

# 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 3000K**

<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>	RSZ151214510-10
<b>Test Date:</b>	2016-03-11
<b>Report Date:</b>	2016-03-15
<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.

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## 1. Product Description

### General Information:

One sample was received on 2015-12-14 and used for testing.

Model Tested: LED200ICA With LT247 3000K  
 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: 3000K  
 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	60	0.0726	8.6	0.987

#### Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
674.098	2.363	78.383	2984	0.00087

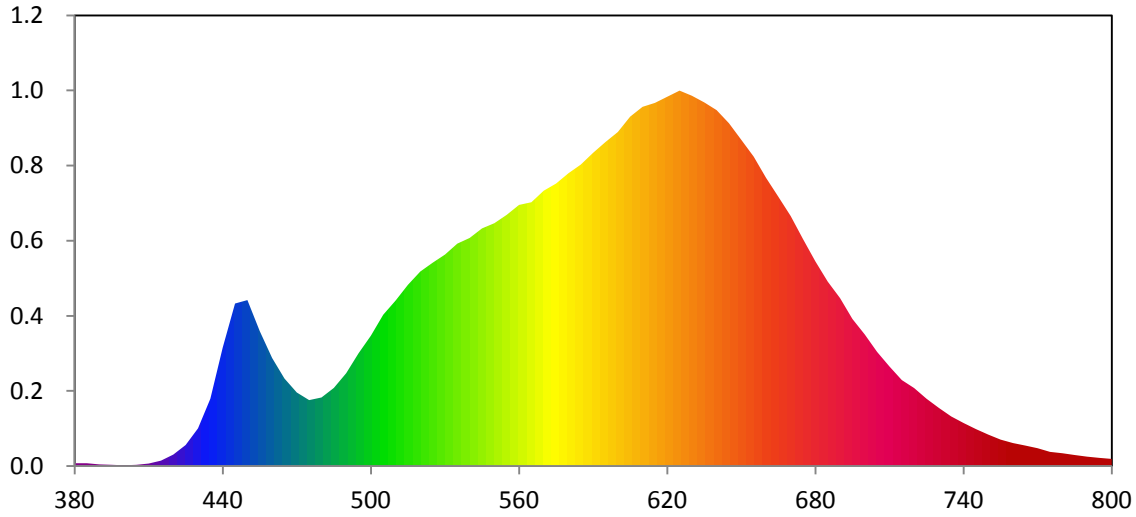
#### Chromaticity Coordinate

x	y	u	v	u'	v'
0.4394	0.4071	0.2508	0.3486	0.2508	0.5229

#### Color Rendering Index

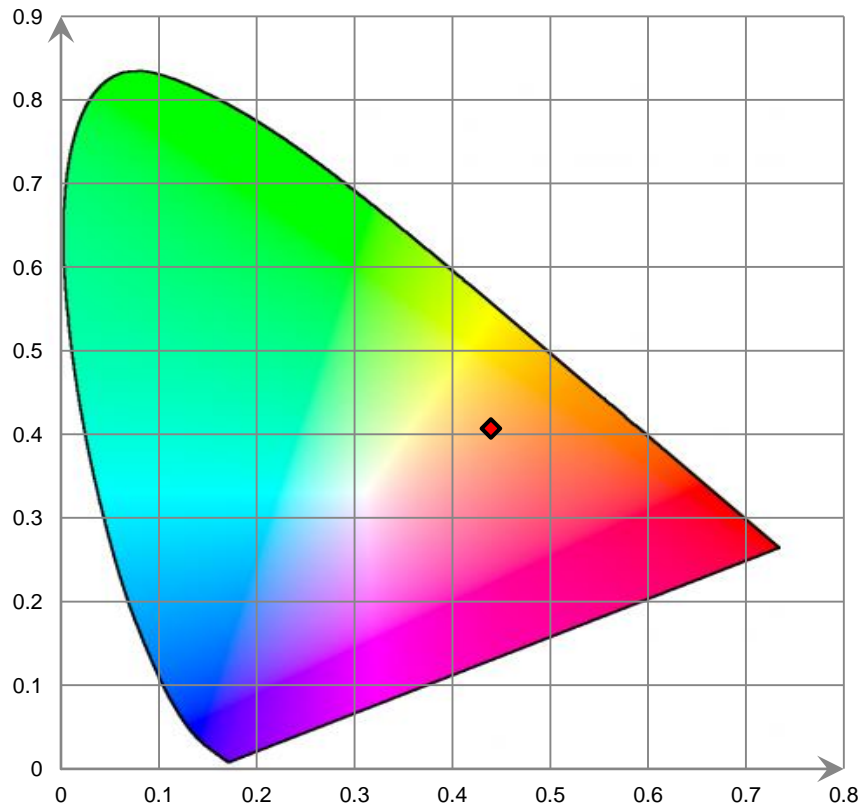
<b>Ra</b>			
92.3			
R1 93	R2 94	R3 94	R4 94
R5 92	R6 92	R7 94	R8 85
R9 64	R10 85	R11 94	R12 80
R13 93	R14 96	R15 90	

Relative Spectral Power Distribution

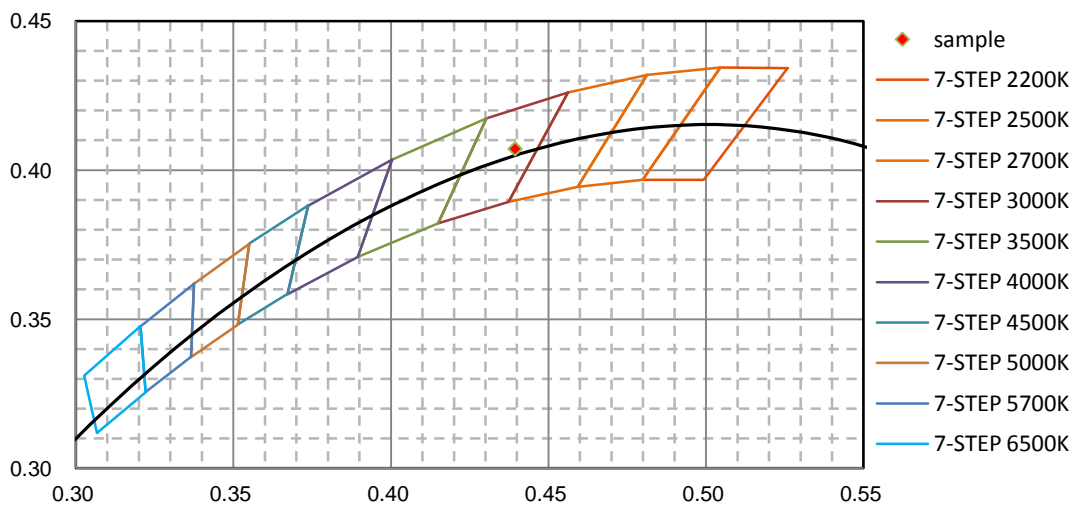


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.282E-04	465	1.267E-02	550	3.513E-02	635	5.260E-02	720	1.129E-02
385	4.250E-04	470	1.066E-02	555	3.634E-02	640	5.148E-02	725	9.751E-03
390	2.590E-04	475	9.551E-03	560	3.778E-02	645	4.959E-02	730	8.423E-03
395	2.011E-04	480	9.934E-03	565	3.816E-02	650	4.719E-02	735	7.191E-03
400	1.277E-04	485	1.131E-02	570	3.983E-02	655	4.477E-02	740	6.244E-03
405	1.939E-04	490	1.344E-02	575	4.087E-02	660	4.171E-02	745	5.363E-03
410	3.779E-04	495	1.632E-02	580	4.236E-02	665	3.896E-02	750	4.565E-03
415	7.983E-04	500	1.887E-02	585	4.361E-02	670	3.617E-02	755	3.840E-03
420	1.677E-03	505	2.190E-02	590	4.531E-02	675	3.283E-02	760	3.342E-03
425	3.060E-03	510	2.394E-02	595	4.687E-02	680	2.961E-02	765	2.982E-03
430	5.467E-03	515	2.622E-02	600	4.831E-02	685	2.669E-02	770	2.596E-03
435	9.747E-03	520	2.814E-02	605	5.054E-02	690	2.430E-02	775	2.066E-03
440	1.713E-02	525	2.941E-02	610	5.196E-02	695	2.128E-02	780	1.868E-03
445	2.352E-02	530	3.059E-02	615	5.253E-02	700	1.904E-02		
450	2.401E-02	535	3.218E-02	620	5.342E-02	705	1.652E-02		
455	1.952E-02	540	3.300E-02	625	5.431E-02	710	1.441E-02		
460	1.565E-02	545	3.438E-02	630	5.356E-02	715	1.245E-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**

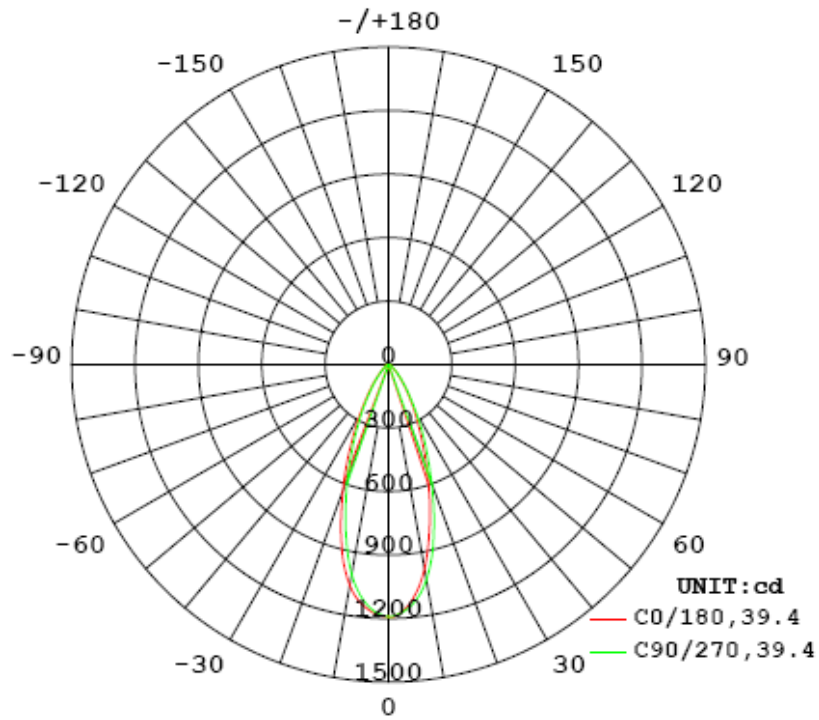
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.06	60	0.0724	8.64	0.9940

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
695.777	80.53	1193	0.60	0.65

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	39.4	39.4	39.4	39.3	39.4
Field Angle (10% I <sub>max</sub> ):	75.9	75.1	75.4	75.1	75.4

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1191	1191	1191	1191	1191	1191	1191	1191
5.0°	1159	1159	1159	1150	1142	1134	1124	1123
10.0°	1060	1054	1047	1028	1008	988	974	963
15.0°	865	857	839	817	791	769	745	736
20.0°	634	625	608	590	567	553	528	518
25.0°	431	424	412	400	382	371	358	349
30.0°	273	269	263	253	245	235	227	222
35.0°	170	166	160	155	153	144	140	137
40.0°	104	101	96	94	93	89	87	85
45.0°	64	62	59	57	57	55	54	53
50.0°	40	39	37	35	35	34	34	34
55.0°	26	25	23	22	22	22	22	22
60.0°	17	17	16	15	15	15	15	15
65.0°	12	12	11	11	10	10	10	10
70.0°	8	8	8	7	7	7	7	7
75.0°	5	5	5	5	4	4	4	4
80.0°	3	3	3	3	2	2	2	2
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	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°	0	0	0	0	0	0	0	0

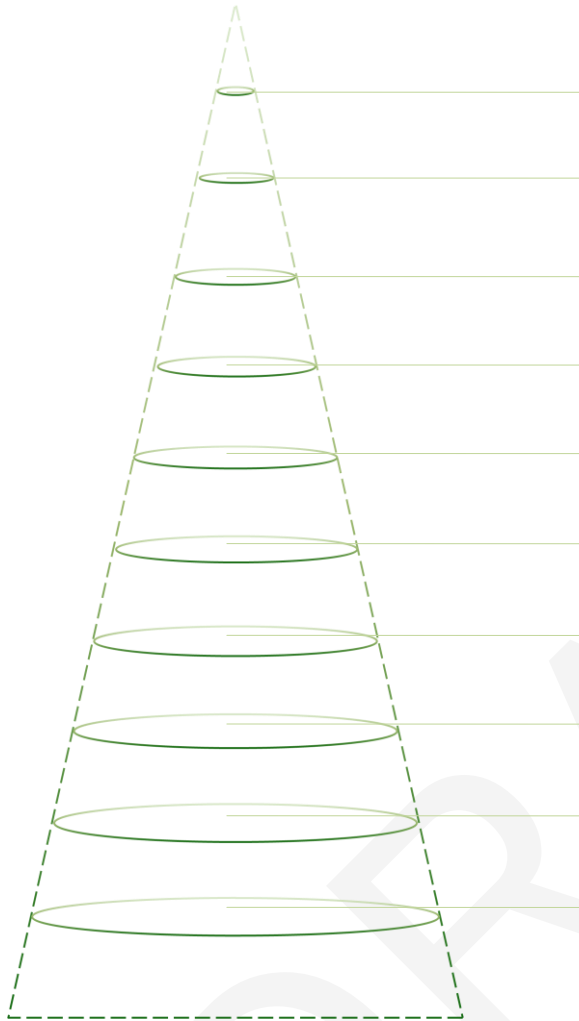


Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1191	1191	1191	1191	1191	1191	1191	1191
5.0°	1136	1136	1139	1142	1151	1160	1162	1168
10.0°	980	988	1003	1015	1033	1050	1066	1075
15.0°	756	766	786	806	828	854	873	886
20.0°	535	544	557	576	598	629	642	657
25.0°	358	368	375	391	407	428	436	447
30.0°	234	233	239	248	264	270	275	278
35.0°	149	147	148	153	161	166	169	172
40.0°	91	89	90	94	98	102	102	105
45.0°	56	54	56	58	62	63	63	64
50.0°	35	34	34	36	40	39	40	39
55.0°	23	22	22	23	25	25	25	25
60.0°	15	15	15	16	17	16	17	17
65.0°	10	10	11	11	11	11	12	12
70.0°	7	7	7	7	7	8	8	8
75.0°	4	4	4	4	5	5	5	5
80.0°	2	2	2	2	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:39.4°. Flux out:327.9lm**



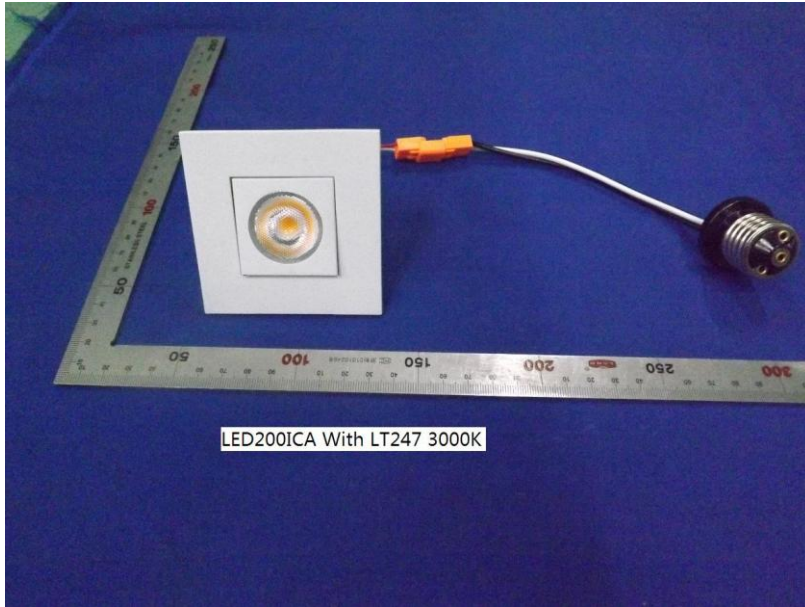
Height (m)	Diameter (cm)	E <sub>avg</sub> (lx)	E <sub>max</sub> (lx)
0.5	35.81	3151.0	4799.0
1.0	71.61	787.8	1200.0
1.5	107.42	350.1	533.2
2.0	143.22	197.0	299.9
2.5	179.03	126.1	191.9
3.0	214.83	87.5	133.3
3.5	250.64	64.3	97.9
4.0	286.44	49.2	75.0
4.5	322.25	38.9	59.2
5.0	358.05	31.5	48.0

Zonal Lumen Density Measurement

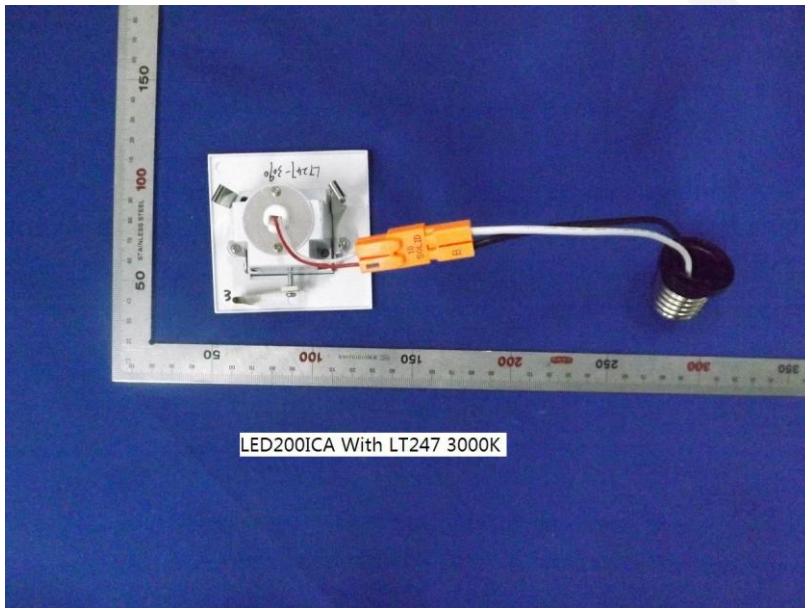
Deg	Flux (lm)	%
0-5	27.9	4.01
5-10	77.6	11.15
10-15	108.4	15.59
15-20	113.9	16.37
20-25	101.5	14.60
25-30	80.6	11.58
30-35	58.6	8.42
35-40	40.9	5.87
40-45	27.8	4.00
45-50	18.8	2.70
50-55	12.8	1.84
55-60	8.9	1.28
60-65	6.4	0.92
65-70	4.6	0.66
70-75	3.1	0.44
75-80	1.9	0.28
80-85	1.0	0.14
85-90	0.3	0.04
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	27.9	4.01
0-10	105.5	15.16
0-15	214.0	30.75
0-20	327.9	47.12
0-25	429.4	61.72
0-30	510.0	73.30
0-35	568.6	81.72
0-40	609.4	87.59
0-45	637.3	91.59
0-50	656.1	94.29
0-55	668.8	96.13
0-60	677.7	97.41
0-65	684.1	98.33
0-70	688.7	98.99
0-75	691.8	99.43
0-80	693.7	99.71
0-85	694.7	99.85
0-90	695.0	99.89
0-95	695.0	99.89
0-100	695.0	99.89
0-105	695.0	99.89
0-110	695.0	99.89
0-115	695.0	99.89
0-120	695.0	99.89
0-125	695.0	99.89
0-130	695.1	99.90
0-135	695.1	99.90
0-140	695.2	99.91
0-145	695.2	99.92
0-150	695.3	99.94
0-155	695.5	99.95
0-160	695.6	99.97
0-165	695.7	99.98
0-170	695.7	99.99
0-175	695.8	100.00
0-180	695.8	100.00

6. Product Photo



LED200ICA With LT247 3000K



LED200ICA With LT247 3000K

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