

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-SQ20-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:	RSZ140925507-10A1
Test Date:	2014-10-11 to 2014-10-13
Report Date:	2014-10-15
Reviewed By:	Jeanne Han/Safety Manager <i>Jeanne Han</i>
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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.

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1. Product Description

General Information:

One sample was received on 2014-09-25 and used for testing. Sample Model: 32PL-840-SQ20-WFL-D

Model Tested: 32PL-840-SQ20-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°C 0~90%	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
120.02	60.0	0.269	32.216	0.998

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
2296.191	6.487	71.275	4244	-3.07E-03

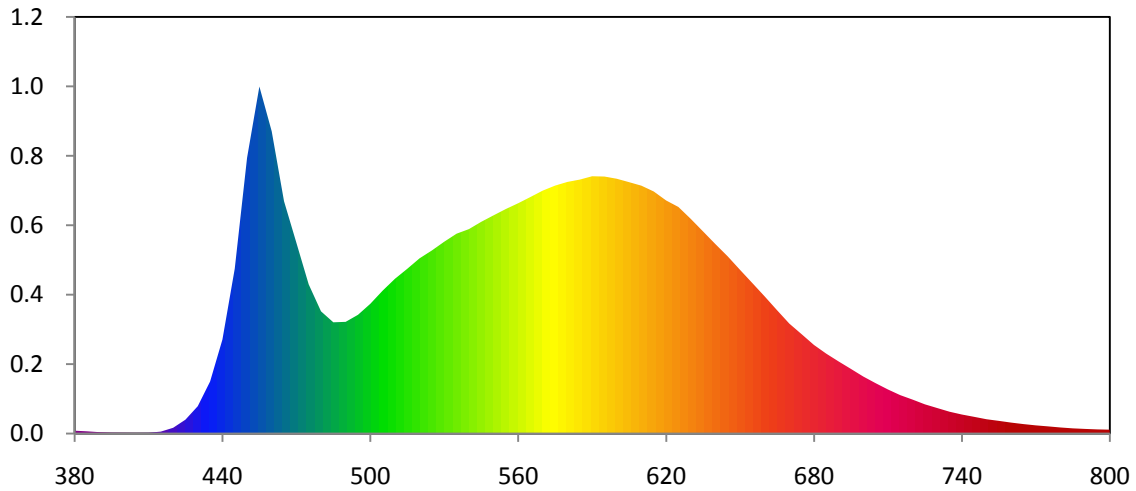
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3686	0.3628	0.2229	0.3290	0.2229	0.4935

Color Rendering Index

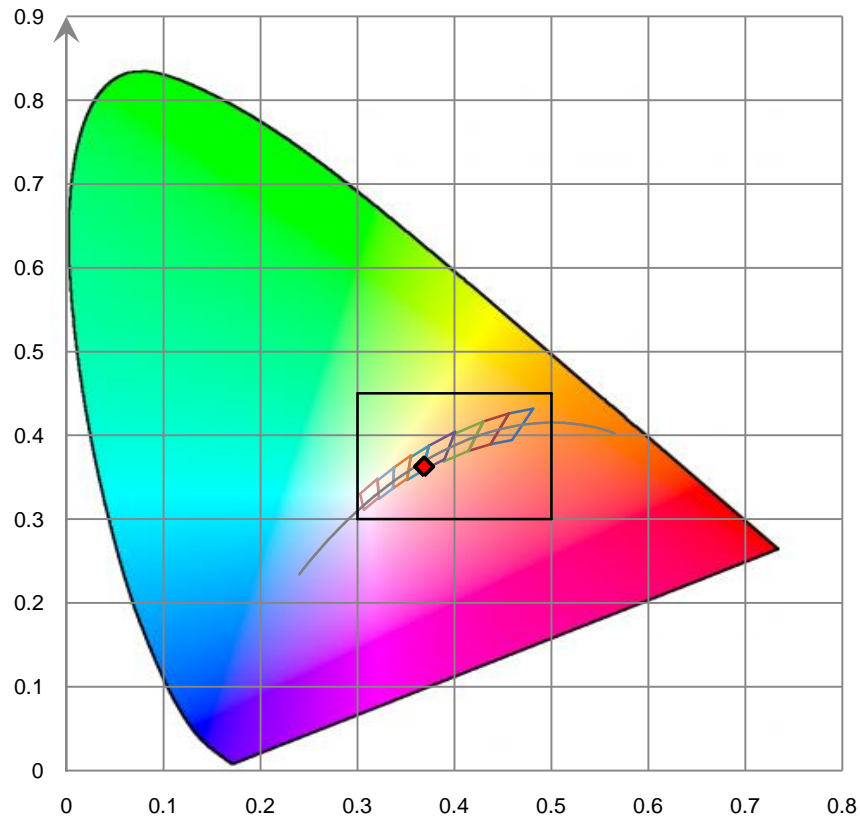
Ra			
87.8			
R1 88	R2 95	R3 96	R4 84
R5 86	R6 90	R7 88	R8 75
R9 40	R10 86	R11 82	R12 64
R13 91	R14 98	R15 85	

Relative Spectral Power Distribution

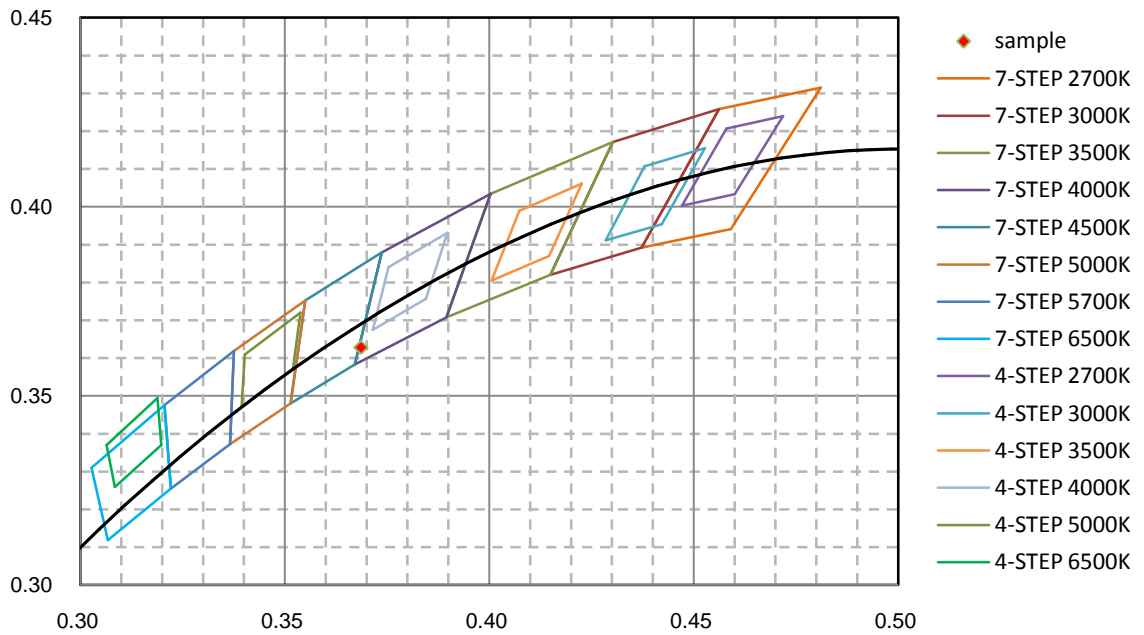


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.813E-03	465	1.465E-01	550	1.376E-01	635	1.274E-01	720	2.143E-02
385	1.413E-03	470	1.203E-01	555	1.416E-01	640	1.195E-01	725	1.843E-02
390	9.054E-04	475	9.406E-02	560	1.452E-01	645	1.117E-01	730	1.610E-02
395	5.959E-04	480	7.705E-02	565	1.491E-01	650	1.032E-01	735	1.378E-02
400	5.353E-04	485	7.014E-02	570	1.532E-01	655	9.488E-02	740	1.202E-02
405	4.538E-04	490	7.043E-02	575	1.563E-01	660	8.647E-02	745	1.055E-02
410	5.054E-04	495	7.486E-02	580	1.586E-01	665	7.781E-02	750	9.037E-03
415	1.235E-03	500	8.179E-02	585	1.601E-01	670	6.934E-02	755	8.003E-03
420	3.636E-03	505	9.007E-02	590	1.622E-01	675	6.264E-02	760	6.922E-03
425	8.771E-03	510	9.757E-02	595	1.620E-01	680	5.587E-02	765	5.983E-03
430	1.725E-02	515	1.039E-01	600	1.606E-01	685	5.037E-02	770	5.169E-03
435	3.283E-02	520	1.105E-01	605	1.585E-01	690	4.547E-02	775	4.530E-03
440	5.929E-02	525	1.154E-01	610	1.563E-01	695	4.076E-02	780	3.842E-03
445	1.039E-01	530	1.209E-01	615	1.526E-01	700	3.596E-02	785	3.284E-03
450	1.739E-01	535	1.260E-01	620	1.470E-01	705	3.178E-02	790	2.926E-03
455	2.188E-01	540	1.289E-01	625	1.428E-01	710	2.781E-02	795	2.634E-03
460	1.906E-01	545	1.335E-01	630	1.354E-01	715	2.423E-02	800	2.459E-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**

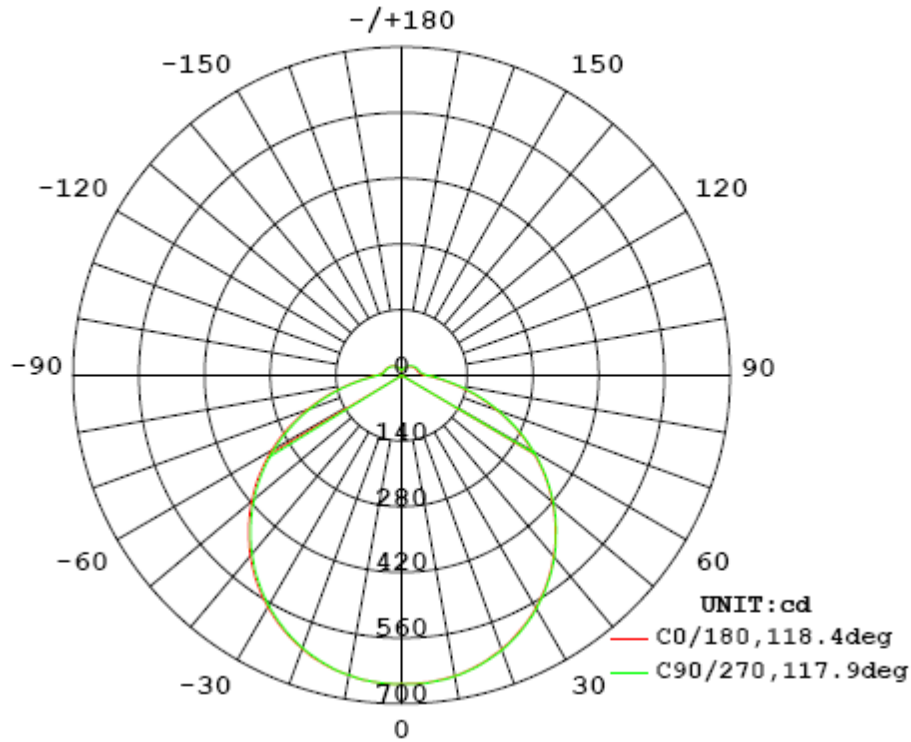
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60.0	0.2693	32.19	0.9961

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
2314.93	71.91	658	1.29	1.28

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	118.4	119.6	117.9	119.6	118.88
Field Angle (10% I _{max}):	173.7	179.8	174.0	179.7	176.80

Luminous Intensity (cd) Distribution Data

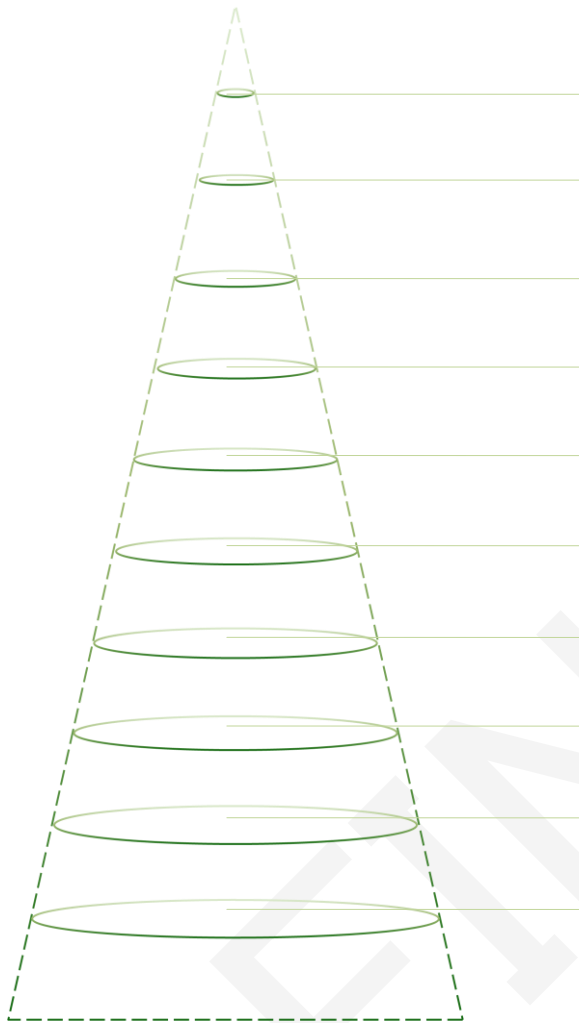
C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	658	658	658	658	658	658	658	658
5.0°	656	656	656	655	656	656	657	656
10.0°	649	649	649	649	648	649	650	650
15.0°	638	637	637	636	636	637	639	639
20.0°	620	620	620	618	618	620	622	623
25.0°	598	598	597	596	595	597	600	601
30.0°	571	571	570	568	567	569	573	574
35.0°	539	539	538	536	533	537	541	543
40.0°	502	503	502	499	496	501	506	507
45.0°	462	462	462	458	455	461	466	468
50.0°	417	418	418	415	411	416	423	424
55.0°	370	371	371	367	363	369	376	378
60.0°	320	322	321	317	313	320	326	328
65.0°	267	269	269	265	261	268	275	277
70.0°	214	216	217	212	208	216	222	223
75.0°	161	165	166	162	157	165	171	171
80.0°	114	119	121	116	111	119	124	124
85.0°	77	83	86	81	74	83	89	86
90.0°	54	61	64	59	52	60	64	61
95.0°	44	50	52	48	43	48	51	48
100.0°	40	45	48	44	39	44	46	43
105.0°	38	43	46	42	37	42	45	41
110.0°	37	42	44	40	36	40	43	40
115.0°	36	40	42	38	34	38	41	38
120.0°	34	37	39	36	33	37	39	36
125.0°	32	35	37	34	31	34	36	34
130.0°	30	33	35	32	29	32	34	32
135.0°	28	31	32	30	28	30	31	29
140.0°	27	28	30	28	26	28	29	27
145.0°	24	26	27	25	24	25	26	25
150.0°	22	23	23	23	22	23	24	22
155.0°	20	20	21	20	20	20	20	20
160.0°	17	18	18	17	17	17	18	18
165.0°	14	15	15	15	15	15	15	15
170.0°	12	13	13	12	13	12	13	13
175.0°	13	12	12	12	12	12	12	12
180.0°	12	12	12	12	12	12	12	12

Luminous Intensity (cd) Distribution Data (cont.)

C \ y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	658	658	658	658	658	658	658	658
5.0°	656	658	657	657	658	657	657	656
10.0°	650	651	652	652	651	651	651	650
15.0°	638	640	641	641	640	640	640	638
20.0°	621	624	625	625	624	624	623	621
25.0°	599	603	604	603	601	602	602	599
30.0°	572	577	578	577	574	576	576	572
35.0°	540	545	547	546	542	544	544	540
40.0°	504	509	511	510	506	508	509	504
45.0°	463	469	472	470	466	468	469	464
50.0°	420	426	429	427	422	425	425	420
55.0°	372	379	383	380	375	377	379	373
60.0°	322	329	333	331	325	328	329	323
65.0°	270	278	281	279	273	276	276	271
70.0°	216	224	229	226	219	223	223	217
75.0°	164	172	177	174	167	171	172	165
80.0°	116	125	130	127	120	125	126	119
85.0°	77	87	93	89	81	88	90	83
90.0°	52	62	68	64	56	64	66	61
95.0°	42	49	53	51	46	51	54	50
100.0°	38	44	48	46	41	47	49	46
105.0°	36	42	46	44	39	44	47	43
110.0°	35	41	44	42	38	43	45	42
115.0°	34	39	42	40	37	41	43	40
120.0°	32	37	40	38	35	39	41	38
125.0°	31	35	37	36	33	36	38	36
130.0°	29	32	35	33	31	34	35	33
135.0°	27	30	32	31	29	31	33	31
140.0°	25	27	30	29	27	28	30	28
145.0°	23	24	27	26	25	26	27	26
150.0°	21	22	24	23	22	22	24	23
155.0°	19	19	20	21	20	20	20	20
160.0°	17	17	17	17	17	18	18	17
165.0°	14	15	15	15	15	15	15	14
170.0°	12	12	12	13	12	13	13	13
175.0°	12	12	12	12	12	12	12	12
180.0°	12	12	12	12	12	12	12	12

Average Area Illumination Figure

Angle: 118.88°. Flux out: 1550.0 lm.



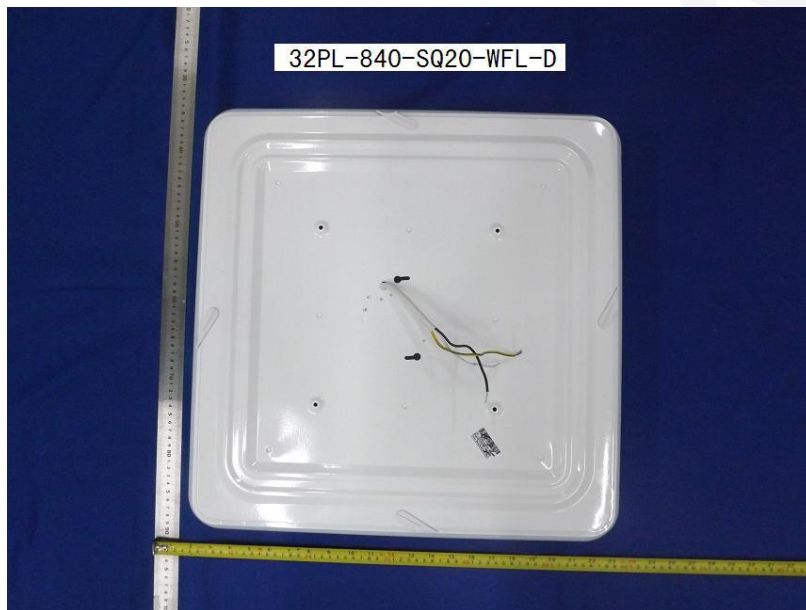
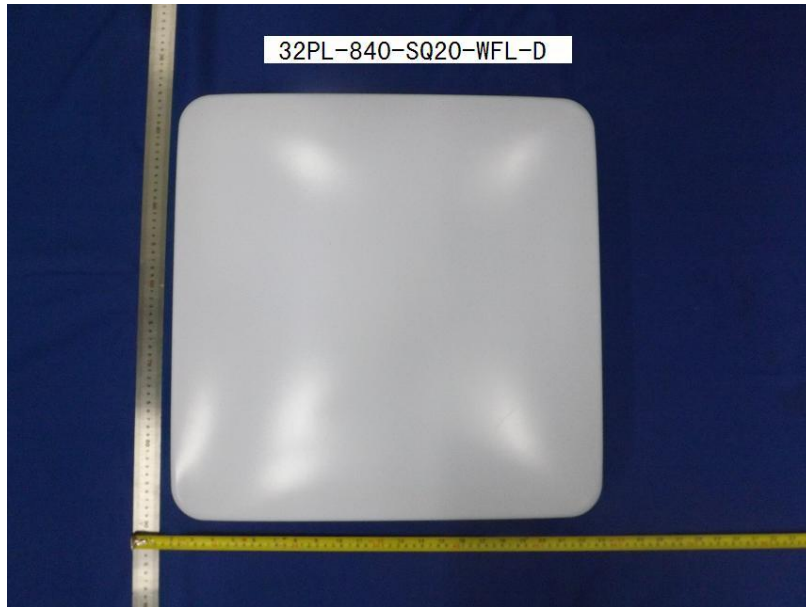
Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	169.4	658.0	2635.0
1.0	338.7	164.5	658.8
1.5	508.1	73.1	292.8
2.0	677.4	41.1	164.7
2.5	846.8	26.3	105.4
3.0	1016.2	18.3	73.2
3.5	1185.5	13.1	53.8
4.0	1354.9	10.3	41.2
4.5	1524.2	8.1	32.5
5.0	1693.6	6.6	26.4

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	15.7	0.68
5-10	46.8	2.02
10-15	76.5	3.30
15-20	103.9	4.49
20-25	128.1	5.53
25-30	148.4	6.41
30-35	164.0	7.09
35-40	174.5	7.53
40-45	179.5	7.76
45-50	179.0	7.73
50-55	172.8	7.47
55-60	161.3	6.97
60-65	144.9	6.26
65-70	124.3	5.37
70-75	100.9	4.36
75-80	76.8	3.32
80-85	55.3	2.38
85-90	39.0	1.69
90-95	29.5	1.27
95-100	25.1	1.08
100-105	23.1	1.00
105-110	21.7	0.94
110-115	20.1	0.87
115-120	18.4	0.79
120-125	16.6	0.72
125-130	14.6	0.63
130-135	12.7	0.55
135-140	10.7	0.46
140-145	8.9	0.39
145-150	7.1	0.30
150-155	5.4	0.24
155-160	3.9	0.17
160-165	2.6	0.11
165-170	1.6	0.07
170-175	0.9	0.04
175-180	0.3	0.01

Deg	Flux (lm)	%
0-5	15.7	0.68
0-10	62.5	2.70
0-15	138.9	6.00
0-20	242.8	10.49
0-25	370.9	16.02
0-30	519.3	22.43
0-35	683.3	29.52
0-40	857.8	37.05
0-45	1037.3	44.81
0-50	1216.3	52.54
0-55	1389.1	60.01
0-60	1550.5	66.98
0-65	1695.4	73.24
0-70	1819.7	78.61
0-75	1920.6	82.97
0-80	1997.5	86.29
0-85	2052.7	88.67
0-90	2091.7	90.36
0-95	2121.2	91.63
0-100	2146.3	92.71
0-105	2169.3	93.71
0-110	2191.0	94.65
0-115	2211.2	95.52
0-120	2229.6	96.31
0-125	2246.2	97.03
0-130	2260.8	97.66
0-135	2273.4	98.21
0-140	2284.2	98.67
0-145	2293.1	99.06
0-150	2300.2	99.36
0-155	2305.6	99.60
0-160	2309.5	99.77
0-165	2312.2	99.88
0-170	2313.8	99.95
0-175	2314.6	99.99
0-180	2314.9	100.00

6. Product Photo



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