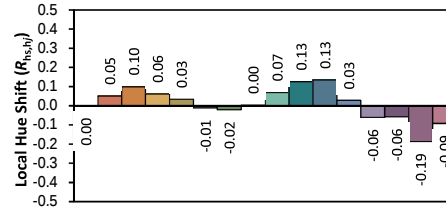
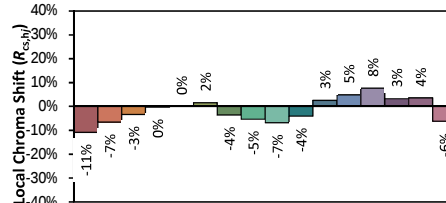
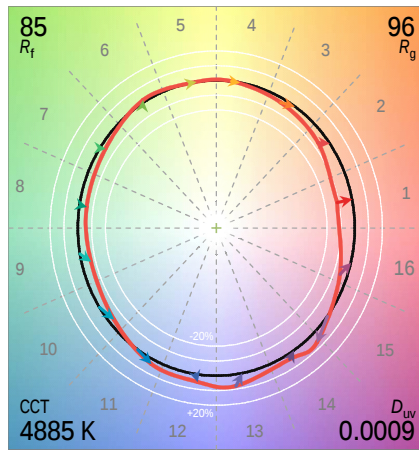
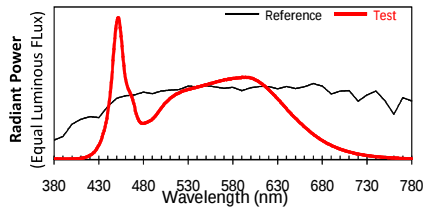
ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: Cree Lighting (C-Lite)

Date: 2021/5/5

Model: C-WR-B-WLIN4-53L-SCCT-xx-xx (5000K)



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

 x 0.3486

 y 0.3562

 u' 0.2120

 v' 0.4874

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

4.3 Goniometry Test Data of 3000K

CIE Type	Direct	IES Classification	Type VS
Maximum Candela	1617.124	Maximum Candela Angle	90H 0V
Spacing Criteria (0-180)	1.20	Basic Luminous Shape	Rectangular w/Sides
Spacing Criteria (90-270)	1.24	Luminous Length	1.16 m
Spacing Criteria (Diagonal)	1.36	Luminous Width	0.15 m
Test Distance	30.13 m	Luminous Height	0.03 m

4.4 Zonal Lumen Summary of 3000K

Zone	Lumens	%Lamp	%Fixt
0-20	587.32	12.20	12.20
0-30	1236.78	25.80	25.80
0-40	2006.12	41.80	41.80
0-60	3500.94	72.90	72.90
0-80	4398.87	91.60	91.60
0-90	4561.33	95.00	95.00
10-90	4408.54	91.80	91.80
20-40	1418.8	29.60	29.60
20-50	2205.44	45.90	45.90
40-70	2045.6	42.60	42.60
60-80	897.93	18.70	18.70
70-80	347.15	7.20	7.20
80-90	162.46	3.40	3.40
90-110	133.62	2.80	2.80
90-120	174.26	3.60	3.60
90-130	202.52	4.20	4.20
90-150	230.84	4.80	4.80
90-180	239.66	5.00	5.00
110-180	106.04	2.20	2.20
0-180	4801.00	100.00	100.00

Total Luminaire Efficiency = 100.00%

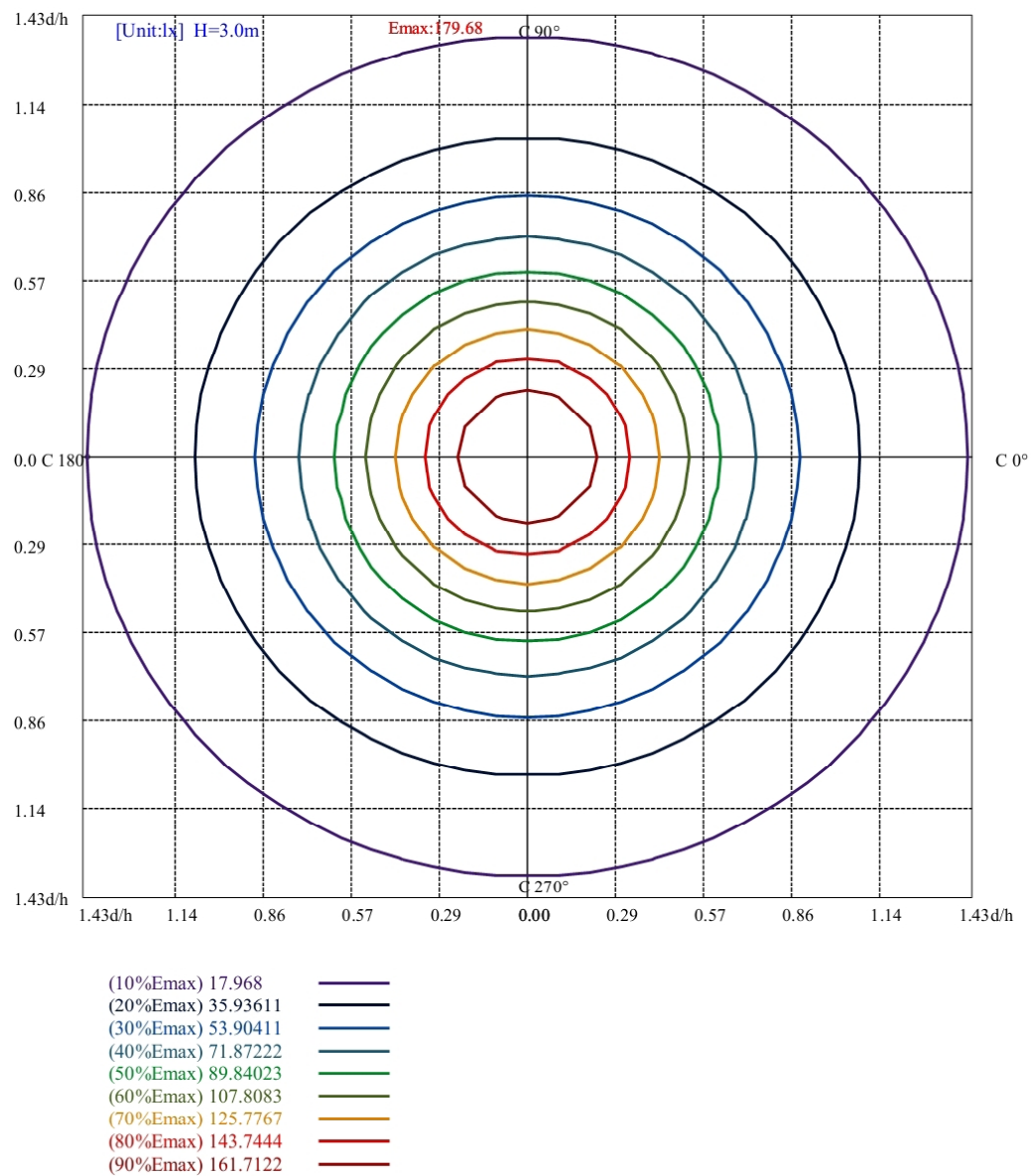
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	152.79
10-20	434.52
20-30	649.46
30-40	769.34
40-50	786.64
50-60	708.18
60-70	550.78
70-80	347.15
80-90	162.46
90-100	78.27
100-110	55.35
110-120	40.64
120-130	28.26
130-140	17.90
140-150	10.42
150-160	5.45
160-170	2.58
170-180	0.79

4.5 LUMINAIRE CLASSIFICATION SYSTEM (LCS) of 3000K

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	618.4	12.9	12.9
FM - Front-Medium (30-60)	1132.1	23.6	23.6
FH - Front-High (60-80)	449.0	9.4	9.4
FVH - Front-Very High (80-90)	81.2	1.7	1.7
BL - Back-Low (0-30)	618.4	12.9	12.9
BM - Back-Medium (30-60)	1132.1	23.6	23.6
BH - Back-High (60-80)	449.0	9.4	9.4
BVH - Back-Very High (80-90)	81.2	1.7	1.7
UL - Uplight-Low (90-100)	78.3	1.6	1.6
UH - Uplight-High (100-180)	161.4	3.4	3.4
Total	4801.1	100.2	100.0
BUG Rating	B2-U3-G1		

4.6 ISO illuminance diagram(Lux) of 3000K

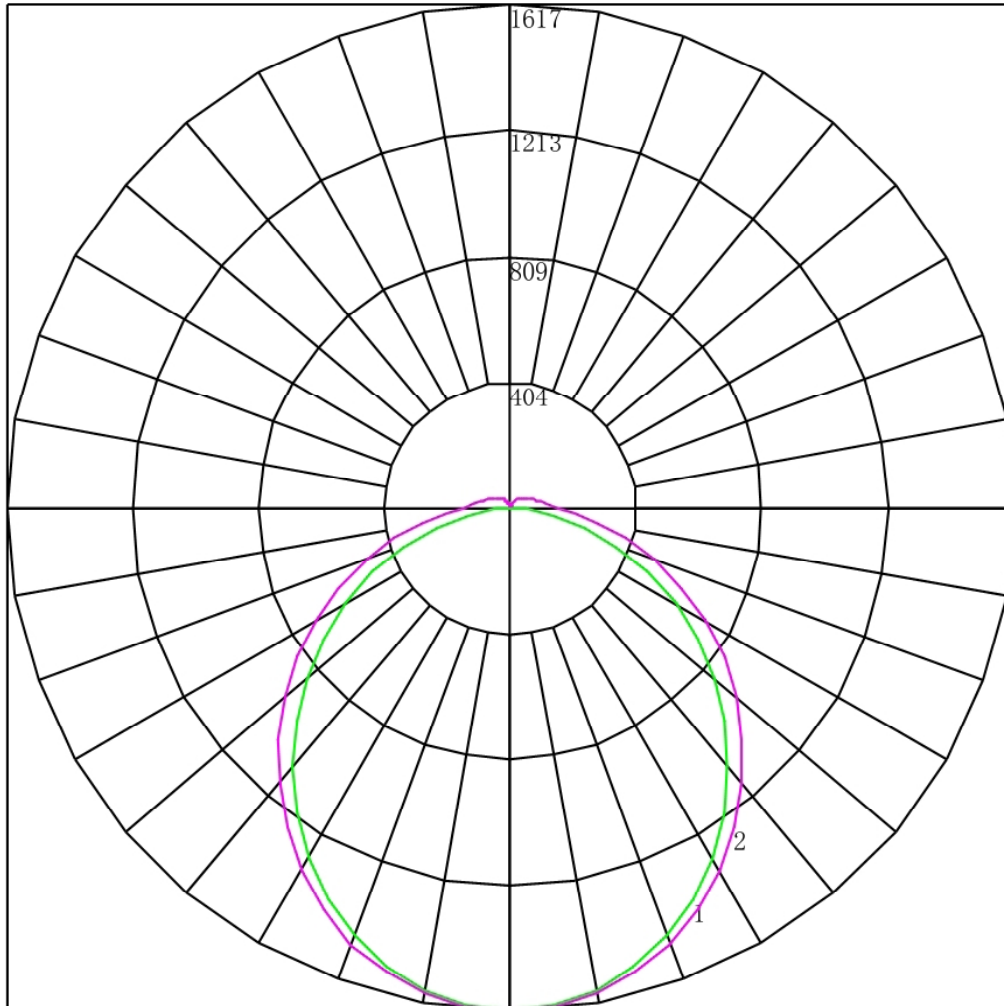




LCTECH



4.7 Polar Curves of 3000K



Maximum Candela = 1617.124 Located At Horizontal Angle = 0, Vertical Angle = 0

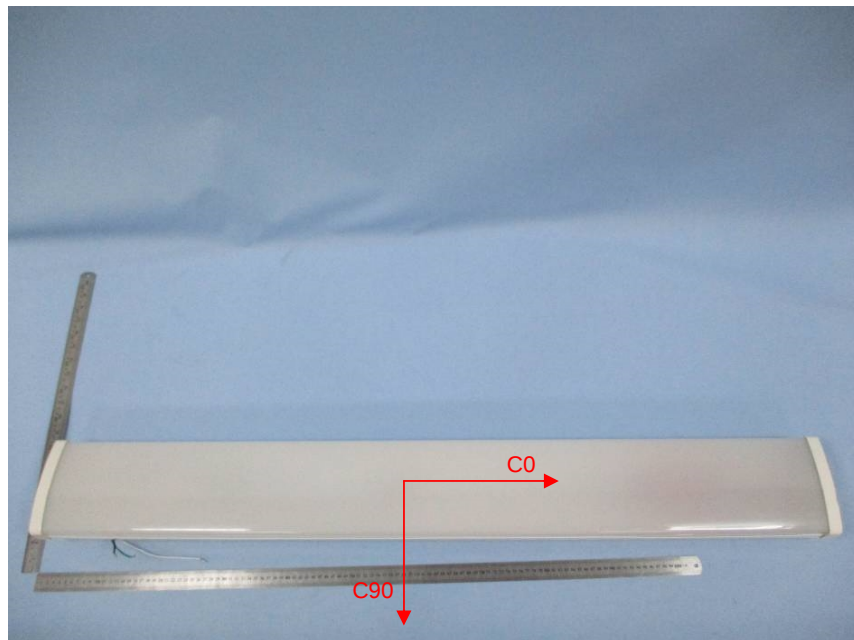
1 - Vertical Plane Through Horizontal Angles (0 - 180)

2 - Vertical Plane Through Horizontal Angles (90 - 270)

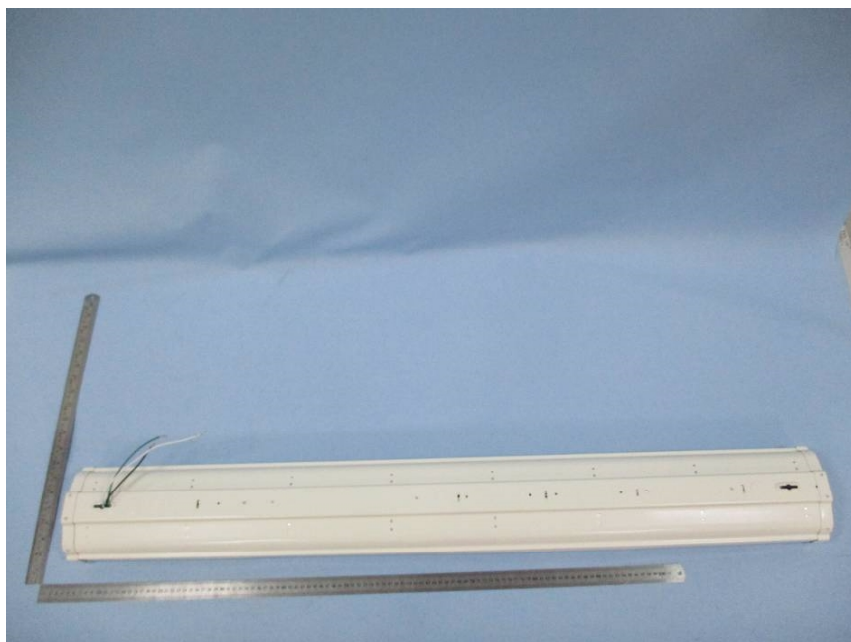
4.8 Candela Tabulation of 3000K

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	1617.124	1617.124	1617.124	1617.124	1617.124	1617.124	1617.124
5	1607.542	1608.004	1609.400	1608.945	1609.641	1610.329	1611.728
10	1578.795	1579.500	1582.595	1583.516	1585.387	1587.468	1588.344
15	1530.884	1534.351	1538.311	1541.508	1543.902	1547.854	1549.220
20	1468.371	1471.415	1477.440	1483.153	1488.364	1492.394	1494.806
25	1389.431	1394.118	1402.484	1411.171	1417.868	1422.220	1426.002
30	1298.628	1305.191	1314.591	1328.293	1346.974	1340.729	1344.606
35	1199.154	1204.861	1217.384	1232.699	1243.094	1250.865	1253.766
40	1088.730	1097.688	1112.451	1131.206	1143.128	1151.717	1156.631
45	974.655	984.590	1002.520	1035.670	1037.044	1047.817	1053.199
50	856.017	867.387	886.693	910.500	927.557	940.753	945.721
55	734.186	748.134	771.082	796.971	815.801	832.099	835.544
60	610.985	624.777	664.640	678.894	701.780	718.236	722.220
65	487.784	502.094	530.779	561.492	585.273	602.791	608.445
70	364.583	382.838	412.443	445.022	471.029	489.613	493.772
75	246.858	279.118	298.874	331.032	359.503	378.930	384.494
80	137.346	158.922	195.531	229.765	259.534	279.555	284.661
85	52.931	75.237	112.858	149.840	179.970	200.327	206.862
90	10.495	30.773	64.937	98.982	127.158	144.414	149.301
95	3.194	19.374	47.451	75.372	97.693	111.821	116.023
100	3.194	16.183	41.092	64.701	83.411	95.750	98.934
105	2.738	14.359	35.871	57.209	74.344	85.110	89.041
110	2.738	11.852	31.103	50.625	66.185	76.282	79.147
115	2.738	9.800	27.015	44.495	58.478	67.455	70.603
120	3.194	8.889	24.289	39.046	51.452	59.759	62.958
125	3.194	7.522	20.432	34.053	45.105	52.062	54.864
130	3.194	6.382	17.026	29.286	38.532	45.044	47.219
135	3.650	5.470	14.303	24.970	32.866	38.255	40.023
140	4.107	5.015	11.806	20.657	27.651	31.917	33.728
145	4.107	5.244	10.443	17.026	22.892	26.937	28.331
150	5.019	5.473	8.628	13.847	18.809	21.731	22.935
155	5.932	6.156	7.268	11.579	14.733	17.429	17.988
160	6.844	6.841	7.268	9.083	12.013	13.807	14.840
165	7.757	7.753	7.948	8.174	9.067	10.865	10.343
170	8.213	8.437	8.405	8.403	8.388	8.829	8.994
175	9.126	9.121	9.085	9.083	9.067	9.055	8.994
180	4.538	4.538	4.538	4.538	4.538	4.538	4.538

Appendix A Product Photo



Picture 1



Picture 2

****End of test report****