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Test report of

IES LM-79-08

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

Rendered to:

RZ LIGHTING CO LTD

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Bao'an, Shenzhen, China 518103

For products:

Outdoor Full-Cutoff Wall-Mounted Area Luminaires

Models No.:

WP17-100M-[CS,CSM,CSP,CSI,CSB,CSMB,CSIB]-3CCT

Test Date: Apr. 24, 2024

Test Lab.: **LCTECH Guangdong Testing Services Co., Ltd.**

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Template No.: LC-RT-PL-092 Rev.1.1

Test Note: N/A

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May. 5, 2024

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1. General

1.1 Product Information

Brand Name	RZ
Category	Outdoor
General Application	High Output
Primary Use	Outdoor Full-Cutoff Wall-Mounted Area Luminaires
Model Number	WP17-100M-[CS, CSM, CSP, CSI, CSB, CSMB, CSIB]-3CCT
Rated Inputs	AC120-347V, 50/60Hz
Rated Power	40W/60W/80W/100W
Rated Light output	13000lm
Declared CCT	3000K/4000K/5000K
Power Supply	BQ-120D2-260-P
LED Package, Array or Module	L128-3080RC35004A1, L128-5080RC35004A1, Lumileds Holding B.V.
Dimming	Continuous Dimming
Integral Controls	No
Controls Controllability	No
Receipt Samples	1 unit
Sample Code of lab.	240419101002
Date of Receipt Samples	Apr. 19, 2024
Note	This is a color tunable product, 3000K, 4000K and 5000K on 100W are 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 ¹	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:

1, 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	2023-12-12	2024-12-11
AC Power supply	LC-I-989	APW-120N	2023-12-12	2024-12-11
Power analyzer	LC-I-PL-024	WT310E	2023-12-12	2024-12-11
Power analyzer	LC-I-954	WT210	2023-12-12	2024-12-11
Multimeter	LC-I-972	Fluke	2023-06-28	2024-06-27
Photometric colorimetric electric system ² (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp ³	LC-I-963	24V50W	2023-06-29	2024-06-28
Luminous Flux Lamp ⁴	LC-I-PL-031	AC220V/200W	2023-06-29	2024-06-28
Goniophotometer(with mirror)	LC-I-902	GMS2000	2024-03-25	2025-03-24
Wireless temperature transmitter	LC-I-PL-009	DWLR-DLR	2023-12-19	2024-12-18
Wireless temperature transmitter	LC-I-PL-008	DWLR-DLR	2023-12-19	2024-12-18

Note:

2, Bandwidth of spectroradiometer is 1 nm.

3, Halogen lamp, 50W, omni-directional type, and its traceability to NIM.

4, Incandescent lamp, 200W, 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	120.00 V~60Hz	120.00 V ~60Hz	119.99 V~60Hz
Input Current(A)	0.835	0.793	0.833
Total Power(W)	99.90	94.87	99.67
Power Factor	0.997	0.997	0.997
I-THD	4.41%	4.52%	4.45%
Off-state Power(W)	-	-	-

3.2 Photometric data

Criteria Item	Result		
	3000K	4000K	5000K
Total Lumens(lm)	13652.40	14440.99	14101.03
Luminaire Efficacy(lm/W)	136.66	152.22	141.48
Correlated Color Temperature (CCT)(K)	3096	3966	5071
Color Rendering Index (CRI)	83	85	84
R ₉	10	21	16
R _f	84	84	83
R _g	98	95	94
R _{cs,h1}	-11%	-11%	-12%
Chromaticity Coordinate (x,y)	0.4288, 0.3985	0.3799, 0.3704	0.3430, 0.3488
Chromaticity Coordinate (u',v')	0.2477, 0.5180	0.2273, 0.4987	0.2111, 0.4830
Duv	-0.0011	-0.0029	-0.0006
Zone Lumens between 0-90°	99.70%	-	-
Zone Lumens between 80-90°	0.80 %	-	-
BUG Rating	B3-U2-G1	-	-

Note: N/A.

3.3 Electrical data on 347V

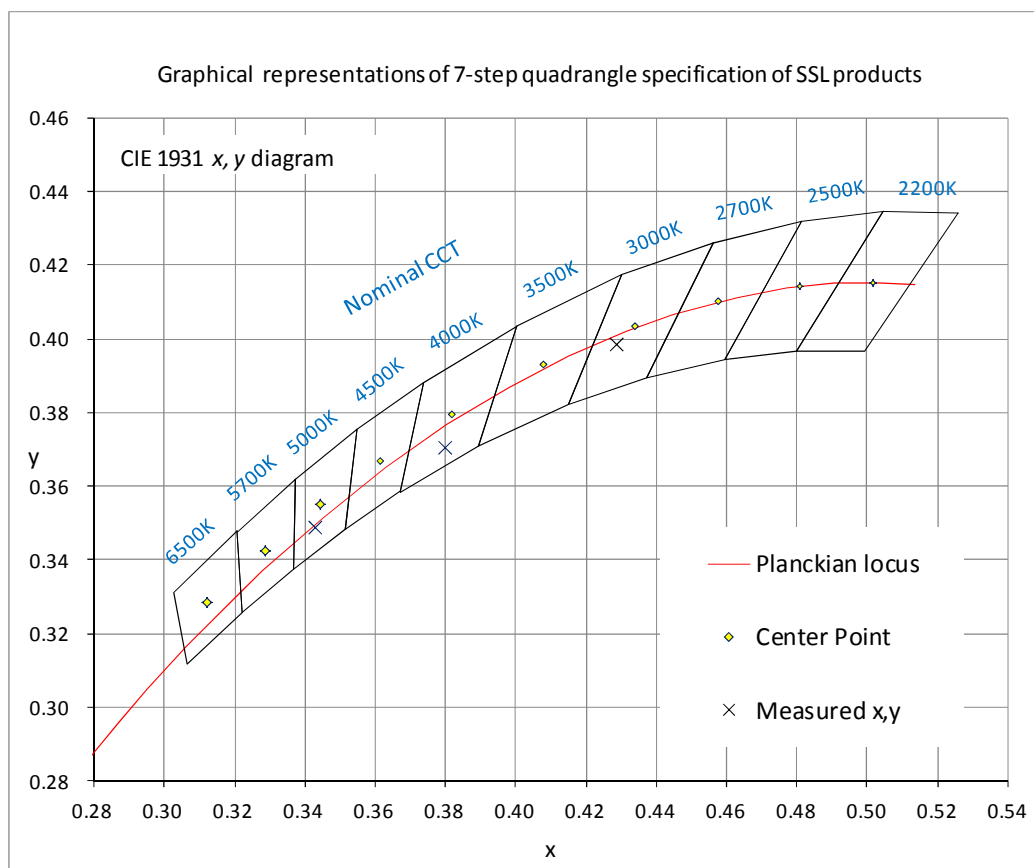
Criteria Item	Result		
	3000K	4000K	5000K
Input Voltage & Frequency	347.07 V~60Hz	346.93 V~60Hz	346.99 V~60Hz
Power Factor	0.943	0.935	0.943
I-THD	14.31%	15.41%	14.03%

3.4 Color Rendering Details

CCT	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
3000K	82	90	96	82	82	88	84	61	10	77	81	69	84	98	75
4000K	85	93	96	83	84	88	86	68	21	81	81	63	88	98	80
5000K	84	91	94	82	83	86	86	68	16	77	80	60	86	97	80

4. Test Data

4.1 ANSI Chromaticity Quadrangles Diagram



4.2 ANSI/IES TM-30-18 Color Rendition

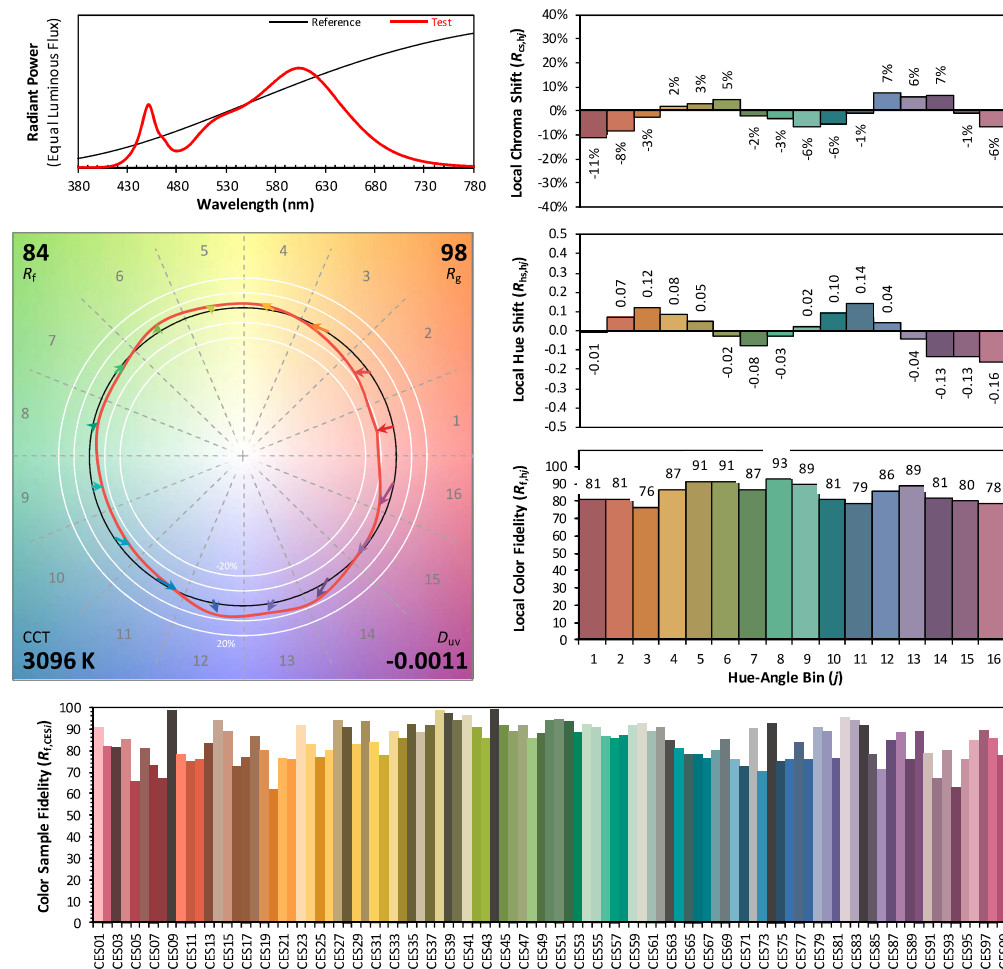
ANSI/IES TM-30-18 Color Rendition Report

Source: SPD

Manufacturer: RZ LIGHTING CO LTD

Date: 2024/05/05

Model: WP17-100M-[CS, CSM, CSP, CSI, CSB, CSMB, CSIB]-3CCT (3000K)



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

x 0.4288
 y 0.3985
 u' 0.2477
 v' 0.5180

CIE 13.3-1995
 (CRI)
 R_a 83
 R_9 10

Note:

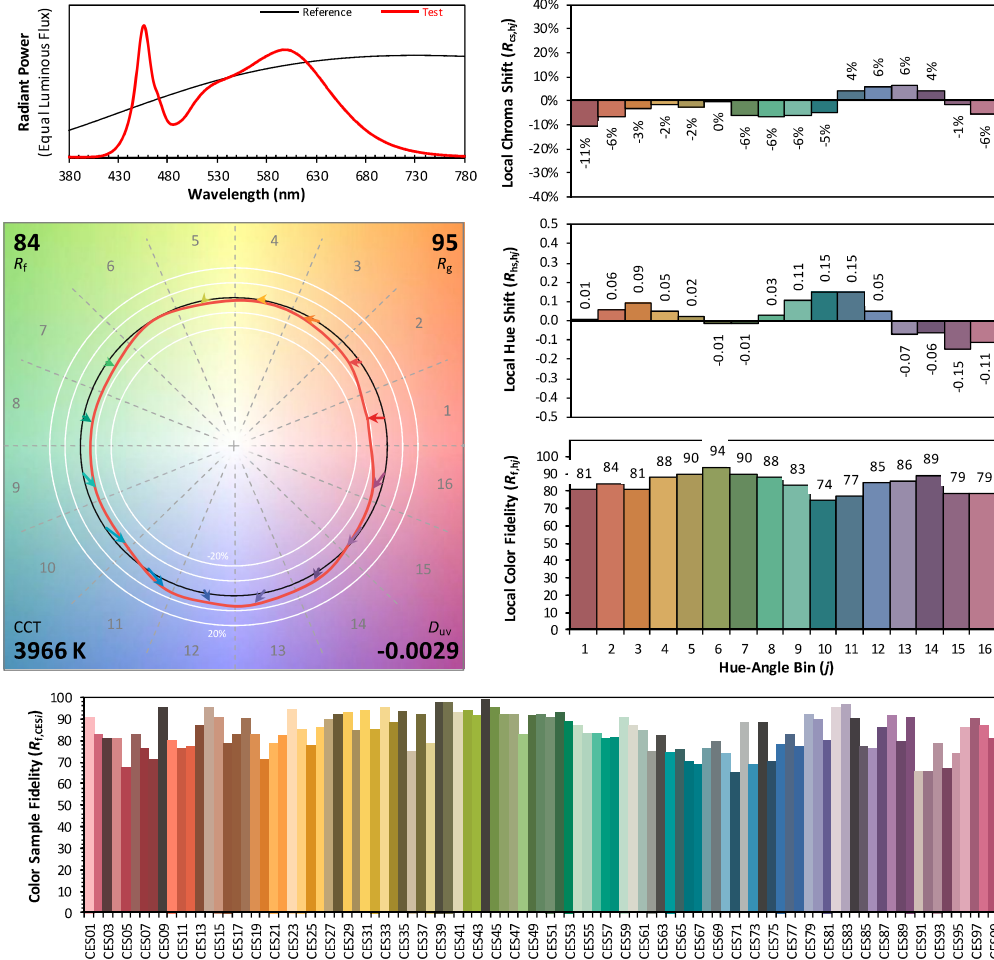
Colors are for visual orientation purposes only. Created with the IES TM-30-18 Calculator Version 2.00.

Source: SPD

Manufacturer: RZ LIGHTING CO LTD

Date: 2024/05/05

Model: WP17-100M-[CS, CSM, CSP, CSI, CSB, CSMB, CS1B]-3CCT (4000K)



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

x 0.3799
 y 0.3704
 u' 0.2273
 v' 0.4987

CIE 13.3-1995
(CRI)

R_a 85
 R_g 21

Note:

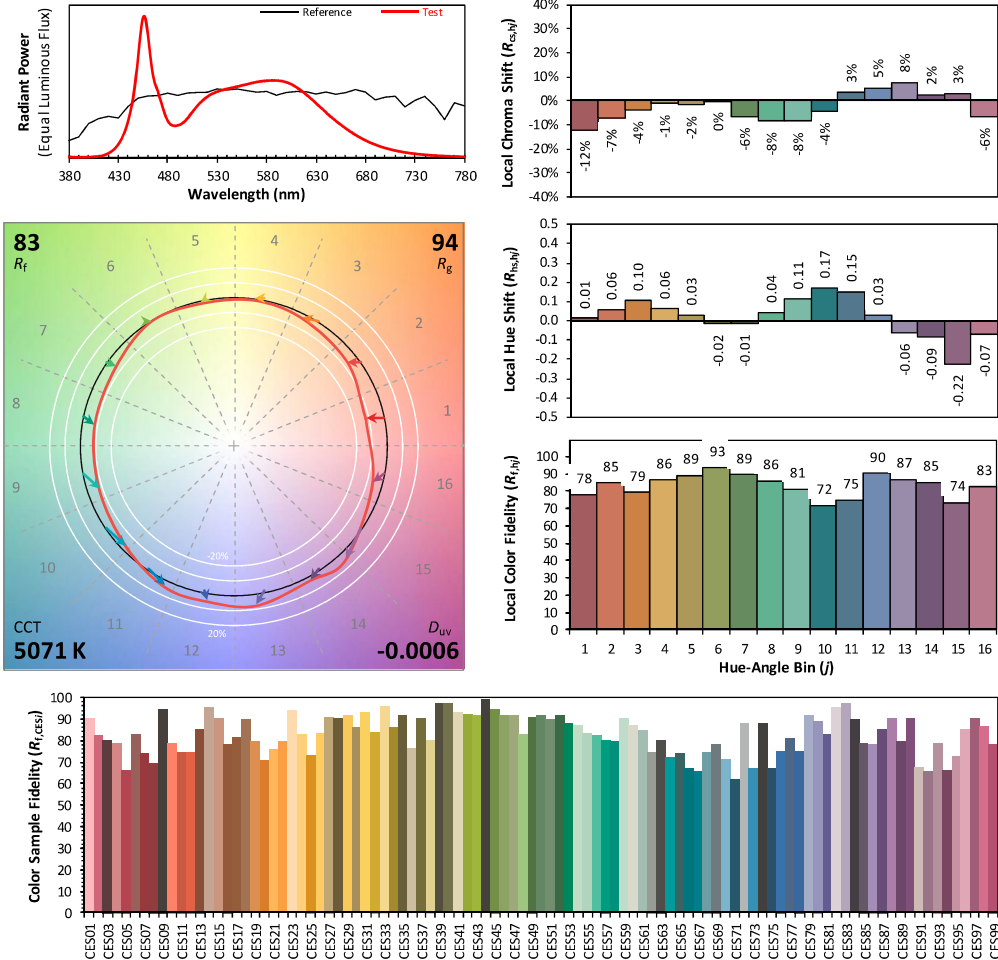
Colors are for visual orientation purposes only. Created with the IES TM-30-18 Calculator Version 2.00.

Source: SPD

Manufacturer: RZ LIGHTING CO LTD

Date: 2024/05/05

Model: WP17-100M-[CS, CSM, CSP, CSI, CSB, CSMB, CS1B]-3CCT (5000K)



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

x 0.3430
 y 0.3488
 u' 0.2111
 v' 0.4830

CIE 13.3-1995
(CRI)

R_a 84
 R_g 16

Note:

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	Basic Luminous Shape	Rectangular
Spacing Criteria (0-180)	1.54	Luminous Length	0.26 m
Spacing Criteria (90-270)	1.28	Luminous Width	0.07 m
Spacing Criteria (Diagonal)	1.38	Luminous Height	0.00 m
Test Distance	29.97 m		

4.4 Zonal Lumen Summary of 3000K

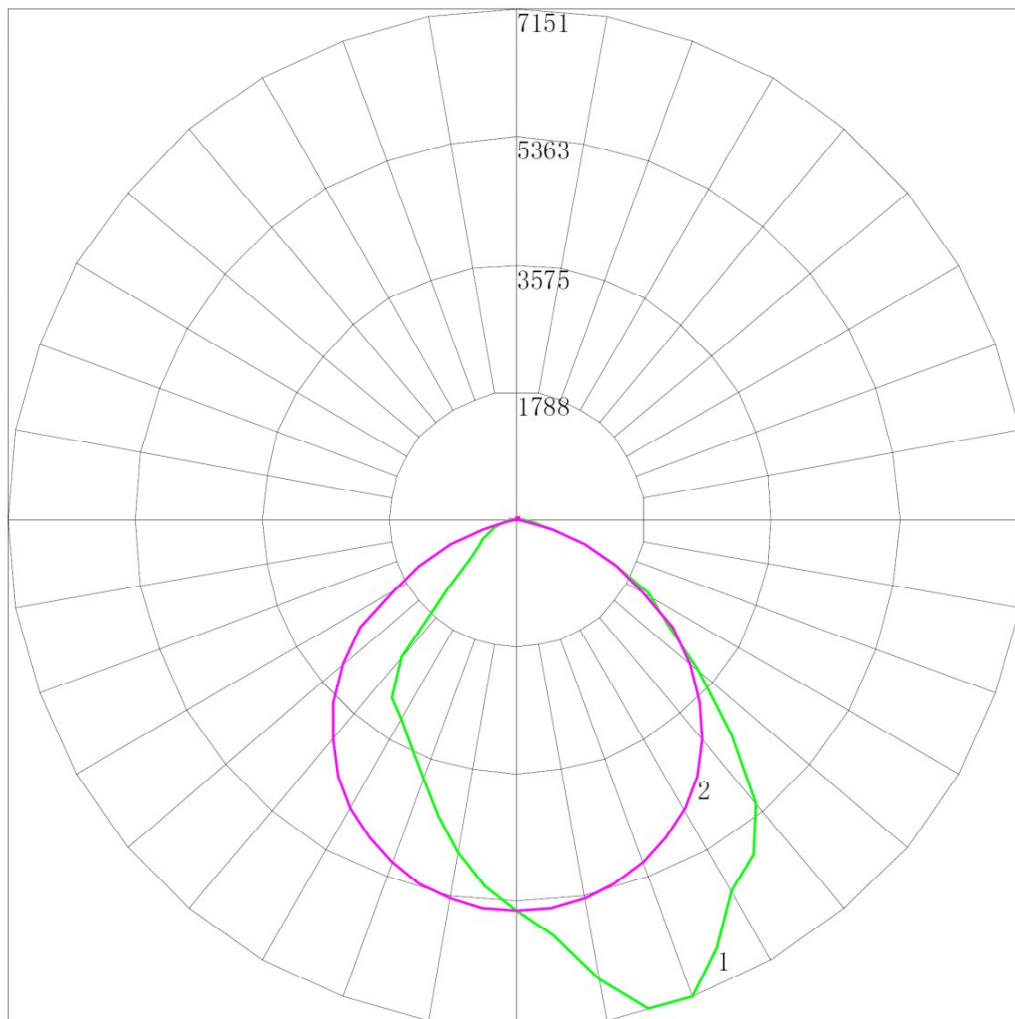
Zone	Lumens	%Lamp	%Fixt
0-20	2070.19	15.20	15.20
0-30	4404.21	32.30	32.30
0-40	7157.57	52.40	52.40
0-60	11731.11	85.90	85.90
0-80	13500.01	98.90	98.90
0-90	13607.02	99.70	99.70
10-90	13083.06	95.80	95.80
20-40	5087.38	37.30	37.30
20-50	7692.17	56.30	56.30
40-70	5812.69	42.60	42.60
60-80	1768.91	13.00	13.00
70-80	529.76	3.90	3.90
80-90	107.01	0.80	0.80
90-110	7.73	0.10	0.10
90-120	12.13	0.10	0.10
90-130	17.28	0.10	0.10
90-150	28.71	0.20	0.20
90-180	45.38	0.30	0.30
110-180	37.65	0.30	0.30
0-180	13652.4	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	523.96
10-20	1546.23
20-30	2334.02
30-40	2753.35
40-50	2604.79
50-60	1968.75
60-70	1239.15
70-80	529.76
80-90	107.01
90-100	3.75
100-110	3.98
110-120	4.40
120-130	5.15
130-140	5.17
140-150	6.26
150-160	7.68
160-170	6.57
170-180	2.41

4.5 Polar Curves of 3000K



Maximum Candela = 7150.716 Located At Horizontal Angle = 0, Vertical Angle = 20
 # 1 - Vertical Plane Through Horizontal Angles (0 - 180)
 # 2 - Vertical Plane Through Horizontal Angles (90 - 270)



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4.6 Candela Tabulation of 3000K

	0	15	30	45	60	75	90	105	120	135
0	5494.818	5494.818	5494.818	5494.818	5494.818	5494.818	5494.818	5494.818	5494.818	5494.818
5	5863.806	5857.064	5789.798	5645.523	5646.444	5556.473	5480.752	5399.442	5320.746	5189.422
10	6560.882	6473.833	6305.678	5983.883	5804.679	5593.571	5421.847	5244.523	5081.472	4862.255
15	7110.728	7002.758	6802.632	6352.112	6004.629	5602.718	5289.092	5029.997	4783.522	4509.929
20	7150.716	7082.048	6955.375	6544.408	6111.491	5569.611	5138.754	4770.694	4463.117	4135.208
25	6621.774	6654.669	6705.677	6464.199	6103.803	5474.683	4939.622	4486.089	4069.299	3717.484
30	6031.940	6086.290	6245.302	6160.512	5948.561	5301.086	4687.739	4154.184	3632.273	3327.349
35	5754.745	5736.498	5811.423	5757.082	5654.627	5056.617	4394.975	3740.430	3195.639	3004.341
40	5214.897	5224.880	5353.638	5325.086	5243.563	4754.334	4041.109	3309.923	2840.498	2823.637
45	4272.435	4409.323	4626.747	4783.835	4739.711	4402.381	3648.120	2830.813	2465.964	2381.239
50	3300.890	3501.410	3870.933	4106.062	4133.091	3928.999	3186.555	2329.626	2104.936	1618.498
55	2581.092	2702.096	3074.917	3406.004	3511.387	3366.325	2680.152	1822.427	1612.073	972.395
60	2113.042	2170.905	2433.787	2775.290	2861.888	2762.929	1993.872	1457.012	865.252	726.301
65	1506.849	1530.080	1765.549	2015.374	2180.641	2098.311	1540.483	983.317	593.236	449.298
70	993.357	1036.940	1146.116	1329.728	1482.547	1505.810	1001.288	404.114	374.544	274.661
75	518.945	518.042	634.722	782.852	915.849	957.196	512.776	213.119	198.592	169.508
80	238.933	249.132	302.499	464.439	497.663	510.599	169.944	103.406	95.415	86.677
85	76.887	77.380	99.069	137.757	158.203	153.002	34.112	30.692	28.973	29.340
90	2.090	2.083	2.485	3.070	4.045	3.352	3.693	4.925	5.489	5.295
95	0.818	0.725	0.904	1.068	1.260	1.343	3.121	5.238	5.894	5.830
100	0.545	0.453	0.497	0.623	0.720	0.986	3.385	5.955	6.749	6.719
105	0.454	0.453	0.452	0.489	0.676	1.077	3.736	6.718	7.603	7.521
110	0.454	0.453	0.497	0.534	0.766	1.211	4.000	7.032	7.965	7.877
115	0.454	0.498	0.587	0.667	1.036	1.390	4.352	7.524	8.414	8.411
120	1.091	1.132	1.310	1.512	1.981	2.644	5.143	7.972	8.909	8.721
125	2.454	2.536	2.756	3.069	3.691	4.528	6.286	7.748	8.729	8.722
130	3.454	3.532	3.705	4.137	4.907	5.918	6.901	7.659	8.505	8.454
135	3.726	3.713	3.976	4.360	5.312	6.320	7.165	7.391	8.190	8.276
140	5.089	5.208	5.467	6.004	6.978	8.158	8.396	8.020	8.553	8.988
145	7.907	8.015	8.449	8.941	10.039	11.207	10.462	9.276	10.037	10.411
150	11.724	11.865	12.109	12.544	13.685	14.930	13.407	11.608	12.469	12.725
155	16.177	15.986	16.401	16.993	18.008	19.187	17.188	15.061	15.845	16.105
160	20.449	20.424	20.783	21.129	22.328	23.400	21.056	17.274	19.268	19.619
165	24.084	24.046	24.307	24.601	25.615	26.405	23.606	21.343	21.925	22.107
170	25.993	25.994	26.250	26.245	27.192	27.796	25.364	23.945	24.629	24.729
175	27.356	27.443	27.516	27.444	28.140	28.426	27.122	27.083	27.510	27.485
180	14.364	14.364	14.364	14.364	14.364	14.364	14.364	14.364	14.364	14.364

Vert. Angles Horizontal Angles

	150	165	180
0	5494.818	5494.818	5494.818
5	5197.549	5180.529	5165.820
10	4804.077	4739.951	4740.485
15	4435.854	4340.527	4322.421
20	4165.675	3917.571	3896.177
25	3601.809	3536.764	3527.190
30	3282.880	3259.169	3247.269
35	3041.591	3059.901	3056.413
40	2834.773	2827.771	2534.742
45	1764.568	1512.232	1382.884
50	1117.215	907.350	859.849
55	780.850	672.780	625.642
60	510.257	519.825	569.931
65	382.976	426.734	436.150
70	295.670	316.879	356.173
75	194.250	201.930	243.659
80	101.535	147.704	131.145



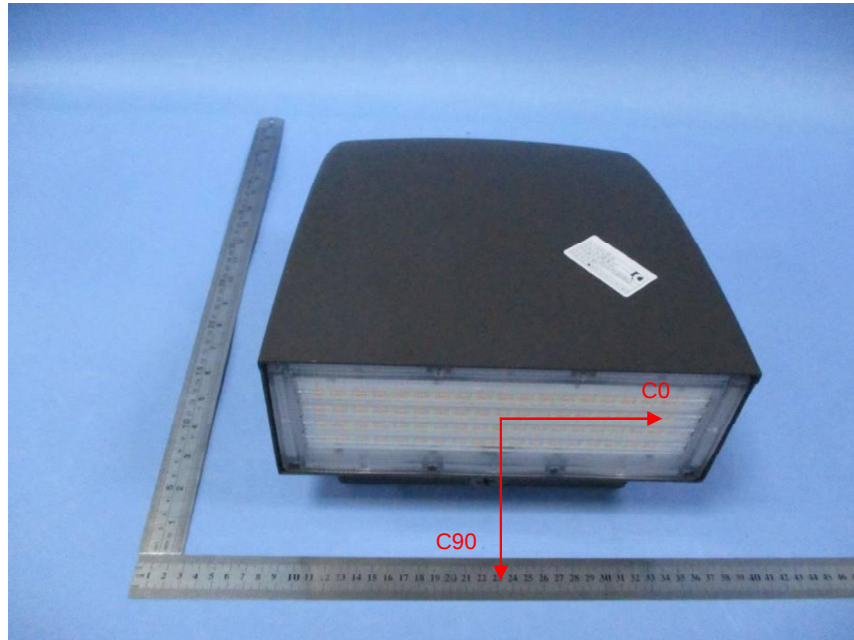
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CANDELA TABULATION - (Cont.)

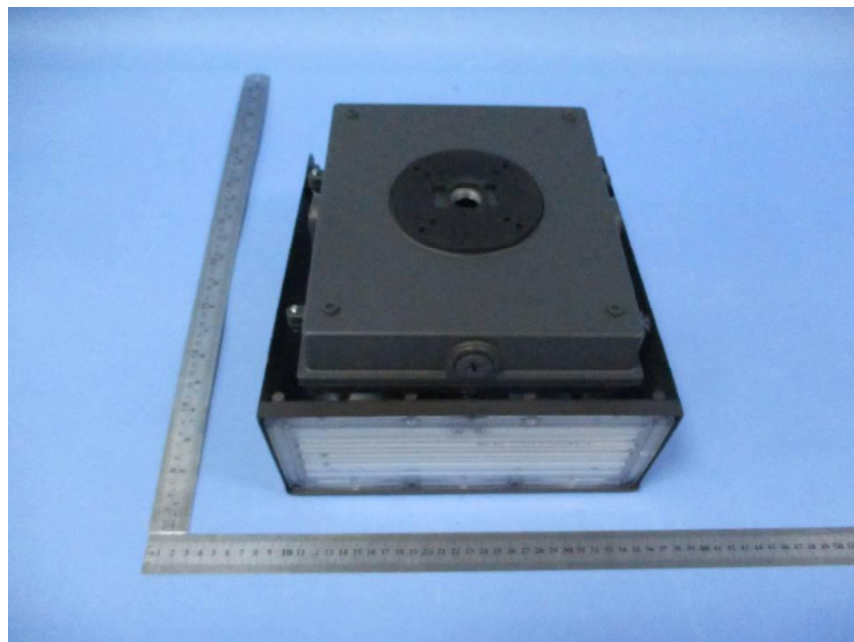
85	32.898	38.587	40.625
90	4.925	4.574	4.453
95	5.422	4.936	4.726
100	5.965	5.706	5.453
105	7.048	6.566	6.271
110	7.590	6.928	6.634
115	7.997	7.472	7.271
120	8.539	8.015	7.816
125	8.494	8.106	7.907
130	8.358	8.061	7.907
135	8.358	8.106	8.089
140	9.262	9.193	9.179
145	10.798	10.868	10.997
150	13.373	13.585	13.814
155	16.897	17.163	17.268
160	20.376	20.695	20.903
165	22.726	23.096	23.266
170	25.393	25.496	25.629
175	28.104	28.304	28.356
180	14.364	14.364	14.364



Appendix A Product Photo



Picture 1



Picture 2

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