

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

L-TECH CORPORATION

Shaogangtou District, Qiaotou Town Dongguan City, Guangdong, China

Test Model: LED200ICA With LT247 5000K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, Spatial Non-uniformity of Chromaticity
Test Engineer:	Daniel Duan
Report Number:	RSZ160405502-10
Test Date:	2016-04-13
Report Date:	2016-04-14
Reviewed By:	Jeanne Han/Safety Manager
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.

1. Product Description

General Information:

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

Model Tested: LED200ICA With LT247 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.

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.

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
120.03	60	0.0732	8.737	0.995

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
729.462	2.525	83.491	4875	0.0013

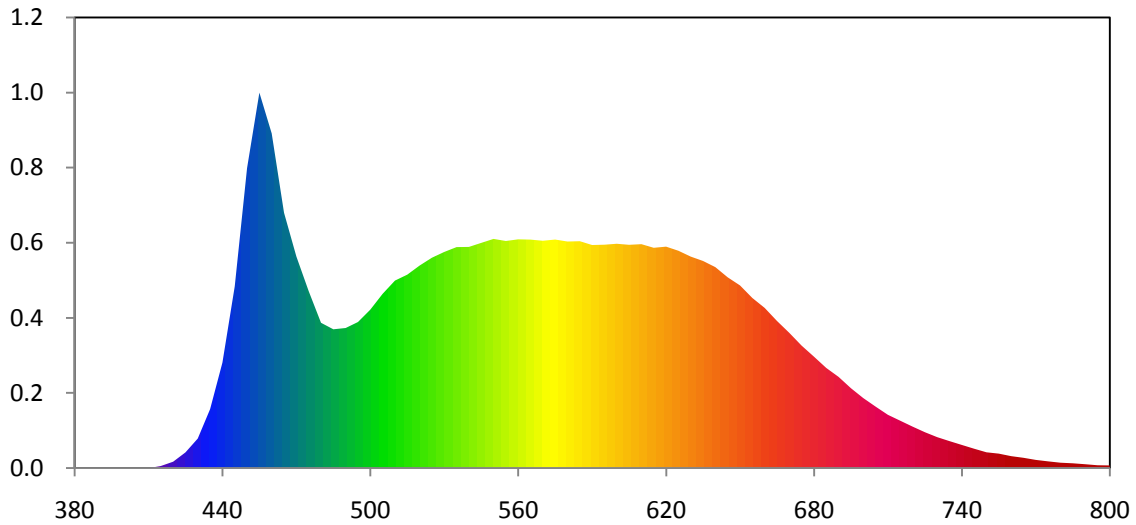
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3490	0.3574	0.2119	0.3254	0.2119	0.4880

Color Rendering Index

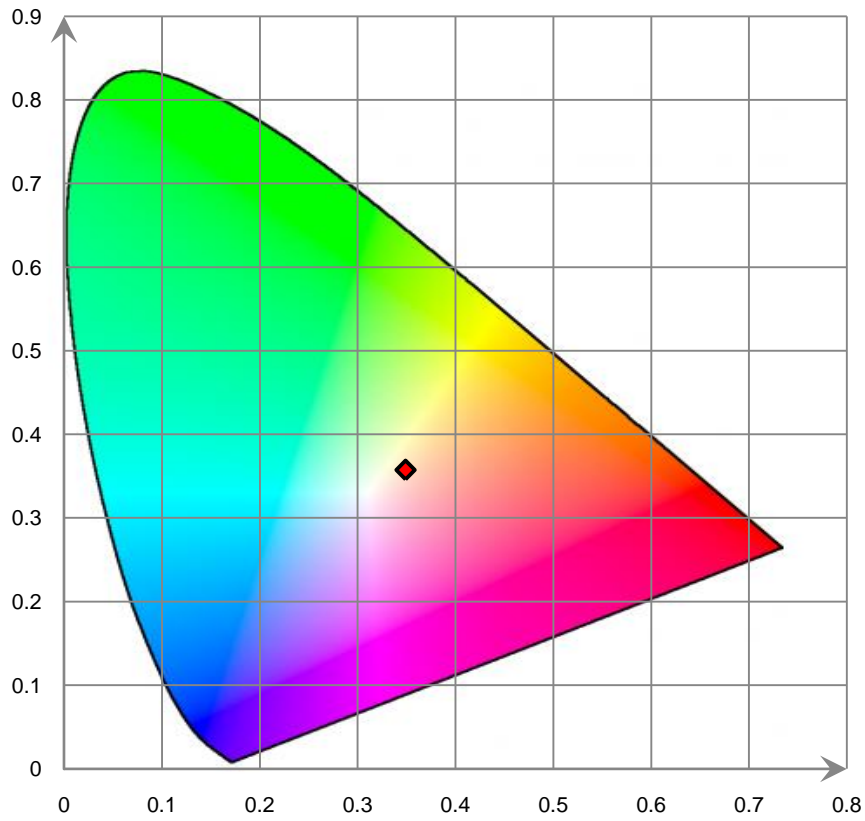
Ra			
92.4			
R1 93	R2 97	R3 97	R4 89
R5 90	R6 92	R7 93	R8 87
R9 70	R10 91	R11 89	R12 64
R13 95	R14 98	R15 91	

Relative Spectral Power Distribution

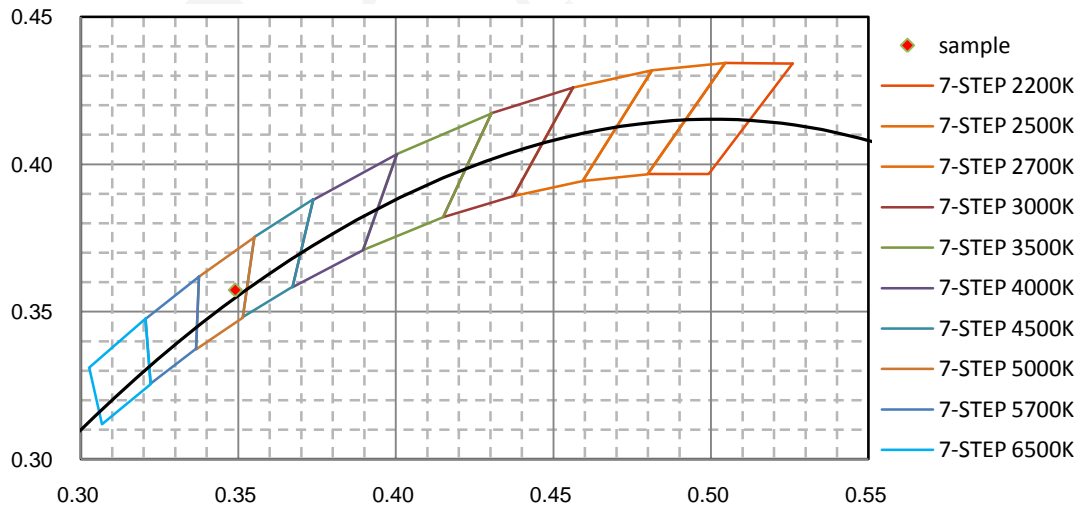


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.000E+00	465	4.913E-02	550	4.410E-02	635	3.985E-02	720	7.996E-03
385	0.000E+00	470	4.072E-02	555	4.370E-02	640	3.866E-02	725	6.919E-03
390	0.000E+00	475	3.405E-02	560	4.401E-02	645	3.671E-02	730	5.963E-03
395	0.000E+00	480	2.796E-02	565	4.396E-02	650	3.515E-02	735	5.199E-03
400	0.000E+00	485	2.671E-02	570	4.374E-02	655	3.273E-02	740	4.467E-03
405	0.000E+00	490	2.696E-02	575	4.397E-02	660	3.082E-02	745	3.739E-03
410	0.000E+00	495	2.811E-02	580	4.359E-02	665	2.831E-02	750	3.053E-03
415	4.133E-04	500	3.049E-02	585	4.365E-02	670	2.603E-02	755	2.793E-03
420	1.242E-03	505	3.353E-02	590	4.292E-02	675	2.357E-02	760	2.311E-03
425	3.032E-03	510	3.608E-02	595	4.298E-02	680	2.145E-02	765	1.996E-03
430	5.698E-03	515	3.722E-02	600	4.316E-02	685	1.928E-02	770	1.589E-03
435	1.136E-02	520	3.897E-02	605	4.296E-02	690	1.755E-02	775	1.307E-03
440	2.030E-02	525	4.048E-02	610	4.309E-02	695	1.538E-02	780	1.053E-03
445	3.498E-02	530	4.159E-02	615	4.238E-02	700	1.348E-02		
450	5.772E-02	535	4.252E-02	620	4.261E-02	705	1.184E-02		
455	7.223E-02	540	4.255E-02	625	4.182E-02	710	1.026E-02		
460	6.439E-02	545	4.333E-02	630	4.069E-02	715	9.131E-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**

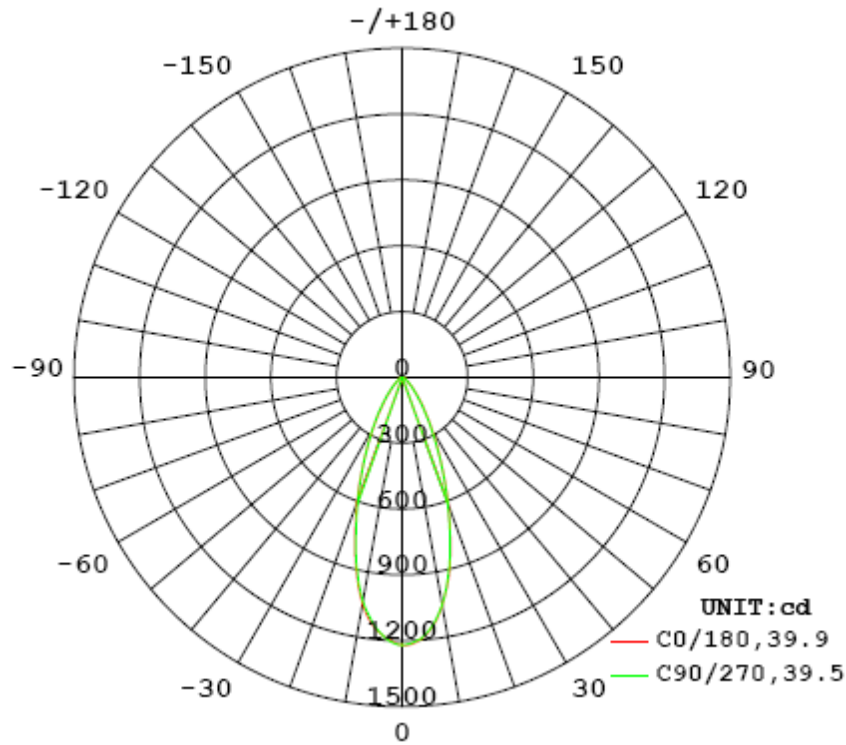
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120	60	0.07297	8.705	0.9941

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
730.798	83.95	1220	0.65	0.65

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	39.9	39.9	39.5	39.7	39.8
Field Angle (10% I _{max}):	76.8	76.4	76.9	76.2	76.6

Luminous Intensity (cd) Distribution Data

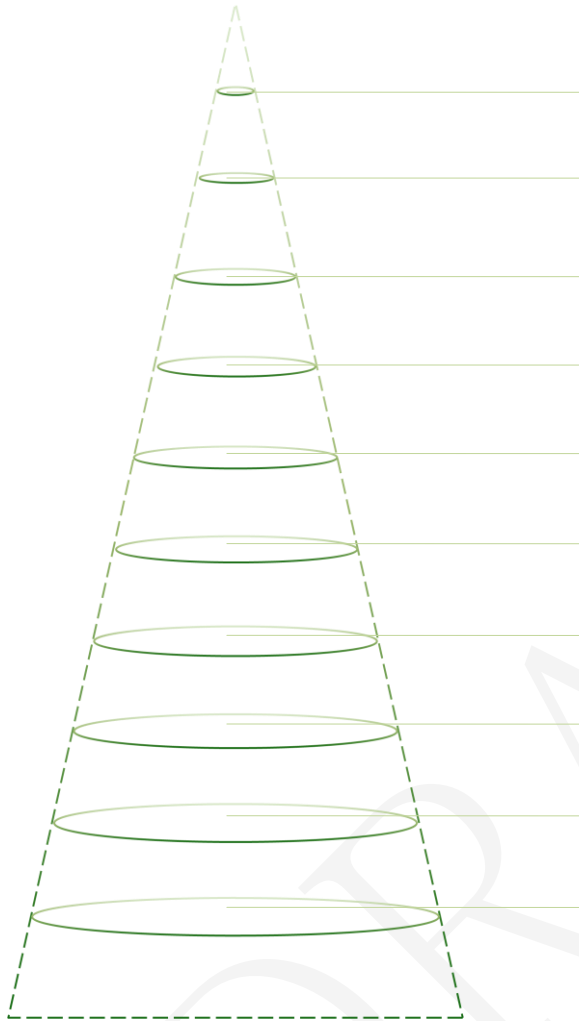
C \ γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1220	1220	1220	1220	1220	1220	1220	1220
5.0°	1169	1169	1168	1168	1167	1168	1170	1171
10.0°	1046	1046	1045	1040	1036	1033	1035	1034
15.0°	832	833	831	827	822	826	829	827
20.0°	603	604	601	597	592	594	595	599
25.0°	410	415	413	416	408	409	406	409
30.0°	267	269	271	273	272	269	267	264
35.0°	166	168	171	173	176	172	168	166
40.0°	102	104	106	107	110	106	105	103
45.0°	63	64	65	66	67	66	65	64
50.0°	41	40	40	41	42	41	41	40
55.0°	27	26	26	26	27	27	27	26
60.0°	18	18	18	18	18	18	18	18
65.0°	13	13	13	13	13	13	13	12
70.0°	9	8	9	9	9	9	9	8
75.0°	5	5	5	5	5	5	6	5
80.0°	3	3	3	3	3	3	3	3
85.0°	1	1	1	1	1	1	1	1
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°	1220	1220	1220	1220	1220	1220	1220	1220
5.0°	1183	1185	1182	1182	1178	1178	1181	1182
10.0°	1055	1056	1057	1055	1054	1051	1057	1056
15.0°	850	850	851	851	844	846	845	851
20.0°	615	613	613	612	607	615	613	620
25.0°	417	417	415	411	410	411	415	419
30.0°	272	267	263	263	261	260	264	265
35.0°	171	165	162	162	164	162	161	165
40.0°	107	102	100	100	101	100	99	102
45.0°	67	64	63	63	64	62	62	62
50.0°	42	41	40	41	41	40	40	40
55.0°	28	27	27	27	27	27	27	26
60.0°	19	18	18	18	19	18	18	18
65.0°	13	13	13	13	13	13	13	13
70.0°	9	9	9	8	8	8	9	9
75.0°	5	5	5	5	5	5	5	6
80.0°	3	3	3	3	3	3	3	3
85.0°	1	1	1	1	1	1	1	1
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:39.8°. Flux out:337.7lm



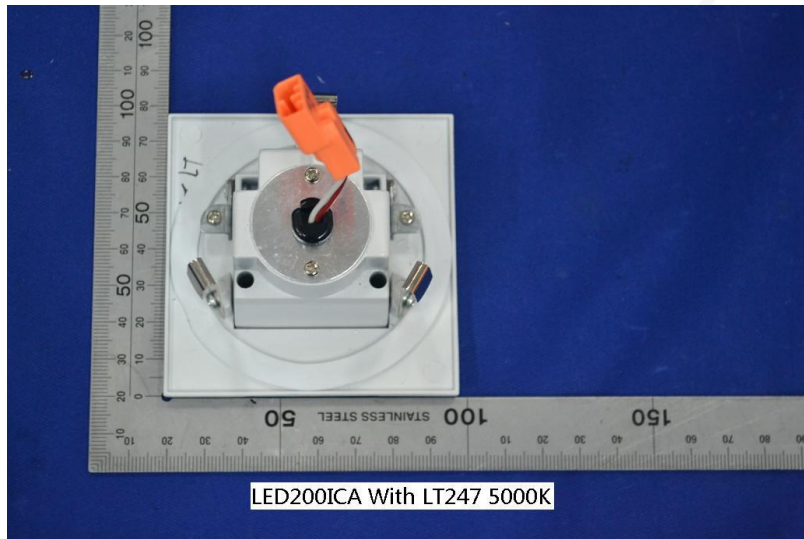
Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	36.20	3246.0	4913.0
1.0	72.40	811.4	1228.0
1.5	108.60	360.6	545.9
2.0	144.80	202.9	307.1
2.5	181.00	129.8	196.5
3.0	217.20	90.2	136.1
3.5	253.40	66.2	100.3
4.0	289.60	50.7	76.8
4.5	325.80	40.1	60.7
5.0	361.99	32.5	49.1

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	28.6	3.91
5-10	79.5	10.88
10-15	111.7	15.28
15-20	117.9	16.14
20-25	105.5	14.43
25-30	84.5	11.57
30-35	62.5	8.55
35-40	44.1	6.04
40-45	30.3	4.15
45-50	20.8	2.84
50-55	14.4	1.97
55-60	10.2	1.40
60-65	7.5	1.02
65-70	5.3	0.73
70-75	3.6	0.49
75-80	2.2	0.30
80-85	1.1	0.16
85-90	0.3	0.03
90-95	0.0	0.00
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.01
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	0.01
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	28.6	3.91
0-10	108.1	14.79
0-15	219.8	30.07
0-20	337.7	46.21
0-25	443.2	60.64
0-30	527.7	72.21
0-35	590.2	80.76
0-40	634.3	86.80
0-45	664.6	90.95
0-50	685.4	93.79
0-55	699.8	95.76
0-60	710.0	97.16
0-65	717.5	98.18
0-70	722.8	98.91
0-75	726.4	99.40
0-80	728.6	99.70
0-85	729.8	99.86
0-90	730.0	99.89
0-95	730.0	99.89
0-100	730.0	99.89
0-105	730.0	99.89
0-110	730.0	99.90
0-115	730.0	99.90
0-120	730.0	99.90
0-125	730.1	99.90
0-130	730.1	99.90
0-135	730.1	99.91
0-140	730.2	99.91
0-145	730.3	99.93
0-150	730.4	99.94
0-155	730.5	99.96
0-160	730.6	99.97
0-165	730.7	99.98
0-170	730.8	99.99
0-175	730.8	100.00
0-180	730.8	100.00

6. Product Photo



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