

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

Shenzhen Jiawei Photovoltaic Lighting Co., Ltd.

No. 1,2,3,4, Xinfu Industry Zone, Central Community, Pingdi Road, Longgang District, Shenzhen City, Guangdong Province, P.R.China

Test Model: 32PL-840-WFL-D

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
Test Engineer:	Daniel Duan <i>Daniel Duan</i>
Report Number:	RSZ140925508-10A1
Test Date:	2014-10-11 to 2014-10-13
Report Date:	2014-10-15
Reviewed By:	Jeanne Han/Safety Manager <i>Jeanne Han</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility:	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
Accreditation:	The NVLAP Lab Code is 200707-0.

STATEMENT: This test may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). The test data was only valid for the test sample(s). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

1. Product Description

General Information:

One sample was received on 2014-09-25 and used for testing. Sample Model: 32PL-840-WFL-D

Model Tested: 32PL-840-WFL-D
 Manufacturer: Shenzhen Jiawei Photovoltaic Lighting Co., Ltd.
 Brand Name: Maximus; duracell
 Product Designation: LED Ceiling Light
 Burning Time Before Test: 0 hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120V AC 60Hz
 Rated Power: 32W
 Nominal CCT: 4000K

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	2014-03-16	2015-03-16
Spectral photometer	SENSING	SPR3000	90902027	350nm~800nm	2014-03-16	2015-03-16
Power Meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/300/600 V	2014-03-12	2015-03-12
AC Power Supply	ALL Power	APW-105N	970613	0V-300V 50-400Hz	2014-03-12	2015-03-12
Standard Light Source	EVERFINE	D204	01331191	N/A	2013-12-04	2014-12-04
Thermal Meter	SENSING	N/A	N/A	25°C,45°C,55°C	2014-03-16	2015-03-16
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~60V	2014-03-12	2015-03-12
AC Power Supply	EVERFINE	VPS1060 PWM	1101006	0-150V, 0-300V	2014-03-12	2015-03-12
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2014-03-12	2015-03-12
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2014-03-12	2015-03-12
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2014-03-04	2015-03-04
Thermal Meter	Victor	VC230	EE091	0~40°C0~90%	2013-04-01	2016-03-31
Standard Light Source	EVERFINE	D908	1012001	N/A	2014-05-06	2015-05-06

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.

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 $U=1.60\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=21\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=1.3(K=2)$, at the 95% confidence level.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement.

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.

5. Test Result

[Integrating Sphere System]

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

Test orientation: **Downward**

Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.03	60.0	0.2713	32.47	0.997

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
2323.464	6.93	71.557	4257	-4.30E-03

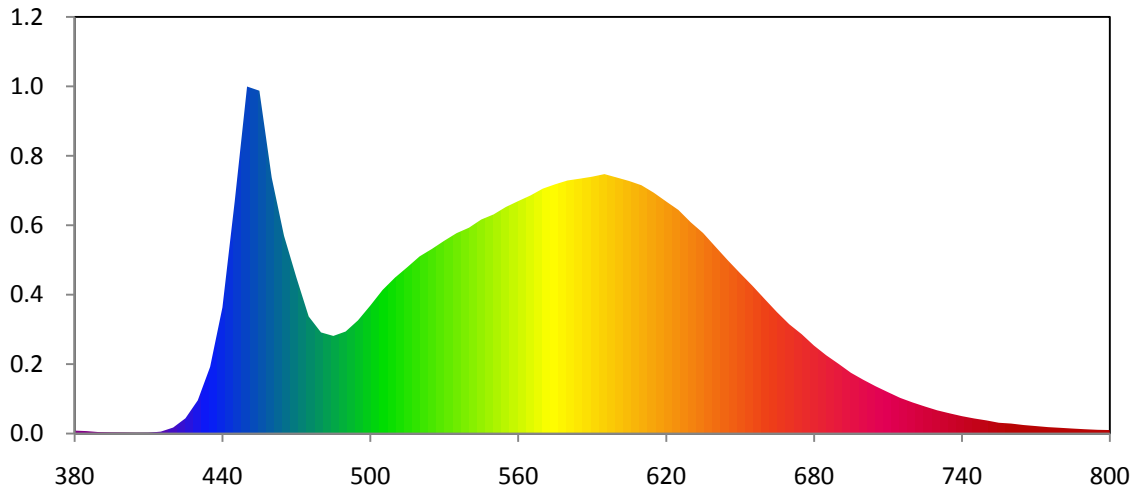
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3675	0.3595	0.2234	0.3279	0.2234	0.4918

Color Rendering Index

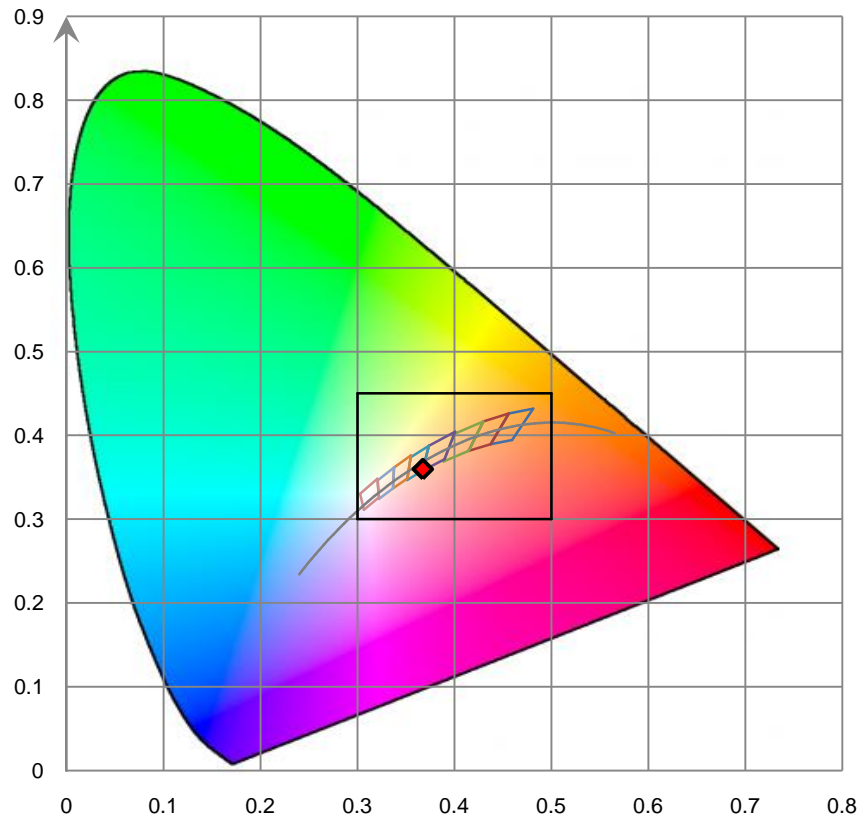
Ra			
87.0			
R1 87	R2 93	R3 95	R4 85
R5 86	R6 88	R7 89	R8 75
R9 36	R10 81	R11 83	R12 63
R13 89	R14 97	R15 84	

Relative Spectral Power Distribution

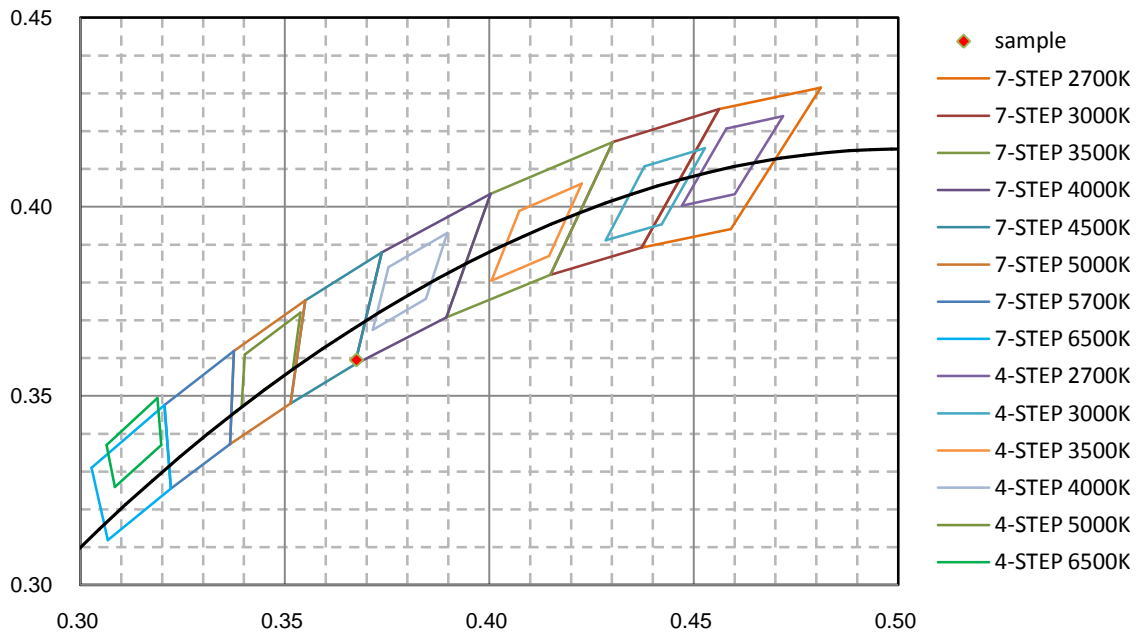


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.013E-03	465	1.338E-01	550	1.483E-01	635	1.357E-01	720	2.106E-02
385	1.668E-03	470	1.057E-01	555	1.533E-01	640	1.265E-01	725	1.833E-02
390	9.908E-04	475	7.924E-02	560	1.573E-01	645	1.173E-01	730	1.573E-02
395	7.434E-04	480	6.844E-02	565	1.611E-01	650	1.086E-01	735	1.371E-02
400	6.558E-04	485	6.607E-02	570	1.657E-01	655	1.000E-01	740	1.179E-02
405	5.101E-04	490	6.906E-02	575	1.686E-01	660	9.103E-02	745	1.021E-02
410	5.681E-04	495	7.660E-02	580	1.712E-01	665	8.214E-02	750	8.907E-03
415	1.317E-03	500	8.659E-02	585	1.725E-01	670	7.392E-02	755	7.307E-03
420	4.060E-03	505	9.718E-02	590	1.738E-01	675	6.726E-02	760	6.780E-03
425	1.032E-02	510	1.055E-01	595	1.755E-01	680	5.955E-02	765	5.788E-03
430	2.246E-02	515	1.126E-01	600	1.732E-01	685	5.294E-02	770	5.081E-03
435	4.510E-02	520	1.199E-01	605	1.709E-01	690	4.715E-02	775	4.362E-03
440	8.534E-02	525	1.249E-01	610	1.680E-01	695	4.113E-02	780	3.883E-03
445	1.573E-01	530	1.305E-01	615	1.630E-01	700	3.641E-02	785	3.381E-03
450	2.348E-01	535	1.356E-01	620	1.571E-01	705	3.202E-02	790	2.926E-03
455	2.320E-01	540	1.393E-01	625	1.513E-01	710	2.804E-02	795	2.559E-03
460	1.732E-01	545	1.448E-01	630	1.430E-01	715	2.412E-02	800	2.398E-03

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

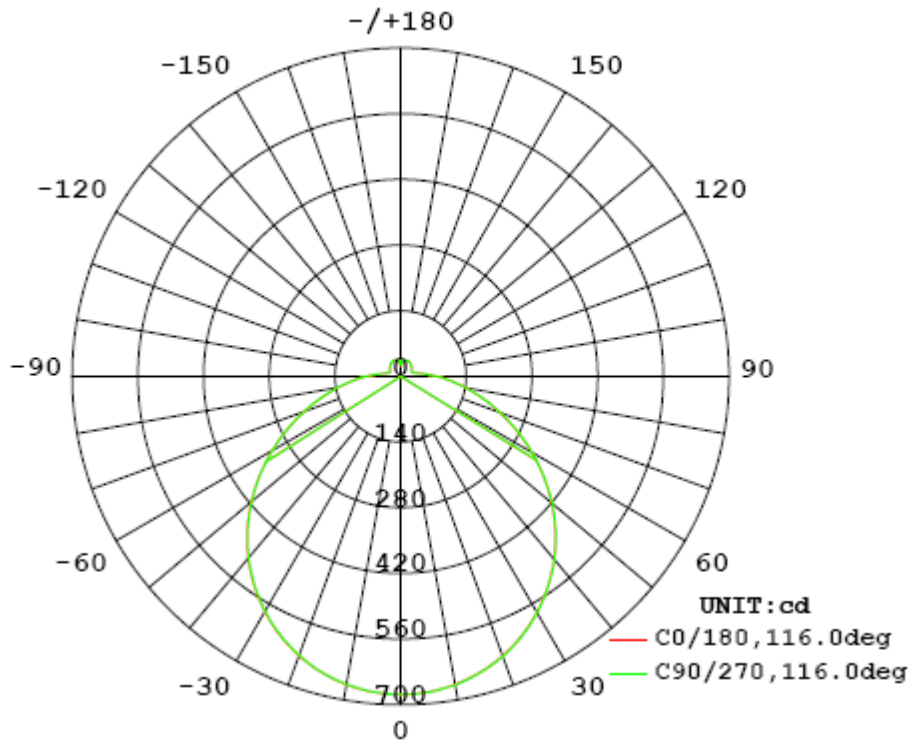
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60.0	0.2722	32.50	0.9950

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
2349.96	72.31	678	1.27	1.27

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	116.0	115.8	116.0	116.2	116.00
Field Angle (10% I _{max}):	183.2	183.1	183.4	183.5	183.30

Luminous Intensity (cd) Distribution Data

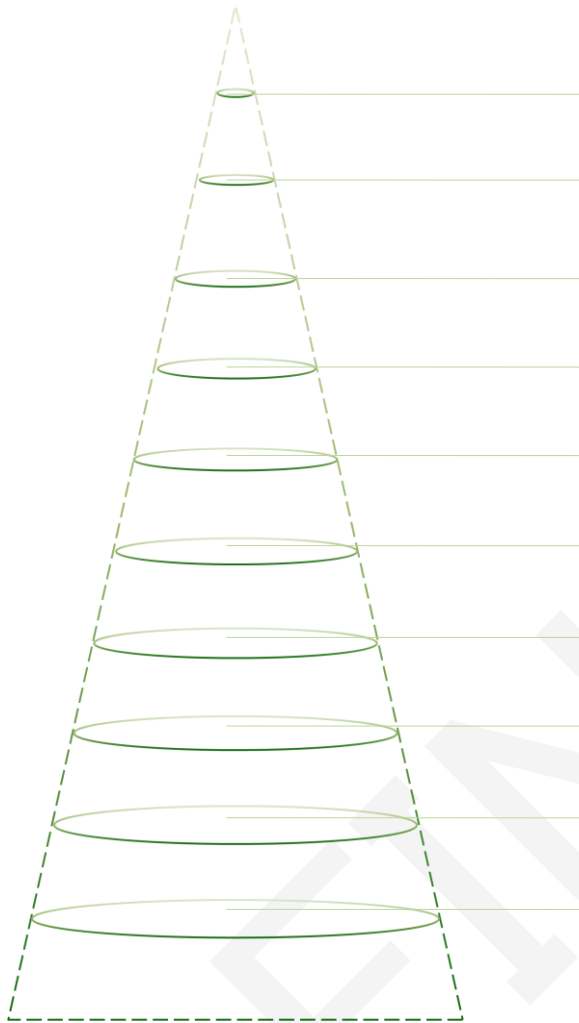
C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	678	678	678	678	678	678	678	678
5.0°	675	675	675	675	675	676	675	675
10.0°	667	666	666	666	666	666	667	667
15.0°	653	652	652	652	652	653	652	654
20.0°	634	632	632	632	633	633	633	635
25.0°	609	608	607	608	607	608	609	611
30.0°	579	577	577	578	578	579	580	583
35.0°	544	543	542	542	543	544	546	549
40.0°	506	503	502	503	504	506	507	510
45.0°	463	461	459	460	461	463	465	468
50.0°	416	413	412	413	414	417	419	422
55.0°	367	364	363	363	366	368	371	374
60.0°	316	314	313	314	316	318	321	324
65.0°	267	264	263	264	266	269	272	275
70.0°	219	217	216	217	219	222	225	227
75.0°	175	173	172	173	175	178	180	183
80.0°	135	133	133	134	136	138	141	143
85.0°	101	100	99	100	102	104	107	108
90.0°	73	72	72	73	74	76	78	80
95.0°	52	51	51	52	53	55	56	57
100.0°	37	37	37	37	38	39	40	41
105.0°	28	28	28	29	29	30	31	31
110.0°	25	25	25	26	26	27	27	27
115.0°	25	25	25	26	26	26	27	26
120.0°	27	27	27	27	28	28	28	28
125.0°	28	28	29	29	29	29	29	29
130.0°	30	30	30	31	31	31	31	31
135.0°	32	32	32	33	32	33	32	32
140.0°	34	34	34	34	34	34	34	34
145.0°	35	35	36	36	35	36	36	35
150.0°	36	37	37	36	37	37	36	37
155.0°	37	36	38	38	38	38	37	37
160.0°	38	37	31	38	38	37	37	32
165.0°	36	36	37	35	36	36	36	38
170.0°	31	32	33	32	33	32	32	33
175.0°	27	27	27	28	29	28	28	27
180.0°	35	35	35	35	35	33	34	34

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	678	678	678	678	678	678	678	678
5.0°	675	676	676	676	676	675	675	674
10.0°	667	667	667	668	668	667	666	666
15.0°	653	654	654	654	654	653	652	652
20.0°	634	634	635	635	635	634	632	632
25.0°	610	610	611	611	611	610	608	607
30.0°	581	581	581	582	582	581	580	578
35.0°	547	547	548	548	548	547	545	543
40.0°	508	509	509	510	509	508	506	504
45.0°	466	467	467	467	467	466	463	461
50.0°	420	421	421	421	421	420	417	414
55.0°	372	373	373	373	373	371	368	366
60.0°	322	323	323	324	323	322	318	316
65.0°	273	274	274	274	273	272	269	266
70.0°	225	226	226	226	226	224	221	218
75.0°	181	182	182	182	181	180	177	174
80.0°	141	142	142	142	141	140	137	135
85.0°	106	107	107	107	106	105	103	101
90.0°	78	78	78	78	78	76	75	73
95.0°	56	56	56	56	55	54	53	52
100.0°	40	40	40	40	39	39	38	37
105.0°	31	31	30	30	30	29	29	29
110.0°	27	26	26	26	26	26	25	25
115.0°	26	26	25	25	25	25	25	25
120.0°	27	27	27	27	27	27	27	27
125.0°	29	29	28	28	28	28	29	29
130.0°	30	30	30	30	30	30	30	30
135.0°	32	32	32	32	32	32	32	32
140.0°	34	34	34	34	34	34	34	34
145.0°	35	35	35	35	35	35	35	35
150.0°	37	36	36	36	37	37	36	37
155.0°	36	37	36	37	36	38	37	37
160.0°	36	37	38	38	37	31	37	37
165.0°	37	37	35	36	36	37	37	35
170.0°	32	32	32	32	32	33	33	32
175.0°	26	26	27	28	27	26	27	26
180.0°	32	32	32	32	33	33	32	32

Average Area Illumination Figure

Angle: 116.00°. Flux out: 1496.0 lm.



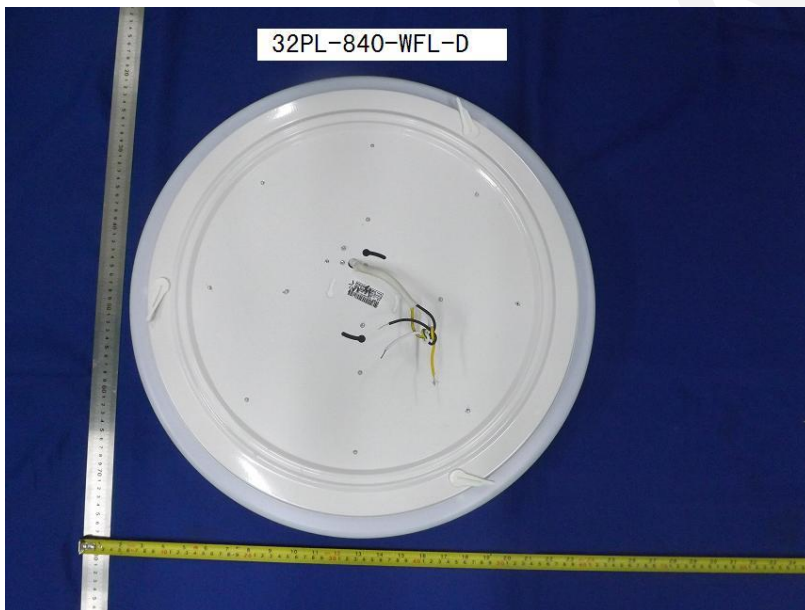
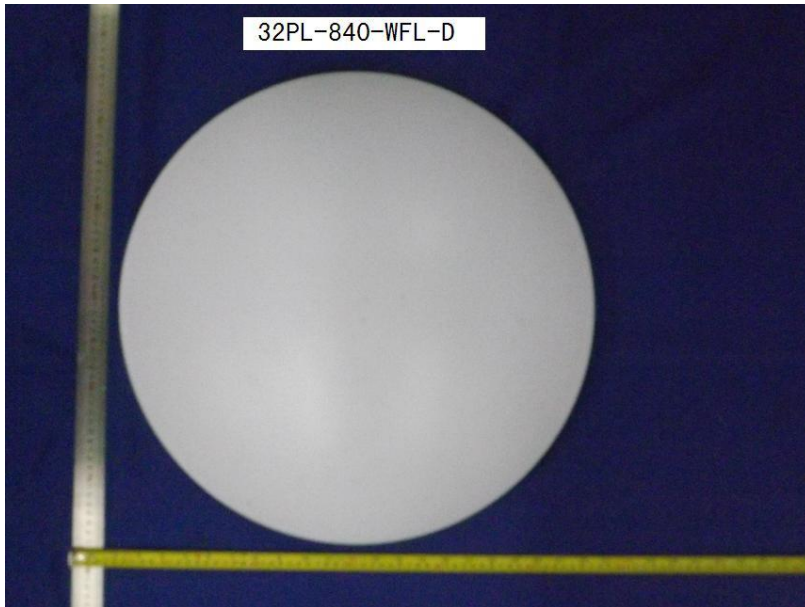
Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	160.0	744.0	2724.0
1.0	320.1	186.0	681.0
1.5	480.1	82.7	302.7
2.0	640.1	46.5	170.3
2.5	800.2	29.8	109.0
3.0	960.2	20.7	75.7
3.5	1120.2	15.2	55.6
4.0	1280.3	11.6	42.6
4.5	1440.3	9.2	33.6
5.0	1600.3	7.4	27.2

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	16.2	0.69
5-10	48.0	2.04
10-15	78.3	3.33
15-20	106.0	4.51
20-25	130.4	5.55
25-30	150.5	6.40
30-35	165.7	7.05
35-40	175.5	7.47
40-45	179.7	7.65
45-50	178.1	7.58
50-55	171.0	7.28
55-60	159.0	6.76
60-65	143.0	6.09
65-70	124.4	5.29
70-75	104.4	4.45
75-80	84.4	3.59
80-85	65.5	2.79
85-90	49.0	2.08
90-95	35.3	1.50
95-100	24.9	1.06
100-105	18.0	0.77
105-110	14.3	0.61
110-115	12.9	0.55
115-120	12.8	0.54
120-125	12.9	0.55
125-130	12.8	0.55
130-135	12.6	0.53
135-140	12.2	0.52
140-145	11.6	0.50
145-150	10.6	0.45
150-155	9.3	0.39
155-160	7.8	0.33
160-165	5.9	0.25
165-170	4.1	0.18
170-175	2.2	0.09
175-180	0.6	0.03

Deg	Flux (lm)	%
0-5	16.2	0.69
0-10	64.2	2.73
0-15	142.5	6.06
0-20	248.5	10.57
0-25	378.9	16.12
0-30	529.3	22.52
0-35	695.0	29.57
0-40	870.5	37.04
0-45	1050.2	44.69
0-50	1228.3	52.27
0-55	1399.3	59.55
0-60	1558.4	66.31
0-65	1701.4	72.40
0-70	1825.7	77.69
0-75	1930.2	82.14
0-80	2014.6	85.73
0-85	2080.1	88.52
0-90	2129.1	90.60
0-95	2164.3	92.10
0-100	2189.2	93.16
0-105	2207.2	93.93
0-110	2221.6	94.54
0-115	2234.5	95.09
0-120	2247.3	95.63
0-125	2260.2	96.18
0-130	2273.1	96.73
0-135	2285.7	97.26
0-140	2297.9	97.78
0-145	2309.4	98.28
0-150	2320.0	98.73
0-155	2329.3	99.12
0-160	2337.1	99.45
0-165	2343.0	99.70
0-170	2347.2	99.88
0-175	2349.3	99.97
0-180	2350.0	100.00

6. Product Photo



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