

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 2700K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
Test Engineer:	Daniel Duan
Report Number:	RSZ160309510-10
Test Date:	2016-03-14
Report Date:	2016-03-14
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 2016-03-10 and used for testing.

Model Tested: LED200ICA With LT247 2700K
 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: 2700K
 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.

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 $U=2.3\%$ ($K=2$), 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
120.01	60	0.0735	8.724	0.989

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
662.49	2.339	75.939	2628	0.00056

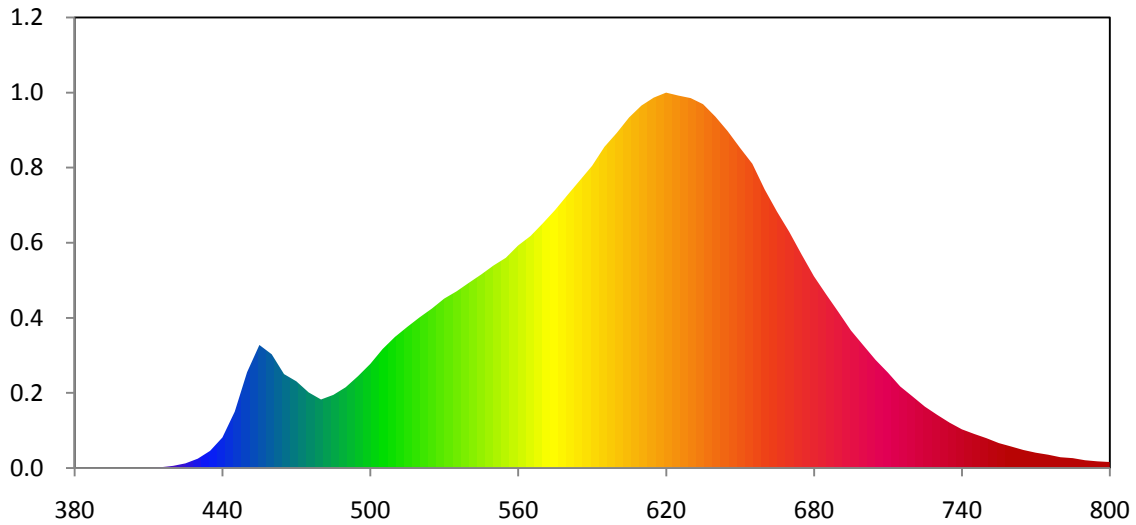
Chromaticity Coordinate

x	y	u	v	u'	v'
0.4669	0.4136	0.2657	0.3530	0.2657	0.5295

Color Rendering Index

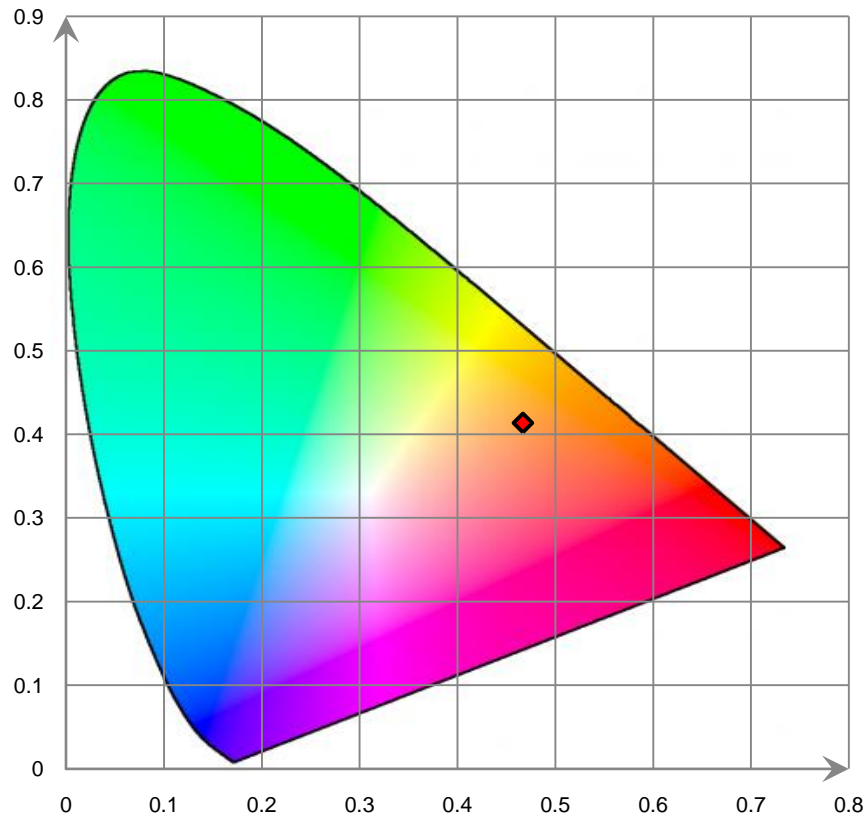
Ra			
92.4			
R1 93	R2 97	R3 99	R4 92
R5 92	R6 97	R7 90	R8 79
R9 56	R10 92	R11 93	R12 83
R13 94	R14 99	R15 88	

Relative Spectral Power Distribution

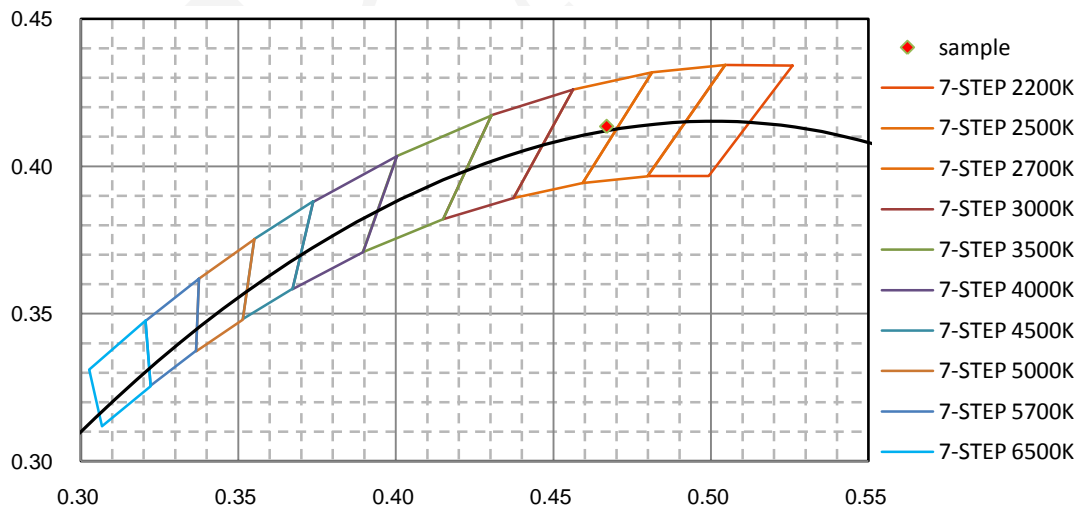


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.000E+00	465	1.727E-02	550	3.720E-02	635	6.682E-02	720	1.316E-02
385	0.000E+00	470	1.594E-02	555	3.862E-02	640	6.453E-02	725	1.130E-02
390	0.000E+00	475	1.390E-02	560	4.089E-02	645	6.186E-02	730	9.783E-03
395	0.000E+00	480	1.261E-02	565	4.261E-02	650	5.880E-02	735	8.360E-03
400	0.000E+00	485	1.345E-02	570	4.494E-02	655	5.587E-02	740	7.130E-03
405	0.000E+00	490	1.485E-02	575	4.740E-02	660	5.116E-02	745	6.282E-03
410	5.649E-05	495	1.688E-02	580	5.014E-02	665	4.709E-02	750	5.503E-03
415	1.705E-04	500	1.914E-02	585	5.281E-02	670	4.336E-02	755	4.603E-03
420	4.257E-04	505	2.187E-02	590	5.551E-02	675	3.921E-02	760	3.981E-03
425	8.802E-04	510	2.409E-02	595	5.898E-02	680	3.522E-02	765	3.331E-03
430	1.741E-03	515	2.593E-02	600	6.154E-02	685	3.187E-02	770	2.836E-03
435	3.180E-03	520	2.768E-02	605	6.438E-02	690	2.860E-02	775	2.472E-03
440	5.640E-03	525	2.930E-02	610	6.655E-02	695	2.528E-02	780	2.006E-03
445	1.038E-02	530	3.113E-02	615	6.802E-02	700	2.256E-02		
450	1.761E-02	535	3.246E-02	620	6.894E-02	705	1.987E-02		
455	2.261E-02	540	3.402E-02	625	6.839E-02	710	1.755E-02		
460	2.091E-02	545	3.556E-02	630	6.792E-02	715	1.500E-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**

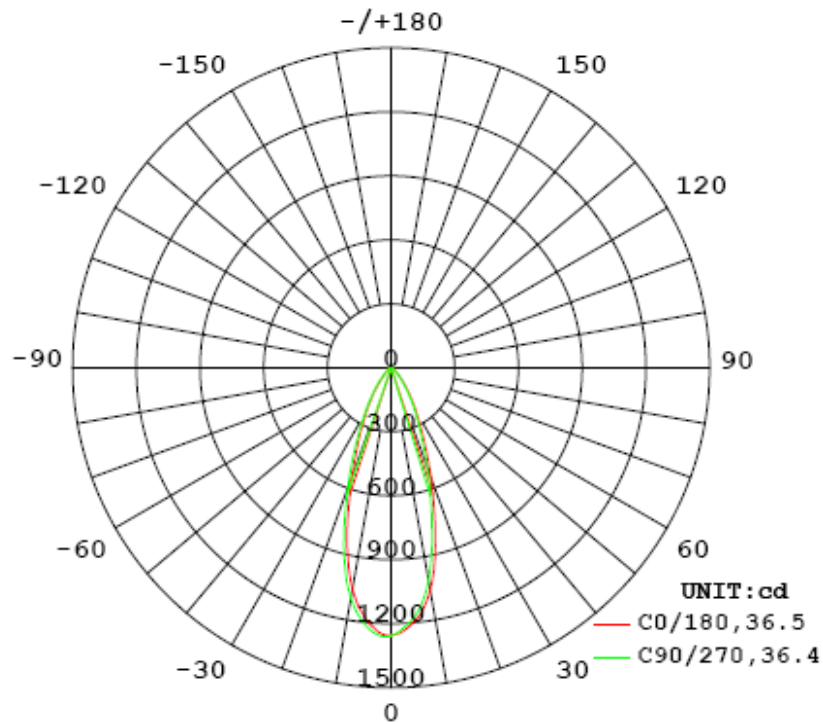
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.04	60	0.0729	8.71	0.9953

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
663.237	76.15	1263	0.60	0.56

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	36.5	36.6	36.4	36.5	36.5
Field Angle (10% I _{max}):	73.1	72.5	73.0	72.5	72.8

Luminous Intensity (cd) Distribution Data

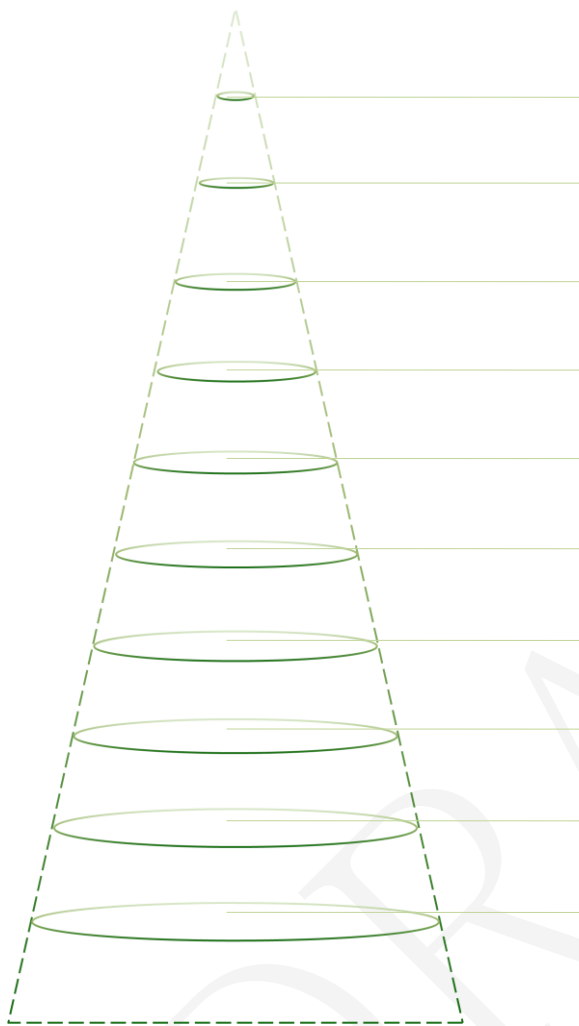
C \ y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1255	1255	1255	1255	1255	1255	1255	1255
5.0°	1202	1215	1227	1228	1226	1220	1210	1200
10.0°	1054	1074	1094	1098	1097	1090	1078	1053
15.0°	806	840	859	867	864	859	836	813
20.0°	544	582	591	602	598	597	577	556
25.0°	354	372	384	399	395	389	373	360
30.0°	229	237	245	253	254	251	243	232
35.0°	142	145	152	156	160	157	154	148
40.0°	83	85	89	93	96	94	90	87
45.0°	49	49	52	54	57	56	52	50
50.0°	30	28	31	31	33	32	31	30
55.0°	20	18	20	20	22	21	21	20
60.0°	14	13	14	14	15	16	16	15
65.0°	10	9	10	10	11	11	12	11
70.0°	7	6	7	7	8	8	8	7
75.0°	4	4	4	4	5	5	5	5
80.0°	2	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	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°	1255	1255	1255	1255	1255	1255	1255	1255
5.0°	1198	1189	1185	1181	1183	1188	1193	1205
10.0°	1061	1041	1028	1016	1012	1017	1029	1050
15.0°	803	781	759	748	740	747	765	796
20.0°	546	526	509	499	496	507	517	535
25.0°	357	341	333	327	319	329	335	351
30.0°	234	224	218	214	212	213	217	224
35.0°	150	143	137	134	134	133	134	140
40.0°	90	82	80	78	79	77	77	79
45.0°	53	49	47	45	47	44	45	45
50.0°	32	30	29	28	29	27	27	27
55.0°	22	20	20	19	19	18	18	18
60.0°	16	15	14	14	14	13	13	13
65.0°	11	11	10	10	10	9	9	9
70.0°	7	7	7	6	7	6	7	6
75.0°	5	4	4	4	4	4	4	4
80.0°	3	2	2	2	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	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:36.5°. Flux out:309.4lm



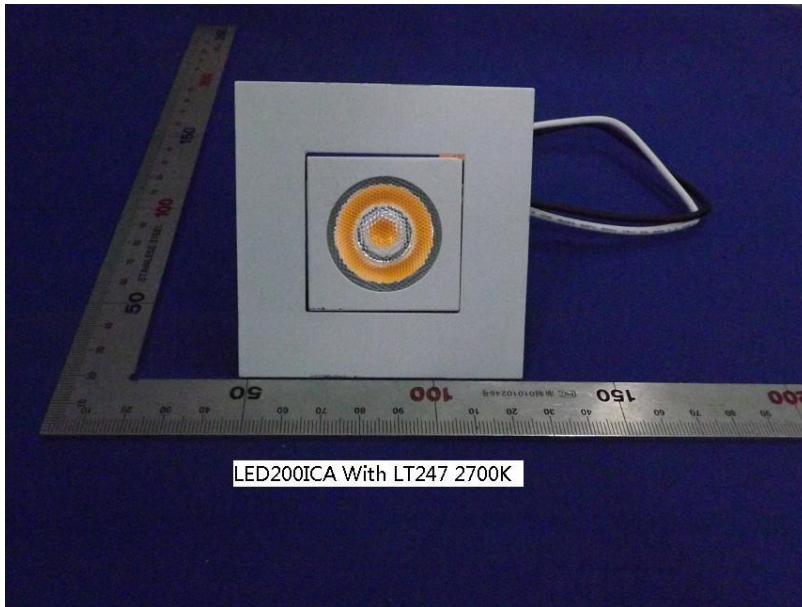
Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	32.98	3323.0	5065.0
1.0	65.95	830.7	1266.0
1.5	98.93	369.2	562.8
2.0	131.90	207.7	316.6
2.5	164.88	132.9	202.6
3.0	197.85	92.3	140.7
3.5	230.83	67.8	103.4
4.0	263.80	51.9	79.2
4.5	296.78	41.0	62.5
5.0	329.75	33.2	50.7

Zonal Lumen Density Measurement

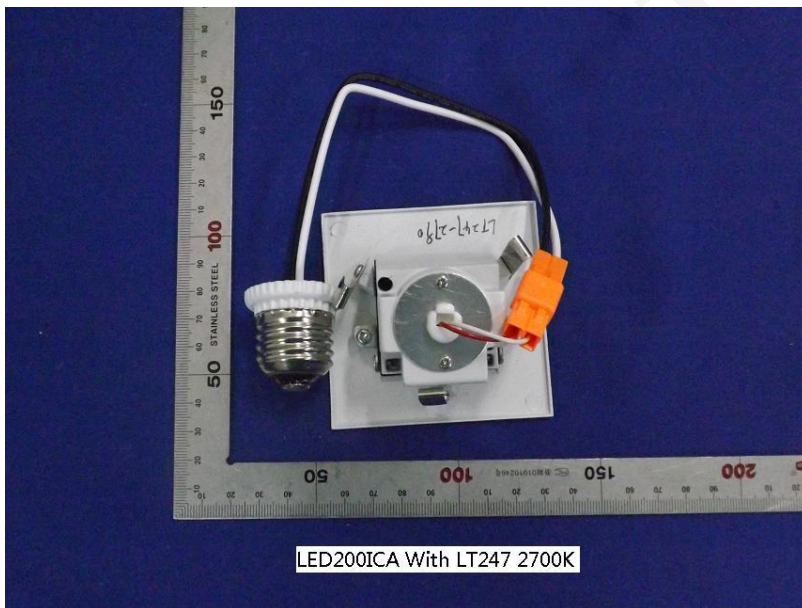
Deg	Flux (lm)	%
0-5	29.4	4.43
5-10	80.9	12.19
10-15	110.2	16.61
15-20	109.9	16.58
20-25	93.1	14.04
25-30	73.0	11.00
30-35	54.4	8.21
35-40	37.5	5.64
40-45	24.2	3.65
45-50	15.5	2.34
50-55	10.5	1.59
55-60	7.8	1.17
60-65	5.9	0.89
65-70	4.3	0.64
70-75	2.9	0.44
75-80	1.8	0.28
80-85	1.0	0.14
85-90	0.3	0.05
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	0.00
130-135	0.0	0.01
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	29.4	4.43
0-10	110.3	16.62
0-15	220.4	33.23
0-20	330.3	49.81
0-25	423.5	63.85
0-30	496.5	74.85
0-35	550.9	83.06
0-40	588.3	88.70
0-45	612.5	92.35
0-50	628.0	94.69
0-55	638.5	96.28
0-60	646.3	97.45
0-65	652.2	98.34
0-70	656.5	98.98
0-75	659.4	99.42
0-80	661.2	99.70
0-85	662.2	99.84
0-90	662.5	99.89
0-95	662.5	99.89
0-100	662.5	99.89
0-105	662.5	99.89
0-110	662.5	99.89
0-115	662.5	99.89
0-120	662.5	99.89
0-125	662.5	99.89
0-130	662.5	99.89
0-135	662.6	99.90
0-140	662.6	99.91
0-145	662.7	99.92
0-150	662.8	99.94
0-155	662.9	99.95
0-160	663.0	99.97
0-165	663.1	99.98
0-170	663.2	99.99
0-175	663.2	100.00
0-180	663.2	100.00

6. Product Photo



LED200ICA With LT247 2700K



LED200ICA With LT247 2700K

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