

IES LM-79-08

MEASUREMENT AND TEST REPORT For

Super Bright LEDs, Inc.
4400 Earth City Expressway - St. Louis, MO 63045

Test Model: WPSC-CW70



1. Product Description

General Information:

One sample was received on 2015-11-03 and used for testing.

Model Tested: WPSC-CW70

Product Designation : Outdoor Non-cutoff and Semi-cutoff Wall-Mounted Area Luminaires
Dimmable: Non-Dimmable
Burning Time Before Test: 0 hour(For New Products)

Rated Values:

Rated Voltage/Frequency: AC110V-270V 60Hz
Rated Power: 70 W
Nominal Light Output: 6500 lm
Nominal CCT: 5000K
Nominal CRI: 80

2. Standards Used

IESNA LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integrating Sphere	SENSING	SPR-600	S09008	1.5 meter	2015-03-24	2016-03-24
Spectral photometer	SENSING	SPR3000	90902027	380nm~800nm	2015-03-24	2016-03-24
Power Meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/300/600 V	2015-03-05	2016-03-05
AC Power Supply	ALL Power	APW-105N	970613	0V-300V 50-400Hz	2015-03-05	2016-03-05
Standard Light Source	EVERFINE	D204	201311	N/A	2015-10-31	2016-10-31
Thermal Meter	SENSING	N/A	N/A	25 ,45 ,55	2015-03-05	2016-03-05
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~60V	2015-03-05	2016-03-05
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2015-03-05	2016-03-05
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2015-03-05	2016-03-05
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2015-03-05	2016-03-05
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W /10A	2015-03-20	2016-03-20

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Thermal Meter	Victor	VC230	EE091	0~40 0~90%	2013-04-01	2016-03-31
Standard Light Source	EVERFINE	D908	1012003	N/A	2015-05-15	2016-05-14

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is $U=2.1\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=32\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.1$ ($K=2$), at the 95% confidence level.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the luminous intensity is $U=2.82\%$ ($K=2$), at the 95% confidence level.

Additional Test

The Additional Test item may not be covered by IESNA LM-79-2008. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. Test voltage for THD and power factor test would be equal to rated voltage or, in case of a voltage range, maximum value of that range.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.15\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.02	60	0.5769	68.43	0.988

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
7197.717	19.439	105.184	5122	0.00353

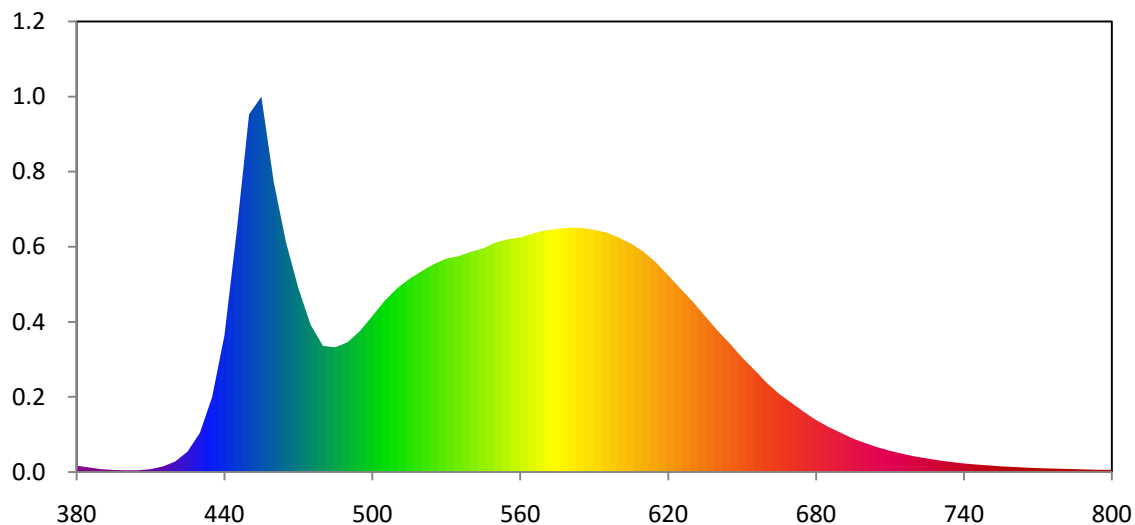
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3423	0.3564	0.2077	0.3244	0.2077	0.4866

Color Rendering Index

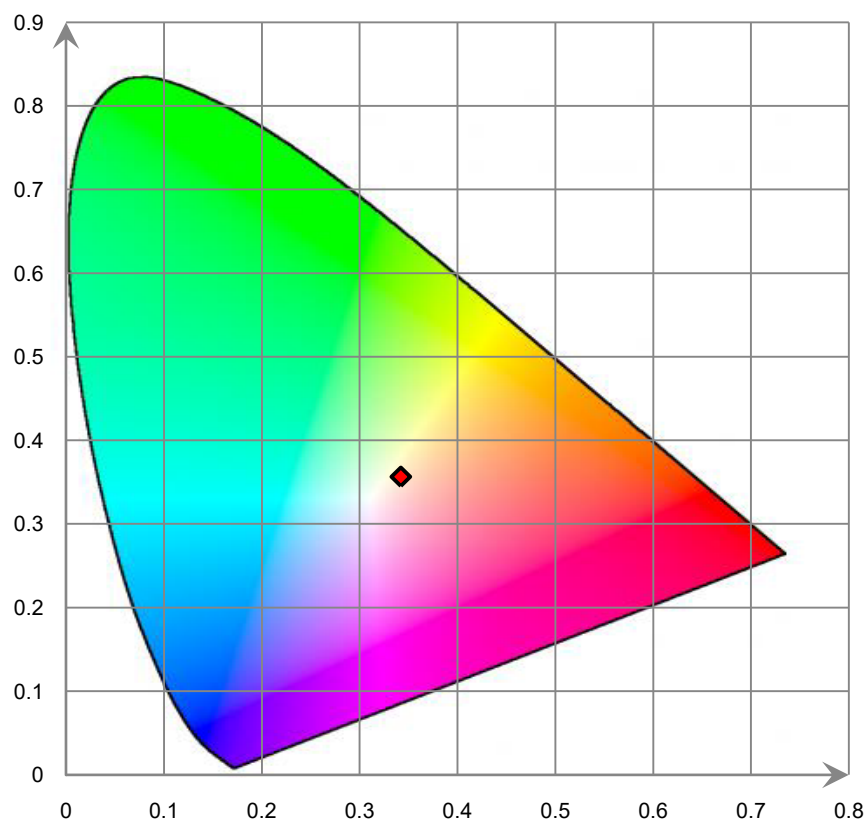
Ra 84.3			
R1 83	R2 91	R3 95	R4 82
R5 83	R6 86	R7 87	R8 68
R9 11	R10 78	R11 81	R12 63
R13 86	R14 97	R15 77	

Relative Spectral Power Distribution

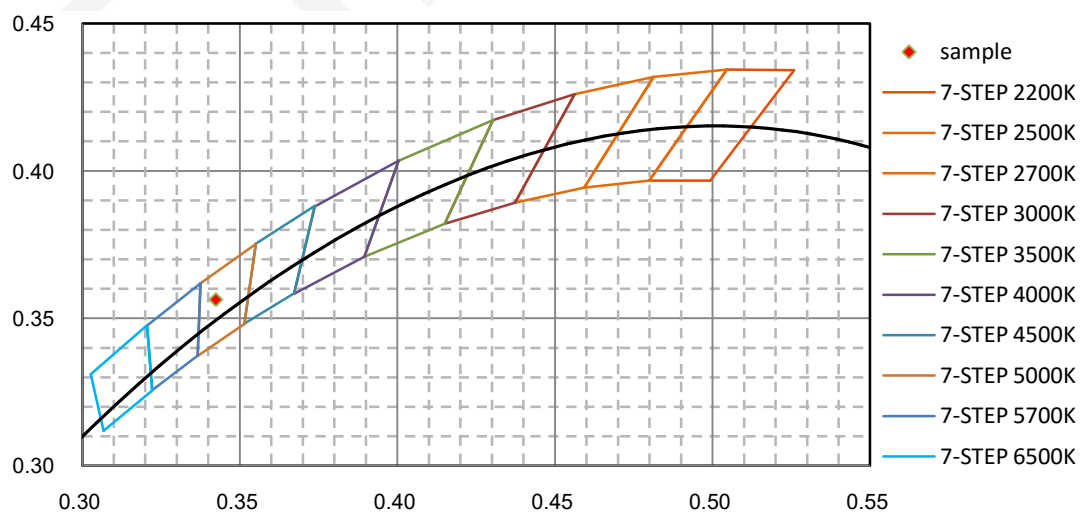


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.217E-02	465	4.341E-01	550	4.340E-01	635	2.947E-01	720	2.981E-02
385	8.951E-03	470	3.475E-01	555	4.399E-01	640	2.678E-01	725	2.602E-02
390	5.652E-03	475	2.781E-01	560	4.434E-01	645	2.433E-01	730	2.216E-02
395	4.127E-03	480	2.385E-01	565	4.506E-01	650	2.167E-01	735	1.914E-02
400	3.492E-03	485	2.359E-01	570	4.567E-01	655	1.934E-01	740	1.645E-02
405	3.719E-03	490	2.457E-01	575	4.595E-01	660	1.688E-01	745	1.446E-02
410	5.632E-03	495	2.666E-01	580	4.621E-01	665	1.482E-01	750	1.275E-02
415	1.078E-02	500	2.949E-01	585	4.616E-01	670	1.311E-01	755	1.098E-02
420	2.003E-02	505	3.236E-01	590	4.577E-01	675	1.143E-01	760	9.905E-03
425	3.869E-02	510	3.470E-01	595	4.527E-01	680	9.873E-02	765	8.675E-03
430	7.385E-02	515	3.650E-01	600	4.431E-01	685	8.568E-02	770	7.685E-03
435	1.417E-01	520	3.796E-01	605	4.318E-01	690	7.452E-02	775	6.936E-03
440	2.584E-01	525	3.930E-01	610	4.164E-01	695	6.356E-02	780	6.403E-03
445	4.558E-01	530	4.034E-01	615	3.967E-01	700	5.480E-02		
450	6.759E-01	535	4.080E-01	620	3.718E-01	705	4.706E-02		
455	7.094E-01	540	4.163E-01	625	3.469E-01	710	4.039E-02		
460	5.488E-01	545	4.226E-01	630	3.223E-01	715	3.480E-02		

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0 hour**

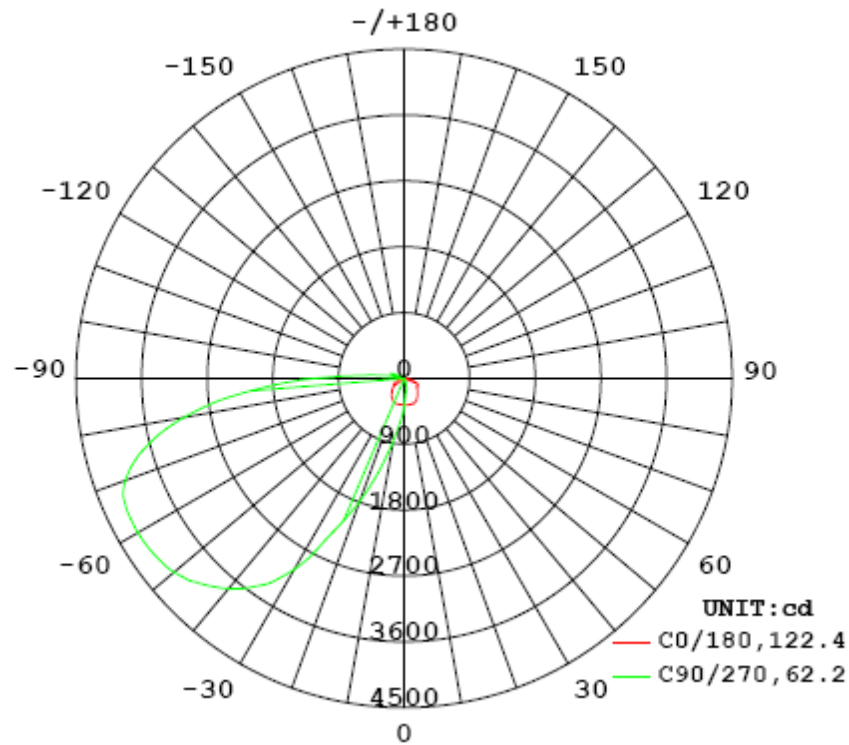
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.5731	67.88	0.9867

Photometric Measurement

Luminous Flux (lm)(0-90° zone)	Efficacy (lm/W) (0-90° zone)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
6944.7	102.31	4220	1.34	0.27

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	122.4	55.2	62.2	56.5	74.1
Field Angle (10% I _{max}):	159.3	95.2	95.0	96.6	111.5

Luminous Intensity (cd) Distribution Data

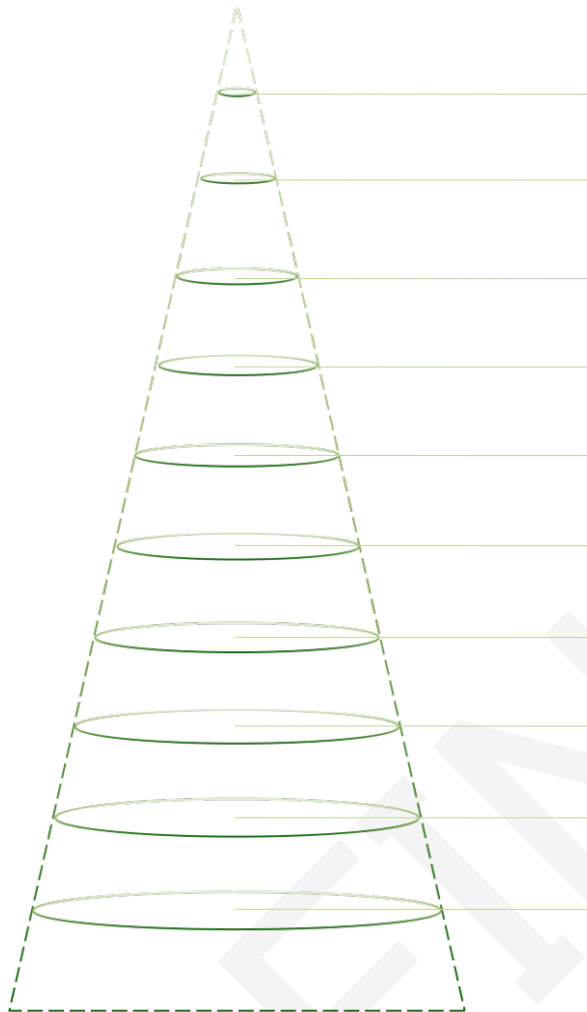
$\gamma \backslash C$	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	363	363	363	363	363	363	363	363
5.0°	362	440	512	563	583	566	516	445
10.0°	362	519	665	803	860	808	677	529
15.0°	364	583	880	1164	1275	1170	897	599
20.0°	362	667	1163	1618	1788	1629	1186	683
25.0°	350	748	1500	2084	2313	2107	1538	776
30.0°	326	855	1864	2727	3012	2762	1909	894
35.0°	301	1000	2372	3192	3455	3251	2446	1047
40.0°	269	1166	2741	3509	3753	3577	2875	1231
45.0°	240	1414	2976	3713	3961	3794	3135	1520
50.0°	206	1603	3144	3874	4122	3955	3311	1793
55.0°	177	1738	3235	3943	4190	4042	3417	1943
60.0°	169	1833	3249	3961	4218	4057	3451	2076
65.0°	138	1843	3188	3933	4206	4035	3426	2142
70.0°	101	1717	3050	3808	4070	3938	3316	2074
75.0°	65	1321	2638	3413	3686	3594	3015	1799
80.0°	21	889	1952	2766	3066	2988	2390	1292
85.0°	6	394	1169	1932	2191	2184	1554	780
90.0°	1	243	546	973	1240	1158	851	298
95.0°	1	82	298	396	531	473	388	190
100.0°	1	42	76	186	216	197	69	97
105.0°	1	19	50	73	74	73	103	47
110.0°	1	6	44	143	171	166	49	11
115.0°	1	1	34	86	119	92	41	3
120.0°	1	0	23	69	88	74	29	1
125.0°	1	0	11	48	65	53	16	1
130.0°	1	0	1	28	43	32	4	1
135.0°	1	0	0	10	21	12	0	1
140.0°	1	0	0	0	3	0	0	1
145.0°	1	0	0	0	0	0	1	1
150.0°	1	1	0	0	0	1	1	1
155.0°	1	1	1	0	0	1	1	1
160.0°	1	1	1	1	1	1	1	2
165.0°	1	1	1	1	1	1	1	2
170.0°	1	1	1	1	1	1	1	2
175.0°	1	1	1	1	1	1	1	2
180.0°	1	1	1	1	1	1	1	1

Luminous Intensity (cd) Distribution Data (cont.)

$\gamma \backslash C$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	363	363	363	363	363	363	363	363
5.0°	365	299	258	235	227	234	257	298
10.0°	365	252	195	171	164	171	194	249
15.0°	366	213	157	126	114	125	156	211
20.0°	366	185	119	76	63	74	115	184
25.0°	358	162	78	43	36	42	73	158
30.0°	339	138	47	25	19	24	43	130
35.0°	312	108	28	13	11	12	25	101
40.0°	286	80	15	9	7	8	13	72
45.0°	260	56	8	5	4	5	8	48
50.0°	243	35	6	3	2	3	5	28
55.0°	209	19	3	1	0	0	3	13
60.0°	214	7	2	0	1	0	1	5
65.0°	210	3	0	1	1	1	1	3
70.0°	169	2	1	1	1	1	1	1
75.0°	123	1	1	1	1	1	1	1
80.0°	51	1	1	1	1	1	1	1
85.0°	23	1	1	1	1	1	1	1
90.0°	1	1	1	1	1	1	1	1
95.0°	0	1	1	1	2	2	1	1
100.0°	1	1	1	2	2	2	2	1
105.0°	1	1	2	2	3	3	2	1
110.0°	1	1	2	3	3	3	2	2
115.0°	1	1	2	3	3	3	2	2
120.0°	1	1	2	3	3	3	2	2
125.0°	1	1	2	3	3	3	2	2
130.0°	1	1	2	2	3	3	2	2
135.0°	1	1	2	2	2	2	2	2
140.0°	1	1	1	2	2	2	2	2
145.0°	1	1	1	1	2	2	2	2
150.0°	1	1	1	1	1	1	1	2
155.0°	1	1	1	1	1	1	1	1
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
170.0°	1	1	1	1	1	1	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	1	1	1	1	1	1	1	1

Average Area Illumination Figure

Angle:74.1 °. Flux out:1083.0 lm.



Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	75.46	2258.0	7801.0
1.0	150.92	564.5	1950.0
1.5	226.37	250.9	866.8
2.0	301.83	141.1	487.6
2.5	377.29	90.3	312.0
3.0	452.75	62.7	216.7
3.5	528.21	46.1	159.2
4.0	603.66	35.3	121.9
4.5	679.12	27.9	96.3
5.0	754.58	22.6	78.0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	9.0	0.12
5-10	29.3	0.41
10-15	57.0	0.79
15-20	96.1	1.34
20-25	148.4	2.06
25-30	217.2	3.01
30-35	302.0	4.20
35-40	389.4	5.40
40-45	470.9	6.54
45-50	549.0	7.62
50-55	614.8	8.54
55-60	666.0	9.24
60-65	704.1	9.78
65-70	718.9	9.98
70-75	687.6	9.55
75-80	587.5	8.16
80-85	437.4	6.07
85-90	260.1	3.61
90-95	127.1	1.76
95-100	52.9	0.74
100-105	18.9	0.26
105-110	16.4	0.23
110-115	15.8	0.22
115-120	10.5	0.14
120-125	7.4	0.11
125-130	4.5	0.06
130-135	2.2	0.03
135-140	0.8	0.01
140-145	0.3	0.01
145-150	0.3	0.00
150-155	0.2	0.00
155-160	0.2	0.01
160-165	0.1	0.00
165-170	0.1	0.00
170-175	0.1	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	9.0	0.12
0-10	38.3	0.53
0-15	95.3	1.32
0-20	191.4	2.66
0-25	339.8	4.72
0-30	557.0	7.73
0-35	859.0	11.93
0-40	1248.4	17.33
0-45	1719.2	23.87
0-50	2268.2	31.49
0-55	2883.0	40.03
0-60	3549.1	49.27
0-65	4253.2	59.05
0-70	4972.1	69.03
0-75	5659.7	78.58
0-80	6247.2	86.74
0-85	6684.6	92.81
0-90	6944.7	96.42
0-95	7071.8	98.18
0-100	7124.6	98.92
0-105	7143.5	99.18
0-110	7159.9	99.41
0-115	7175.8	99.63
0-120	7186.2	99.77
0-125	7193.6	99.88
0-130	7198.2	99.94
0-135	7200.4	99.97
0-140	7201.2	99.98
0-145	7201.6	99.99
0-150	7201.8	99.99
0-155	7202.1	99.99
0-160	7202.2	100.00
0-165	7202.4	100.00
0-170	7202.5	100.00
0-175	7202.6	100.00
0-180	7202.6	100.00

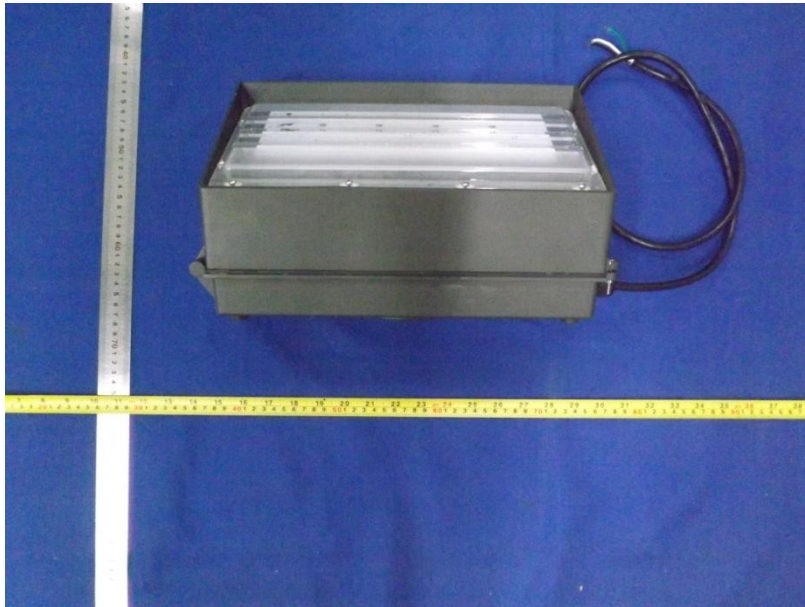
80-90° Zonal Lumen Density : $(6944.7-6247.2) / 6944.7 = 10.04\%$

[Additional Test]

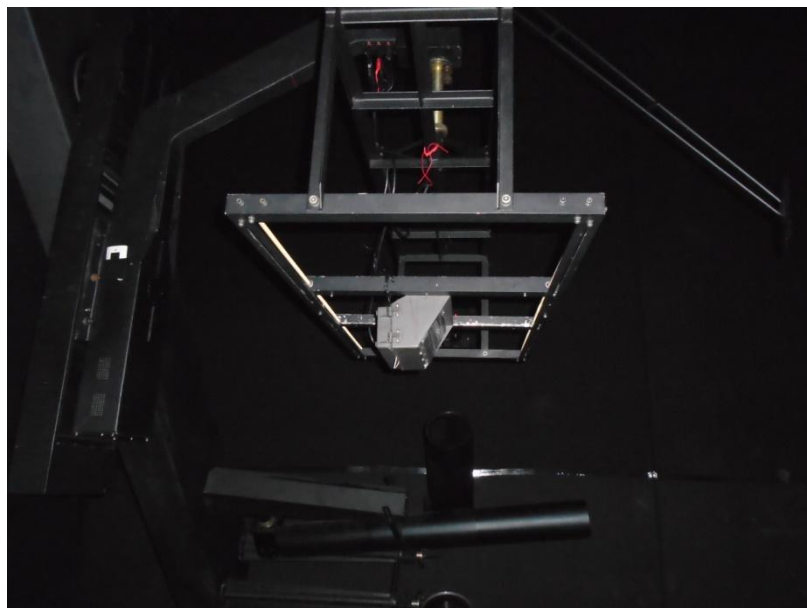
Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	270.0	60	0.9315
Total Harmonic Distortion:	270.0	60	18.58%
Total Harmonic Distortion:	120.0	60	13.14%
Total Harmonic Distortion:	110.0	60	12.57%
Power Factor:	110.0	60	0.9979

6. Product Photo





7. Product Test orientation in the Goniophotometer



*****END OF REPORT*****