

# 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 4000K**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
<b>Test Engineer:</b>	Daniel Duan
<b>Report Number:</b>	RSZ160309509-10
<b>Test Date:</b>	2016-03-14
<b>Report Date:</b>	2016-03-14
<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 2016-03-10 and used for testing.

Model Tested: LED200ICA With LT247 4000K  
 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: 120V AC 60Hz  
 Rated Power: 9 W  
 Nominal CCT: 4000K  
 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	N/A	N/A	25°C	2016-03-04	2017-03-03
Power Meter	SENSING	UI2008	908735	10.0-600.0V	2016-03-04	2017-03-03
Spectral photometer	SENSING	SPR3000	s0902024	350nm~800nm	2016-03-04	2017-03-03
AC Power Supply	EVERFINE	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°C	2016-03-04	2017-03-03
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	2015-03-20	2016-03-19
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C;-20°C~60°C	2015-03-24	2016-03-23
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  $U=2.3\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=23\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.3(K=2)$ , 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  $U=2.82\%$  ( $K=2$ ), 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	62	0.0753	8.944	0.989

#### Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
771.236	2.617	86.229	3767	0.00102

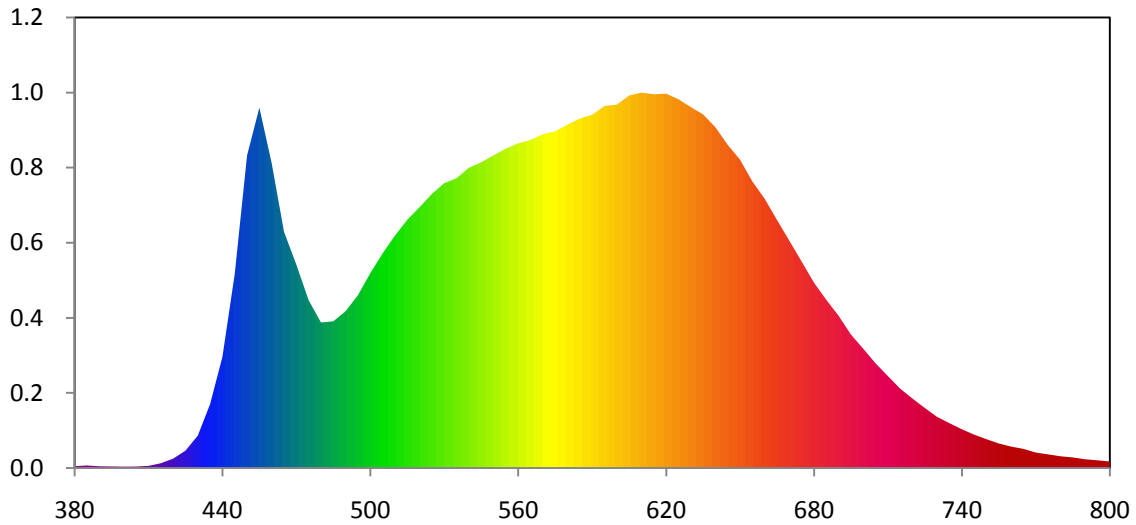
#### Chromaticity Coordinate

x	y	u	v	u'	v'
0.3922	0.3860	0.2291	0.3382	0.2291	0.5073

#### Color Rendering Index

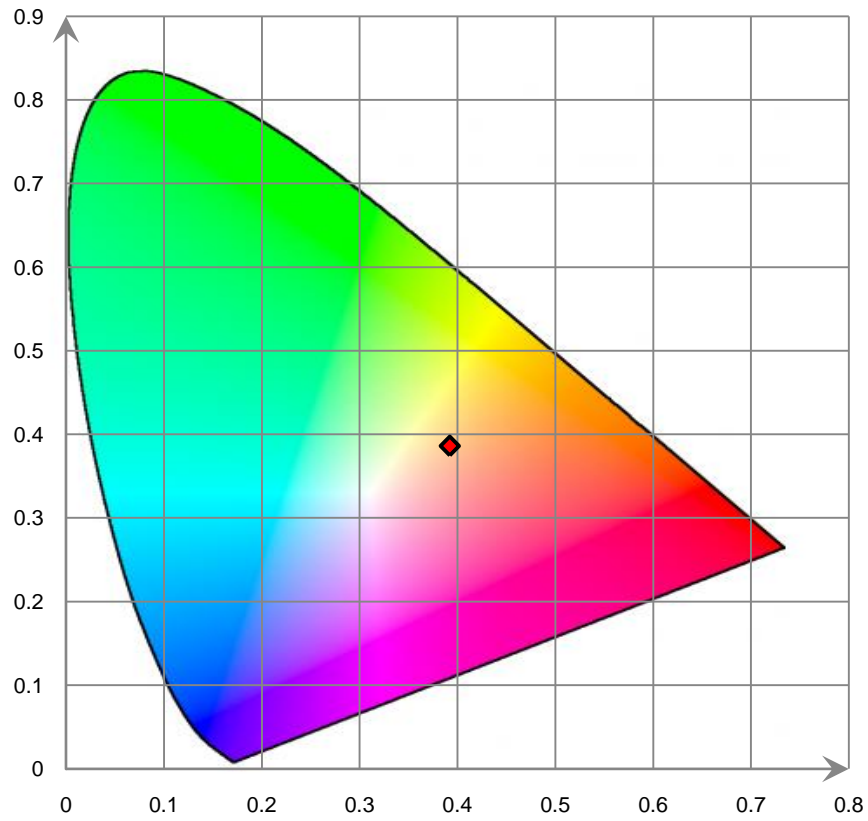
<b>Ra</b>			
92.2			
R1 92	R2 96	R3 97	R4 91
R5 91	R6 93	R7 94	R8 85
R9 63	R10 88	R11 91	R12 70
R13 94	R14 98	R15 90	

Relative Spectral Power Distribution

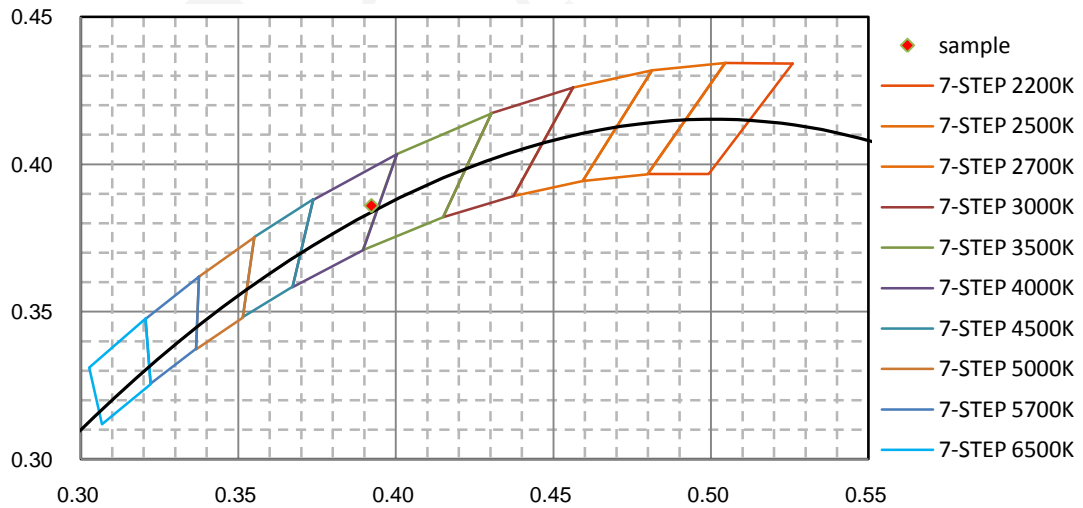


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.132E-04	465	3.748E-02	550	4.959E-02	635	5.608E-02	720	1.103E-02
385	4.250E-04	470	3.225E-02	555	5.066E-02	640	5.405E-02	725	9.536E-03
390	3.050E-04	475	2.661E-02	560	5.149E-02	645	5.125E-02	730	8.120E-03
395	2.685E-04	480	2.309E-02	565	5.203E-02	650	4.892E-02	735	7.125E-03
400	2.392E-04	485	2.328E-02	570	5.294E-02	655	4.545E-02	740	6.165E-03
405	2.610E-04	490	2.489E-02	575	5.339E-02	660	4.270E-02	745	5.314E-03
410	3.610E-04	495	2.743E-02	580	5.447E-02	665	3.935E-02	750	4.593E-03
415	7.788E-04	500	3.091E-02	585	5.543E-02	670	3.606E-02	755	3.914E-03
420	1.506E-03	505	3.405E-02	590	5.602E-02	675	3.275E-02	760	3.419E-03
425	2.771E-03	510	3.687E-02	595	5.742E-02	680	2.942E-02	765	3.055E-03
430	5.147E-03	515	3.938E-02	600	5.763E-02	685	2.669E-02	770	2.478E-03
435	1.015E-02	520	4.137E-02	605	5.907E-02	690	2.416E-02	775	2.188E-03
440	1.765E-02	525	4.348E-02	610	5.953E-02	695	2.118E-02	780	1.884E-03
445	3.080E-02	530	4.519E-02	615	5.927E-02	700	1.893E-02		
450	4.958E-02	535	4.596E-02	620	5.936E-02	705	1.661E-02		
455	5.715E-02	540	4.763E-02	625	5.849E-02	710	1.460E-02		
460	4.833E-02	545	4.849E-02	630	5.725E-02	715	1.260E-02		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



**[Goniophotometer System]**

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

Test orientation: **Downward**

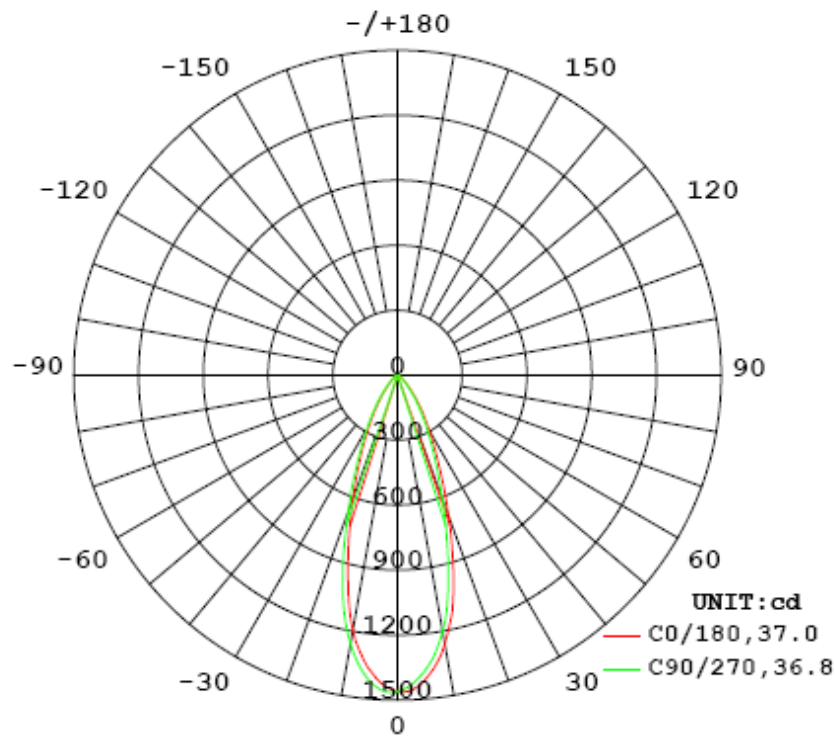
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.05	60	0.0751	8.96	0.9938

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
780.526	87.11	1467	0.63	0.58

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	37.0	37.1	36.8	36.9	37.0
Field Angle (10% I <sub>max</sub> ):	73.7	73.1	73.3	73.1	73.3

Luminous Intensity (cd) Distribution Data

C \ y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1460	1460	1460	1460	1460	1460	1460	1460
5.0°	1378	1389	1399	1410	1423	1426	1428	1417
10.0°	1195	1209	1234	1250	1259	1271	1279	1264
15.0°	892	914	947	967	990	993	996	986
20.0°	606	626	646	661	676	677	686	683
25.0°	396	410	419	434	439	448	448	449
30.0°	256	265	267	280	286	290	289	290
35.0°	160	164	168	175	182	185	185	184
40.0°	95	96	99	103	111	112	113	111
45.0°	57	56	58	60	64	64	65	65
50.0°	34	34	35	35	37	38	38	38
55.0°	23	22	23	23	24	25	24	24
60.0°	16	16	16	16	16	17	17	16
65.0°	11	12	11	11	11	11	11	11
70.0°	8	8	8	8	8	8	8	8
75.0°	5	5	5	5	5	5	5	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°	1	1	1	1	1	1	1	1
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°	1	1	1	1	1	1	1	1

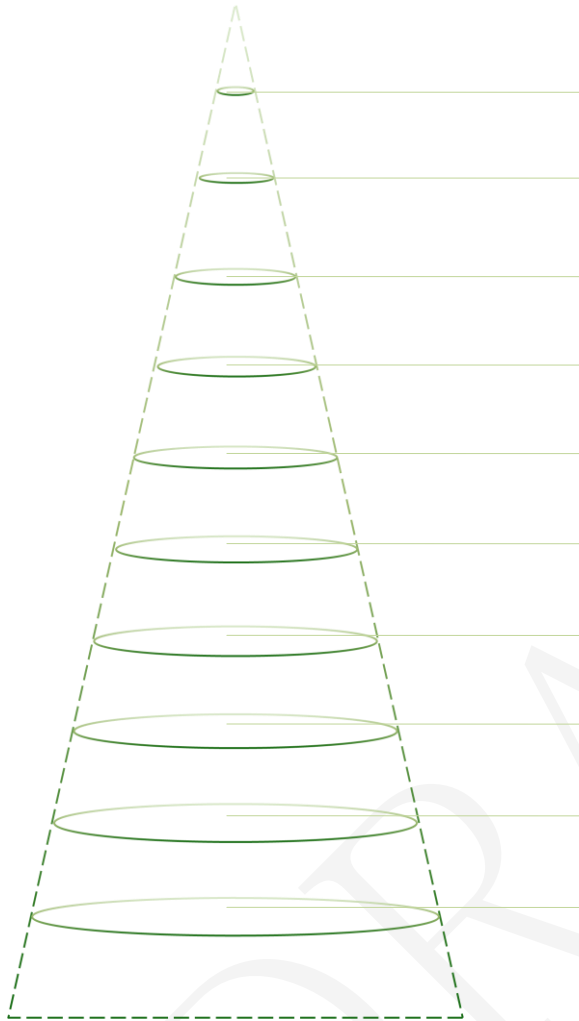


Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1460	1460	1460	1460	1460	1460	1460	1460
5.0°	1416	1406	1398	1386	1379	1372	1378	1379
10.0°	1261	1240	1227	1210	1200	1191	1197	1200
15.0°	1003	976	946	924	908	897	897	905
20.0°	692	678	652	630	609	600	609	618
25.0°	452	442	424	407	394	389	391	398
30.0°	294	285	275	265	259	251	251	257
35.0°	190	182	173	167	163	156	157	159
40.0°	115	110	103	98	95	92	91	92
45.0°	68	64	61	57	57	52	54	54
50.0°	41	38	37	34	34	32	33	33
55.0°	26	24	24	23	23	22	22	22
60.0°	18	16	16	16	17	16	16	16
65.0°	12	11	11	11	12	11	11	12
70.0°	8	8	8	8	8	8	8	8
75.0°	5	5	5	5	5	5	5	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	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°	1	1	1	1	1	1	1	1

Average Area Illumination Figure

**Angle:37.0°. Flux out:362.2lm**



Height (m)	Diameter (cm)	E <sub>avg</sub> (lx)	E <sub>max</sub> (lx)
0.5	33.46	3889.0	5898.0
1.0	66.92	972.3	1474.0
1.5	100.38	432.1	655.3
2.0	133.84	243.1	368.6
2.5	167.30	155.6	235.9
3.0	200.76	108.0	163.8
3.5	234.22	79.4	120.4
4.0	267.68	60.8	92.2
4.5	301.14	48.0	72.8
5.0	334.60	38.9	59.0

Zonal Lumen Density Measurement

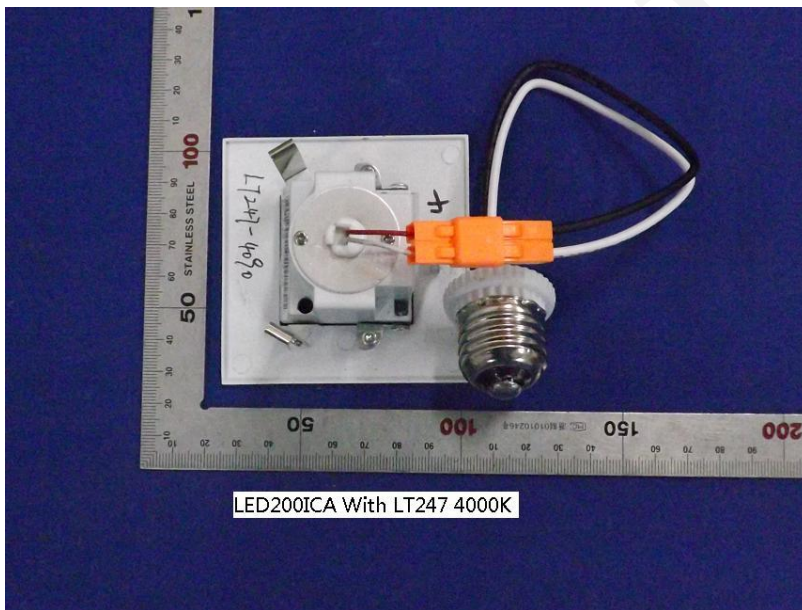
Deg	Flux (lm)	%
0-5	34.2	4.38
5-10	94.1	12.05
10-15	129.1	16.55
15-20	129.5	16.58
20-25	109.9	14.08
25-30	86.0	11.02
30-35	64.3	8.24
35-40	44.8	5.74
40-45	29.2	3.74
45-50	18.8	2.41
50-55	12.5	1.60
55-60	9.0	1.16
60-65	6.7	0.85
65-70	4.8	0.62
70-75	3.3	0.42
75-80	2.1	0.26
80-85	1.1	0.14
85-90	0.4	0.05
90-95	0.0	0.00
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	0.01
130-135	0.0	0.00
135-140	0.1	0.01
140-145	0.1	0.01
145-150	0.1	0.02
150-155	0.1	0.01
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	34.2	4.38
0-10	128.3	16.43
0-15	257.4	32.98
0-20	386.9	49.56
0-25	496.8	63.64
0-30	582.8	74.66
0-35	647.1	82.90
0-40	691.9	88.64
0-45	721.1	92.38
0-50	739.8	94.79
0-55	752.3	96.39
0-60	761.4	97.55
0-65	768.1	98.40
0-70	772.9	99.02
0-75	776.1	99.44
0-80	778.2	99.70
0-85	779.3	99.84
0-90	779.7	99.89
0-95	779.7	99.89
0-100	779.7	99.89
0-105	779.7	99.89
0-110	779.7	99.89
0-115	779.7	99.89
0-120	779.7	99.89
0-125	779.7	99.89
0-130	779.7	99.90
0-135	779.7	99.90
0-140	779.8	99.91
0-145	779.9	99.92
0-150	780.0	99.94
0-155	780.2	99.95
0-160	780.3	99.97
0-165	780.4	99.98
0-170	780.5	99.99
0-175	780.5	100.00
0-180	780.5	100.00

6. Product Photo



LED200ICA With LT247 4000K



LED200ICA With LT247 4000K

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