

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: 36PL-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:	RSZ140925509-10A1
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: 36PL-840-WFL-D

Model Tested: 36PL-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: 36W
 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
120.11	60.0	0.3074	36.791	0.996

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
2706.536	7.613	73.565	4200	-1.11E-03

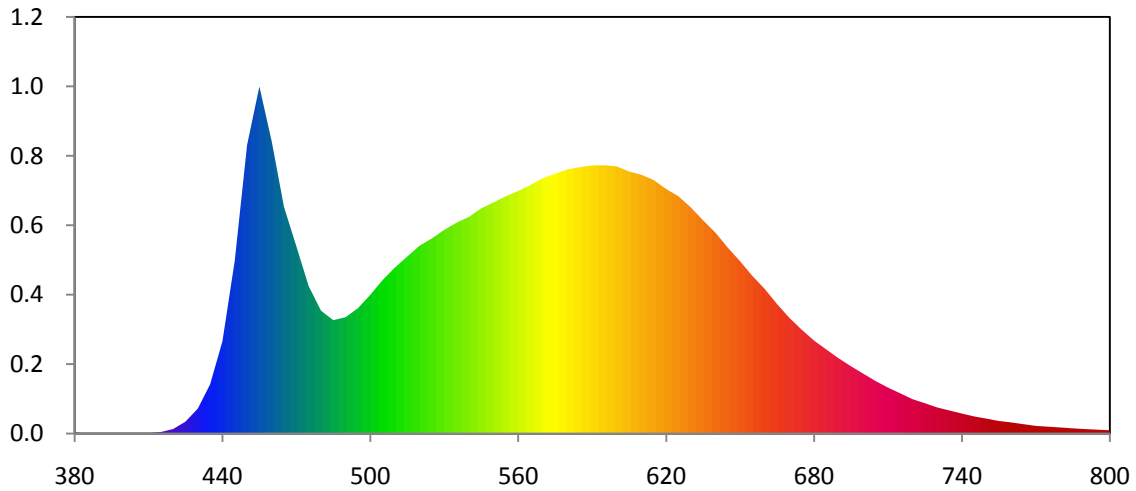
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3714	0.3686	0.2224	0.3311	0.2224	0.4966

Color Rendering Index

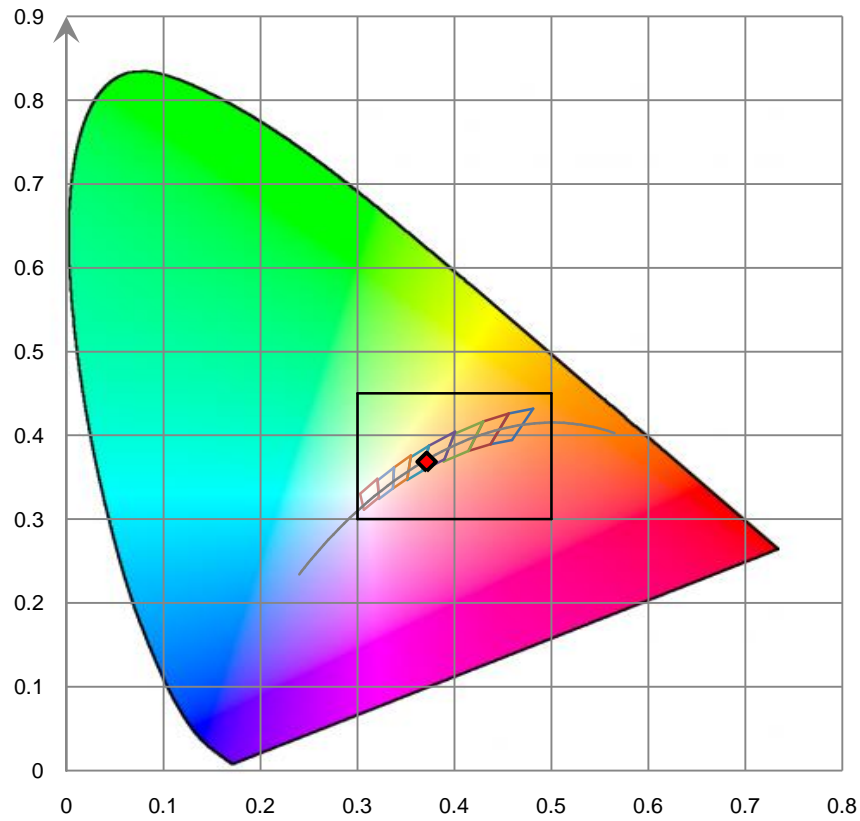
Ra			
87.4			
R1 87	R2 94	R3 96	R4 84
R5 86	R6 89	R7 88	R8 74
R9 38	R10 84	R11 82	R12 63
R13 90	R14 98	R15 84	

Relative Spectral Power Distribution

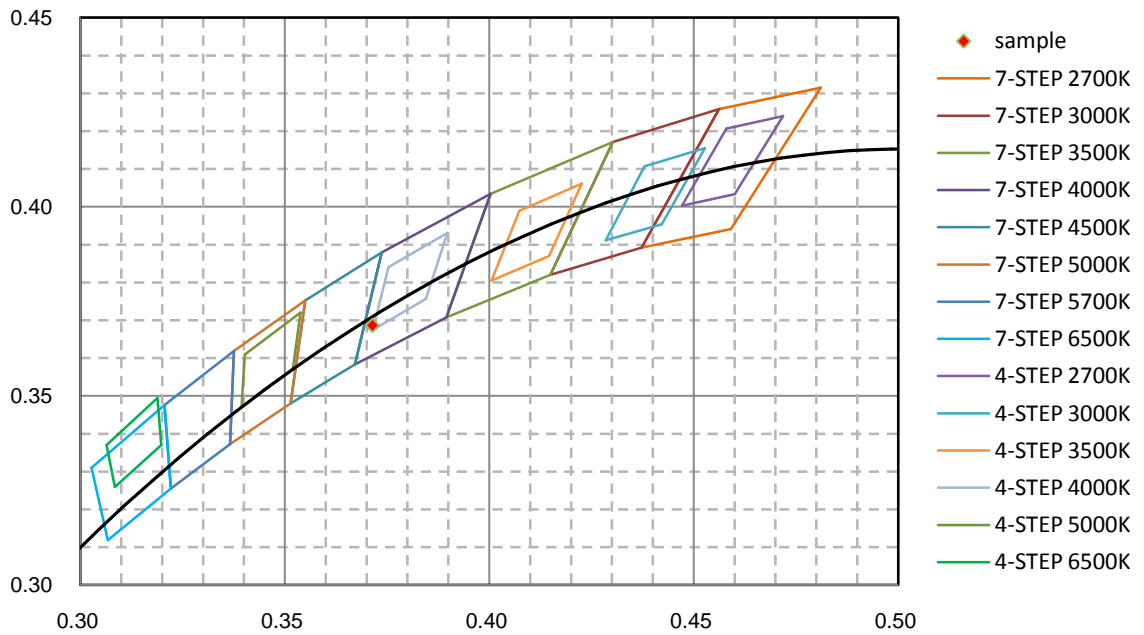


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	7.971E-04	465	1.615E-01	550	1.649E-01	635	1.521E-01	720	2.453E-02
385	1.910E-04	470	1.335E-01	555	1.692E-01	640	1.433E-01	725	2.165E-02
390	1.281E-04	475	1.051E-01	560	1.730E-01	645	1.327E-01	730	1.862E-02
395	8.850E-05	480	8.765E-02	565	1.773E-01	650	1.230E-01	735	1.644E-02
400	0.000E+00	485	8.085E-02	570	1.822E-01	655	1.125E-01	740	1.429E-02
405	1.500E-04	490	8.302E-02	575	1.853E-01	660	1.032E-01	745	1.222E-02
410	2.825E-04	495	8.941E-02	580	1.884E-01	665	9.241E-02	750	1.066E-02
415	1.068E-03	500	9.895E-02	585	1.900E-01	670	8.257E-02	755	9.010E-03
420	3.246E-03	505	1.095E-01	590	1.912E-01	675	7.416E-02	760	7.960E-03
425	8.486E-03	510	1.185E-01	595	1.913E-01	680	6.637E-02	765	6.689E-03
430	1.776E-02	515	1.262E-01	600	1.905E-01	685	6.001E-02	770	5.479E-03
435	3.507E-02	520	1.340E-01	605	1.869E-01	690	5.370E-02	775	4.890E-03
440	6.579E-02	525	1.392E-01	610	1.846E-01	695	4.804E-02	780	4.336E-03
445	1.233E-01	530	1.452E-01	615	1.808E-01	700	4.272E-02	785	3.710E-03
450	2.057E-01	535	1.504E-01	620	1.744E-01	705	3.746E-02	790	3.195E-03
455	2.475E-01	540	1.545E-01	625	1.692E-01	710	3.282E-02	795	2.794E-03
460	2.085E-01	545	1.606E-01	630	1.613E-01	715	2.871E-02	800	2.349E-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**

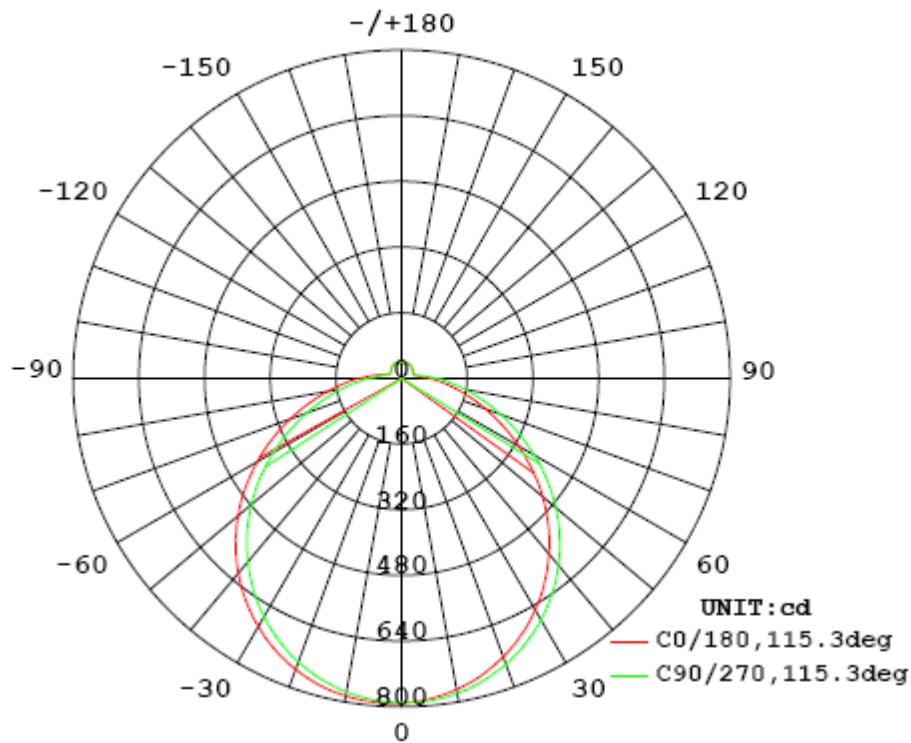
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60.0	0.3069	36.63	0.9950

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
2710.67	74.00	790	1.31	1.26

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	115.3	115.0	115.3	115.6	115.30
Field Angle (10% I _{max}):	182.4	182.1	182.1	182.4	182.25

Luminous Intensity (cd) Distribution Data

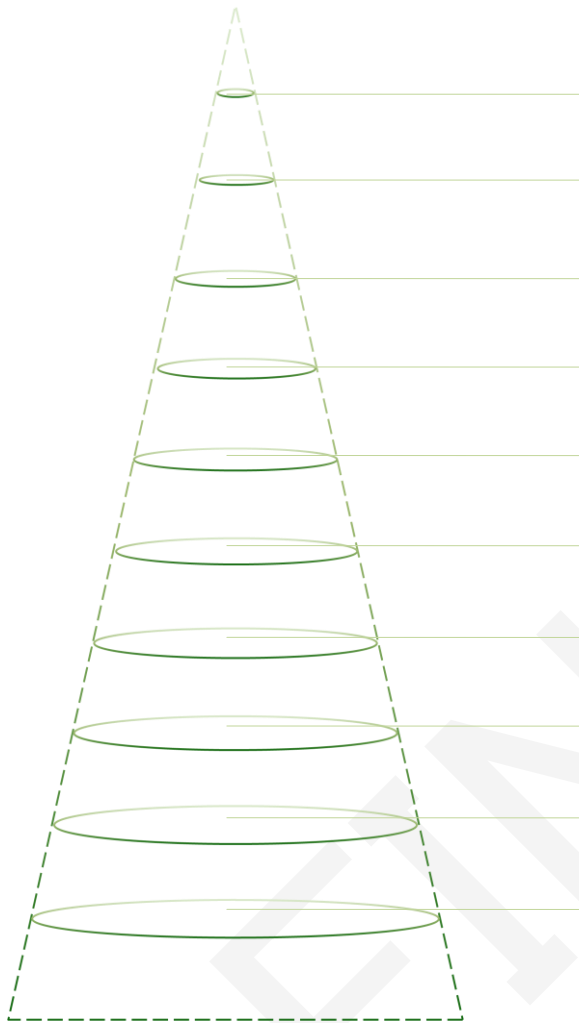
C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	790	790	790	790	790	790	790	790
5.0°	791	790	789	787	786	785	784	783
10.0°	785	784	781	778	776	773	771	770
15.0°	774	771	768	763	759	755	752	750
20.0°	755	752	747	741	736	730	727	725
25.0°	730	726	720	713	706	699	695	692
30.0°	699	694	687	679	671	663	658	654
35.0°	662	656	649	640	630	621	615	611
40.0°	620	614	605	594	584	574	567	563
45.0°	572	566	556	545	533	522	515	510
50.0°	521	513	503	491	478	467	459	453
55.0°	465	458	447	434	421	409	400	395
60.0°	407	399	388	375	361	349	340	335
65.0°	348	340	328	315	302	290	281	277
70.0°	289	281	271	258	246	235	227	223
75.0°	234	227	217	206	195	185	179	175
80.0°	184	178	170	160	150	142	136	133
85.0°	141	136	129	121	112	106	101	98
90.0°	105	101	96	89	82	77	73	72
95.0°	76	73	69	64	60	56	53	52
100.0°	55	53	50	47	44	42	40	39
105.0°	41	40	38	36	35	34	33	33
110.0°	33	33	32	32	31	31	31	31
115.0°	31	31	31	31	31	31	32	31
120.0°	31	31	32	32	32	32	33	32
125.0°	32	32	33	33	33	33	34	34
130.0°	33	33	34	34	34	35	35	35
135.0°	35	35	35	36	36	37	37	37
140.0°	36	37	37	38	38	38	38	38
145.0°	38	38	39	39	39	40	40	40
150.0°	39	40	38	40	40	41	41	38
155.0°	40	40	41	40	40	40	40	42
160.0°	40	41	41	40	39	40	40	41
165.0°	39	39	39	39	38	38	39	39
170.0°	39	38	38	37	37	37	37	37
175.0°	42	42	42	42	42	42	42	42
180.0°	43	43	43	43	43	43	43	43

Luminous Intensity (cd) Distribution Data (cont.)

C γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	790	790	790	790	790	790	790	790
5.0°	783	784	784	786	788	789	791	791
10.0°	769	770	772	775	778	781	785	785
15.0°	749	750	753	758	763	767	771	772
20.0°	722	724	729	734	741	747	752	753
25.0°	689	692	697	704	713	721	726	729
30.0°	650	654	660	669	679	688	695	698
35.0°	607	610	617	628	639	650	657	660
40.0°	558	562	570	581	594	605	615	618
45.0°	505	509	518	530	544	556	566	571
50.0°	448	452	462	476	490	504	514	518
55.0°	388	393	403	417	433	447	458	462
60.0°	328	333	343	357	373	387	399	403
65.0°	270	275	284	298	313	327	338	343
70.0°	217	221	230	242	256	269	280	284
75.0°	170	173	181	191	204	216	226	230
80.0°	129	132	138	147	158	168	177	181
85.0°	95	98	102	110	118	127	134	138
90.0°	69	71	74	80	87	94	99	102
95.0°	50	51	53	57	62	68	72	74
100.0°	38	39	40	42	45	49	52	53
105.0°	32	32	33	33	35	37	39	40
110.0°	31	30	30	30	30	31	32	33
115.0°	31	31	31	30	30	30	30	30
120.0°	33	32	32	31	31	31	31	31
125.0°	34	33	33	32	32	32	32	32
130.0°	35	35	34	34	33	33	33	33
135.0°	36	36	36	35	35	34	34	34
140.0°	38	38	37	37	36	36	36	36
145.0°	39	39	39	38	38	37	37	37
150.0°	39	40	40	39	38	38	39	38
155.0°	40	39	40	39	40	40	39	39
160.0°	40	40	38	38	39	39	39	39
165.0°	38	38	38	38	38	38	38	38
170.0°	40	40	40	41	41	41	41	41
175.0°	42	42	43	43	42	42	42	42
180.0°	43	43	43	43	43	42	43	43

Average Area Illumination Figure

Angle: 115.30°. Flux out: 1739.0 lm.



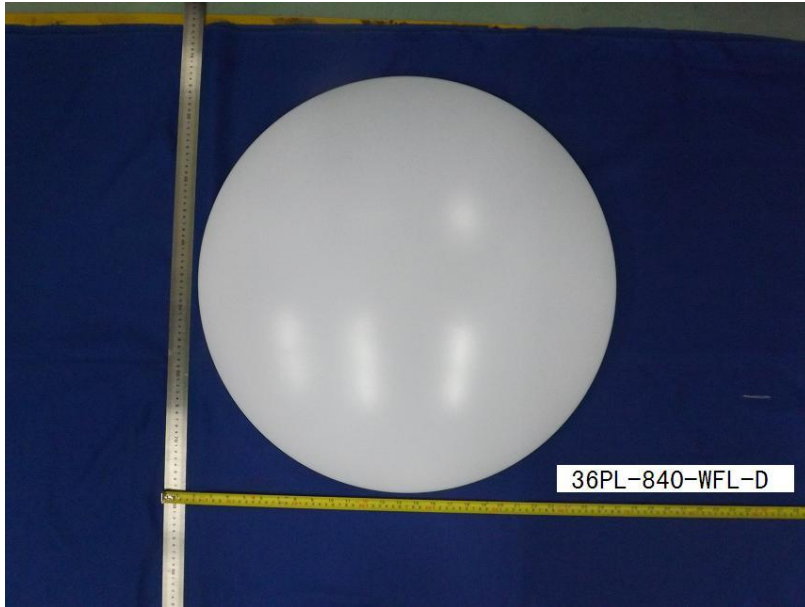
Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	157.9	864.7	3165.0
1.0	315.8	216.2	791.1
1.5	473.6	96.1	351.6
2.0	631.5	54.0	197.8
2.5	789.4	34.6	126.6
3.0	947.3	24.0	87.9
3.5	1105.2	17.7	64.6
4.0	1263.0	13.5	49.5
4.5	1420.9	10.7	39.1
5.0	1578.8	8.6	31.7

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	18.9	0.70
5-10	56.0	2.06
10-15	91.2	3.37
15-20	123.6	4.56
20-25	151.9	5.60
25-30	175.2	6.46
30-35	192.8	7.11
35-40	204.1	7.53
40-45	208.8	7.70
45-50	206.7	7.63
50-55	198.1	7.31
55-60	183.5	6.77
60-65	164.1	6.05
65-70	141.6	5.22
70-75	118.0	4.36
75-80	94.9	3.50
80-85	73.6	2.71
85-90	55.1	2.03
90-95	40.1	1.48
95-100	28.9	1.07
100-105	21.5	0.79
105-110	17.3	0.64
110-115	15.6	0.58
115-120	15.1	0.56
120-125	14.9	0.54
125-130	14.5	0.54
130-135	14.0	0.52
135-140	13.4	0.49
140-145	12.6	0.47
145-150	11.5	0.42
150-155	10.0	0.37
155-160	8.5	0.31
160-165	6.5	0.24
165-170	4.4	0.16
170-175	3.0	0.11
175-180	1.0	0.04

Deg	Flux (lm)	%
0-5	18.9	0.70
0-10	74.8	2.76
0-15	166.1	6.13
0-20	289.6	10.69
0-25	441.5	16.29
0-30	616.7	22.75
0-35	809.5	29.86
0-40	1013.6	37.39
0-45	1222.3	45.09
0-50	1429.0	52.72
0-55	1627.1	60.03
0-60	1810.6	66.80
0-65	1974.7	72.85
0-70	2116.3	78.07
0-75	2234.3	82.43
0-80	2329.2	85.93
0-85	2402.8	88.64
0-90	2457.9	90.67
0-95	2498.0	92.15
0-100	2526.9	93.22
0-105	2548.3	94.01
0-110	2565.7	94.65
0-115	2581.3	95.23
0-120	2596.4	95.79
0-125	2611.3	96.33
0-130	2625.8	96.87
0-135	2639.8	97.39
0-140	2653.3	97.88
0-145	2665.9	98.35
0-150	2677.4	98.77
0-155	2687.4	99.14
0-160	2695.8	99.45
0-165	2702.3	99.69
0-170	2706.7	99.85
0-175	2709.7	99.96
0-180	2710.7	100.00

6. Product Photo



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