

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### L-TECH CORPORATION

Shaogangtou District, Qiaotou Town Dongguan City, Guangdong, China

**Test Model: LED200ICA With LT240/243 5000K**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, Spatial Non-uniformity of Chromaticity
<b>Test Engineer:</b>	Daniel Duan
<b>Report Number:</b>	RSZ160405504-10
<b>Test Date:</b>	2016-04-13
<b>Report Date:</b>	2016-04-14
<b>Reviewed By:</b>	Jeanne Han/Safety Manager
<b>Prepared By:</b>	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
<b>Test Facility:</b>	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
<b>Accreditation:</b>	The NVLAP Lab Code is 200707-0.

## 1. Product Description

### General Information:

One sample was received on 2016-04-05 and used for testing.

Model Tested: LED200ICA With LT240/243 5000K  
 Manufacturer: L-TECH CORPORATION  
 Brand Name: L-TECH CORP  
 Product Designation: LED Downlight  
 Burning Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120 V AC 60Hz  
 Rated Power: 9W  
 Nominal CCT: 5000K  
 Nominal Lumen Output: 600 lm

## 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	25~50°C	2016-03-10	2017-03-09
Spectral photometer	SENSING	SPR3000	90902027	350nm~800nm	2016-03-10	2017-03-09
Power Meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/300/600 V	2016-03-04	2017-03-03
AC Power Supply	ALL Power	APW-105N	970663	220V±10% 50HZ	2016-03-04	2017-03-03
Standard Light Source	EVERFINE	D204	01331191	24V/100W	2015-08-27	2016-08-26
Thermal Meter	SENSING	N/A	N/A	25、50°C	2016-03-10	2017-03-09
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2016-03-04	2017-03-03
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2016-03-04	2017-03-03
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2016-03-04	2017-03-03
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2016-03-04	2017-03-03
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2016-03-10	2017-03-09
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C;-20°C~60°C	2016-03-21	2017-03-20
Standard Light Source	EVERFINE	D908	1012003	N/A	2015-09-08	2016-09-07

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.

$4\pi$  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.

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.

##### **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  $U=1.6\%$  ( $K=2$ ), 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
120.01	60	0.0734	8.765	0.995

#### Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
656.323	2.250	74.88	4811	0.00165

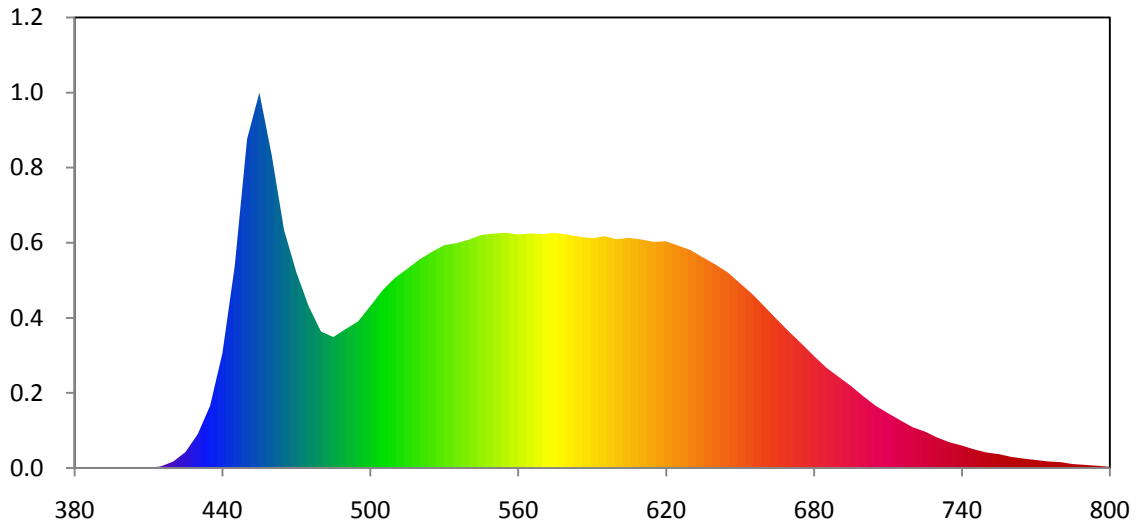
#### Chromaticity Coordinate

x	y	u	v	u'	v'
0.3511	0.3597	0.2123	0.3263	0.2123	0.4894

#### Color Rendering Index

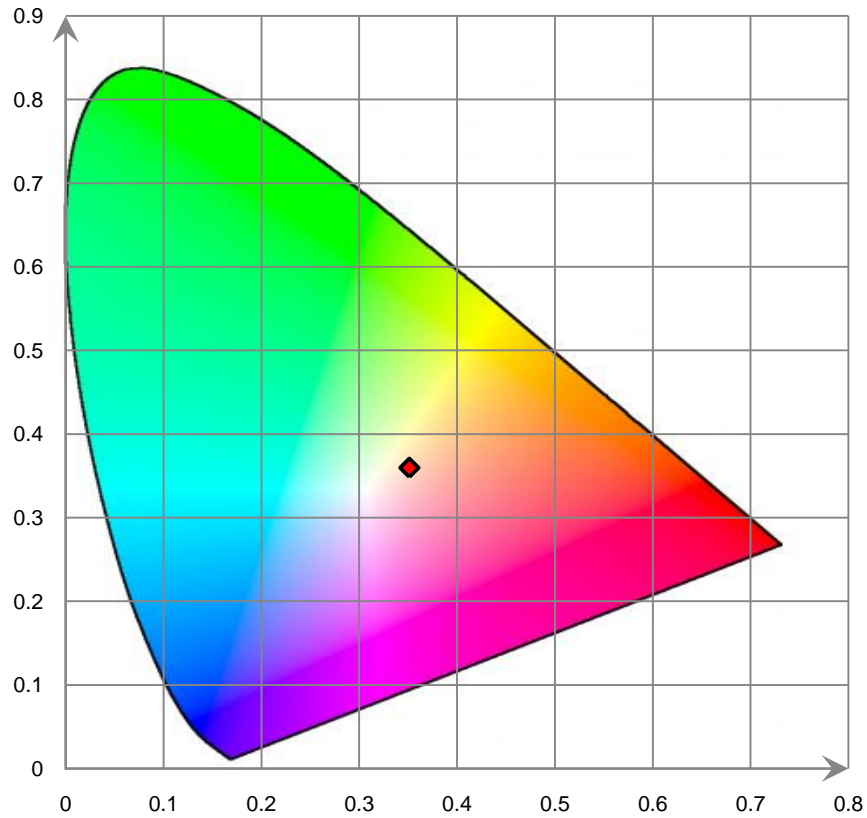
<b>Ra</b>			
91.9			
R1 92	R2 96	R3 96	R4 89
R5 90	R6 91	R7 94	R8 87
R9 66	R10 88	R11 89	R12 63
R13 94	R14 97	R15 90	

Relative Spectral Power Distribution

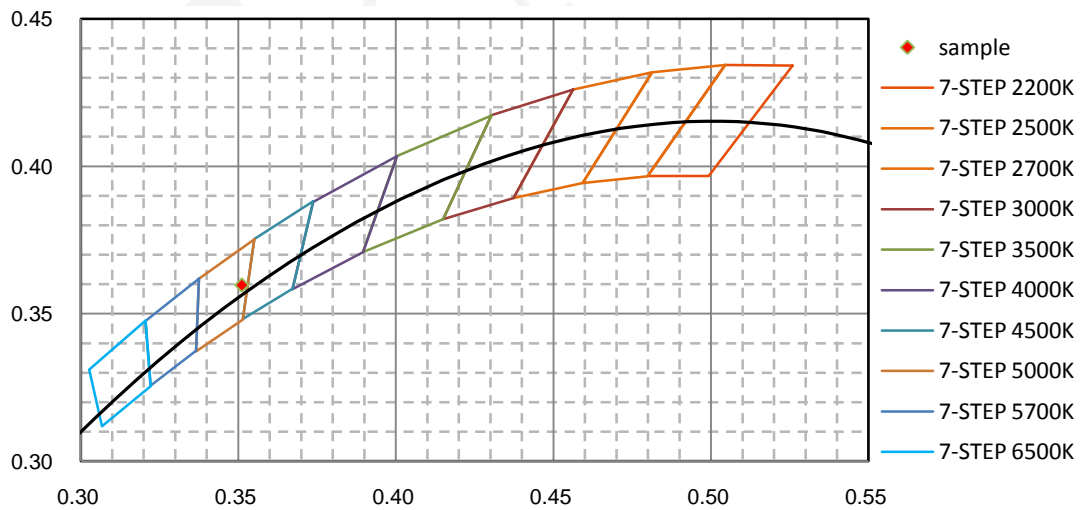


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.000E+00	465	3.960E-02	550	3.898E-02	635	3.501E-02	720	6.809E-03
385	0.000E+00	470	3.255E-02	555	3.912E-02	640	3.385E-02	725	6.084E-03
390	0.000E+00	475	2.691E-02	560	3.884E-02	645	3.255E-02	730	5.098E-03
395	0.000E+00	480	2.271E-02	565	3.901E-02	650	3.073E-02	735	4.297E-03
400	0.000E+00	485	2.179E-02	570	3.892E-02	655	2.893E-02	740	3.755E-03
405	0.000E+00	490	2.313E-02	575	3.909E-02	660	2.684E-02	745	3.117E-03
410	1.344E-05	495	2.436E-02	580	3.881E-02	665	2.470E-02	750	2.606E-03
415	2.985E-04	500	2.693E-02	585	3.846E-02	670	2.264E-02	755	2.336E-03
420	1.088E-03	505	2.958E-02	590	3.822E-02	675	2.069E-02	760	1.876E-03
425	2.671E-03	510	3.163E-02	595	3.855E-02	680	1.865E-02	765	1.590E-03
430	5.657E-03	515	3.313E-02	600	3.804E-02	685	1.671E-02	770	1.357E-03
435	1.038E-02	520	3.470E-02	605	3.828E-02	690	1.517E-02	775	1.115E-03
440	1.913E-02	525	3.595E-02	610	3.800E-02	695	1.367E-02	780	1.003E-03
445	3.361E-02	530	3.706E-02	615	3.761E-02	700	1.196E-02		
450	5.470E-02	535	3.740E-02	620	3.771E-02	705	1.037E-02		
455	6.241E-02	540	3.798E-02	625	3.697E-02	710	9.138E-03		
460	5.203E-02	545	3.876E-02	630	3.622E-02	715	7.960E-03		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



**[Goniophotometer System]**

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

Test orientation: **Downward**

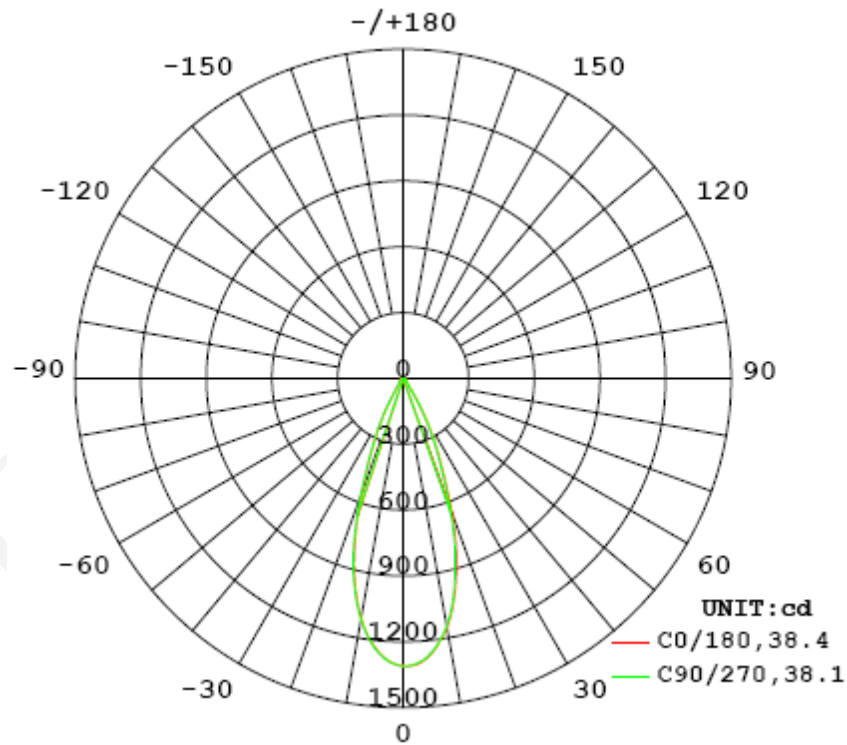
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.01	60	0.07355	8.776	0.9943

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
660.276	75.24	1312	0.63	0.62

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	38.4	40.1	38.1	40.6	39.3
Field Angle (10% I <sub>max</sub> ):	62.3	68.3	62.3	68.4	65.3

Luminous Intensity (cd) Distribution Data

C \ γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1311	1311	1311	1311	1311	1311	1311	1311
5.0°	1255	1255	1258	1260	1259	1262	1264	1268
10.0°	1112	1113	1110	1115	1114	1121	1125	1135
15.0°	875	875	875	884	888	903	912	914
20.0°	561	586	634	602	575	611	671	647
25.0°	309	329	399	340	318	348	432	387
30.0°	142	170	187	177	149	188	218	214
35.0°	53	65	98	70	56	72	123	85
40.0°	32	34	52	35	33	36	59	37
45.0°	25	27	28	28	26	28	29	27
50.0°	22	23	23	23	22	23	23	23
55.0°	20	21	20	21	20	20	19	20
60.0°	18	18	17	18	18	18	16	17
65.0°	14	15	14	15	14	15	14	14
70.0°	11	11	11	11	11	11	11	11
75.0°	8	8	8	8	8	8	7	7
80.0°	5	5	5	5	5	5	5	4
85.0°	2	2	2	2	2	2	2	2
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	1	1	1	1	1	1	0
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°	0	0	0	0	0	0	0	0

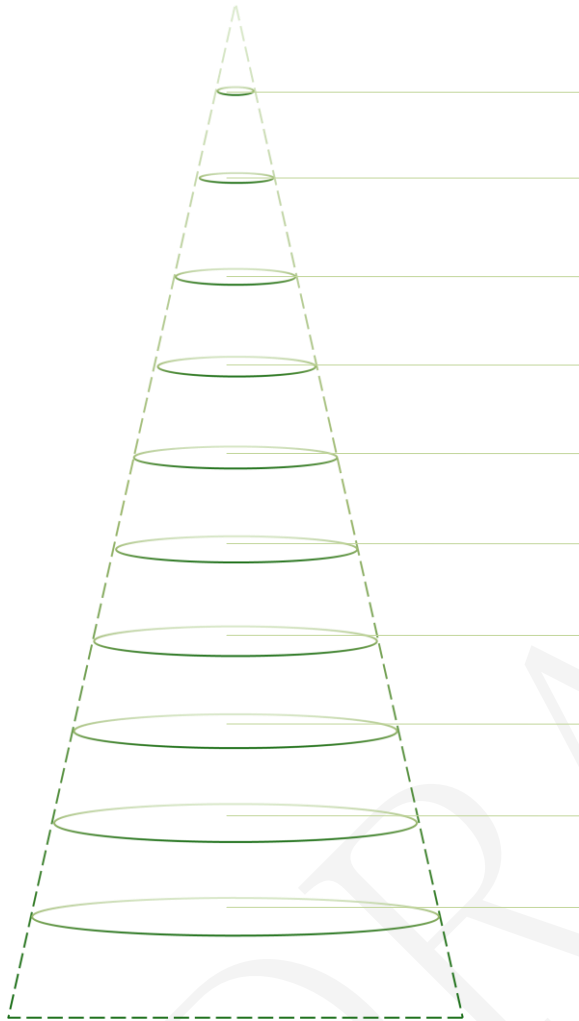


Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1311	1311	1311	1311	1311	1311	1311	1311
5.0°	1277	1279	1278	1276	1273	1269	1266	1266
10.0°	1154	1156	1158	1153	1146	1144	1142	1136
15.0°	936	935	932	928	919	921	916	909
20.0°	649	666	685	655	619	644	669	629
25.0°	378	394	452	390	363	380	433	357
30.0°	189	224	239	223	179	207	214	189
35.0°	65	89	143	90	59	79	117	76
40.0°	33	37	69	36	32	35	57	36
45.0°	26	27	30	27	25	27	29	28
50.0°	22	23	23	23	21	23	23	23
55.0°	20	20	19	20	20	20	20	21
60.0°	17	17	16	17	17	17	17	18
65.0°	14	14	13	14	13	14	14	15
70.0°	10	10	10	10	10	11	10	11
75.0°	7	7	7	7	7	7	7	8
80.0°	4	4	4	4	4	4	4	5
85.0°	2	2	2	2	2	2	2	2
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Average Area Illumination Figure

**Angle:39.3°. Flux out:363.8lm**



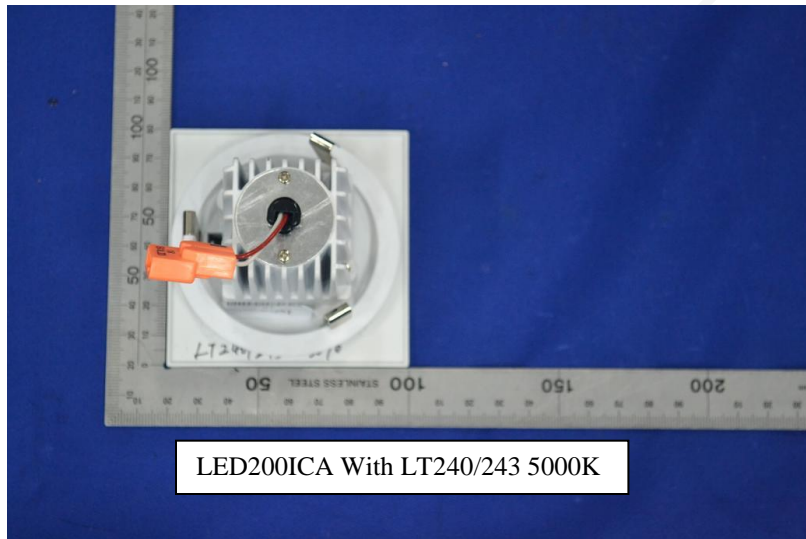
Height (m)	Diameter (cm)	E <sub>avg</sub> (lx)	E <sub>max</sub> (lx)
0.5	35.71	3497.0	5264.0
1.0	71.41	874.2	1316.0
1.5	107.12	388.5	584.9
2.0	142.83	218.5	329.0
2.5	178.53	139.9	210.6
3.0	214.24	97.1	146.2
3.5	249.95	71.4	107.4
4.0	285.65	54.6	82.3
4.5	321.36	43.2	65.0
5.0	357.07	35.0	52.6

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	30.8	4.67
5-10	85.8	12.99
10-15	120.9	18.31
15-20	126.3	19.13
20-25	103.3	15.64
25-30	70.4	10.67
30-35	38.6	5.85
35-40	19.5	2.95
40-45	12.1	1.84
45-50	9.9	1.50
50-55	9.2	1.40
55-60	8.6	1.31
60-65	7.6	1.15
65-70	6.2	0.94
70-75	4.7	0.72
75-80	3.2	0.49
80-85	1.7	0.26
85-90	0.4	0.06
90-95	0.0	0.01
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.00
115-120	0.0	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	0.01
135-140	0.1	0.00
140-145	0.1	0.02
145-150	0.1	0.01
150-155	0.1	0.02
155-160	0.1	0.02
160-165	0.1	0.01
165-170	0.1	0.01
170-175	0.0	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	30.8	4.67
0-10	116.6	17.66
0-15	237.5	35.97
0-20	363.8	55.10
0-25	467.1	70.74
0-30	537.5	81.41
0-35	576.2	87.26
0-40	595.7	90.21
0-45	607.8	92.05
0-50	617.7	93.55
0-55	626.9	94.95
0-60	635.6	96.26
0-65	643.2	97.41
0-70	649.4	98.35
0-75	654.1	99.07
0-80	657.4	99.56
0-85	659.1	99.82
0-90	659.5	99.88
0-95	659.5	99.89
0-100	659.5	99.89
0-105	659.5	99.89
0-110	659.5	99.89
0-115	659.5	99.89
0-120	659.5	99.89
0-125	659.5	99.89
0-130	659.6	99.89
0-135	659.6	99.90
0-140	659.6	99.90
0-145	659.7	99.92
0-150	659.8	99.93
0-155	660.0	99.95
0-160	660.1	99.97
0-165	660.2	99.98
0-170	660.2	99.99
0-175	660.3	100.00
0-180	660.3	100.00

## 6. Product Photo



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