

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 3000K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
Test Engineer:	Daniel Duan
Report Number:	RSZ160309513-10
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.

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1. Product Description

General Information:

One sample was received on 2016-03-10 and used for testing.

Model Tested: LED200ICA With LT240/243 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.

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
120.04	60	0.0745	8.845	0.989

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
628.027	2.165	71.004	2996	0.00095

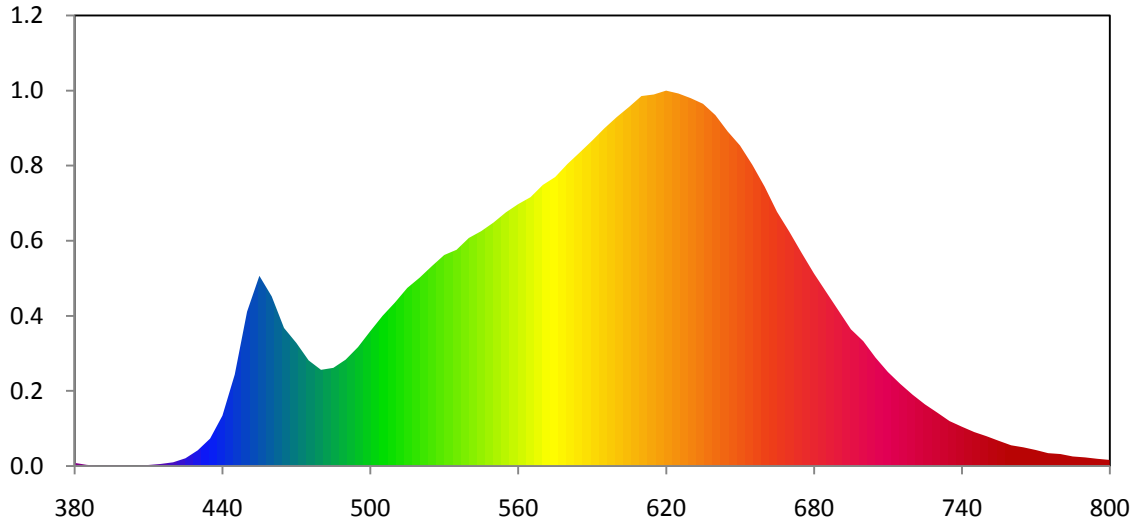
Chromaticity Coordinate

x	y	u	v	u'	v'
0.4386	0.4070	0.2504	0.3485	0.2504	0.5228

Color Rendering Index

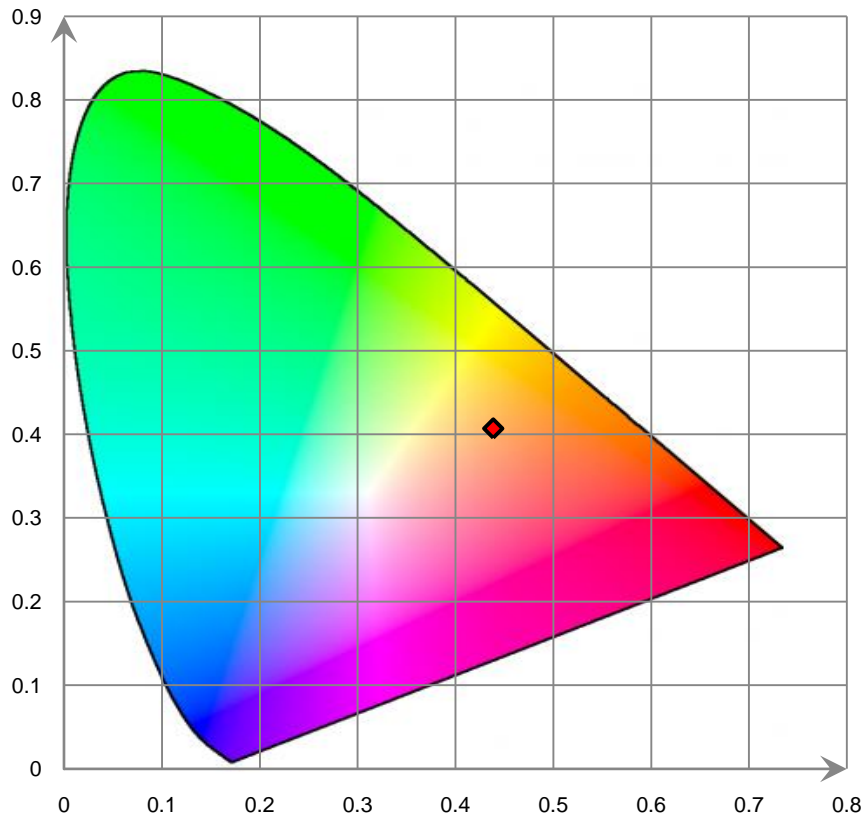
Ra			
92.5			
R1 93	R2 96	R3 99	R4 92
R5 92	R6 95	R7 92	R8 82
R9 59	R10 90	R11 92	R12 77
R13 94	R14 99	R15 89	

Relative Spectral Power Distribution

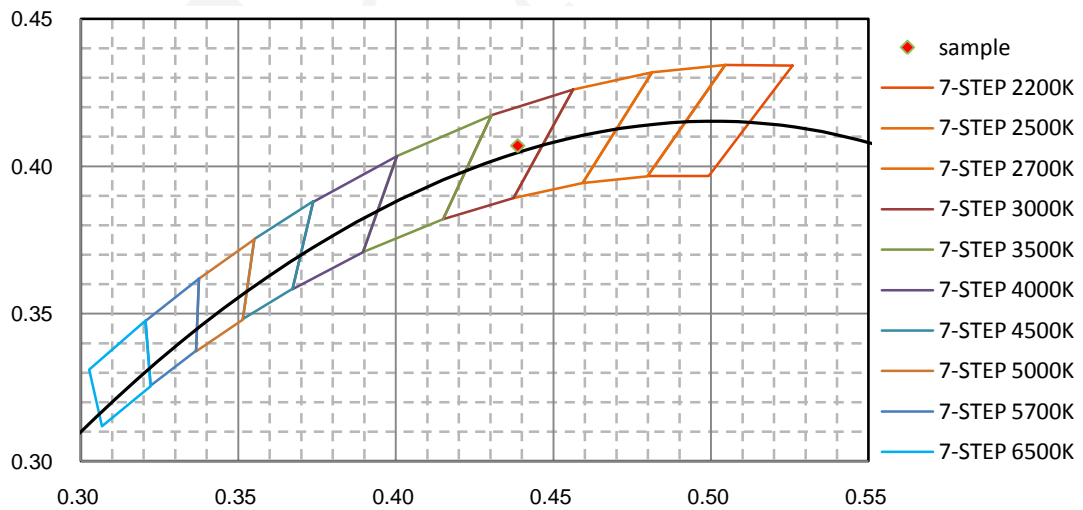


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.856E-04	465	2.037E-02	550	3.592E-02	635	5.342E-02	720	1.054E-02
385	1.901E-04	470	1.816E-02	555	3.742E-02	640	5.175E-02	725	9.120E-03
390	5.978E-05	475	1.558E-02	560	3.863E-02	645	4.934E-02	730	7.902E-03
395	1.000E-04	480	1.420E-02	565	3.965E-02	650	4.727E-02	735	6.645E-03
400	9.344E-05	485	1.449E-02	570	4.146E-02	655	4.442E-02	740	5.816E-03
405	3.959E-05	490	1.571E-02	575	4.262E-02	660	4.120E-02	745	5.031E-03
410	1.745E-04	495	1.755E-02	580	4.456E-02	665	3.750E-02	750	4.419E-03
415	3.307E-04	500	1.990E-02	585	4.625E-02	670	3.457E-02	755	3.735E-03
420	5.700E-04	505	2.217E-02	590	4.799E-02	675	3.144E-02	760	3.078E-03
425	1.161E-03	510	2.412E-02	595	4.981E-02	680	2.841E-02	765	2.775E-03
430	2.336E-03	515	2.628E-02	600	5.147E-02	685	2.566E-02	770	2.383E-03
435	4.070E-03	520	2.778E-02	605	5.296E-02	690	2.291E-02	775	1.916E-03
440	7.450E-03	525	2.950E-02	610	5.456E-02	695	2.018E-02	780	1.788E-03
445	1.351E-02	530	3.113E-02	615	5.479E-02	700	1.843E-02		
450	2.278E-02	535	3.190E-02	620	5.536E-02	705	1.599E-02		
455	2.806E-02	540	3.365E-02	625	5.494E-02	710	1.388E-02		
460	2.503E-02	545	3.465E-02	630	5.425E-02	715	1.214E-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**

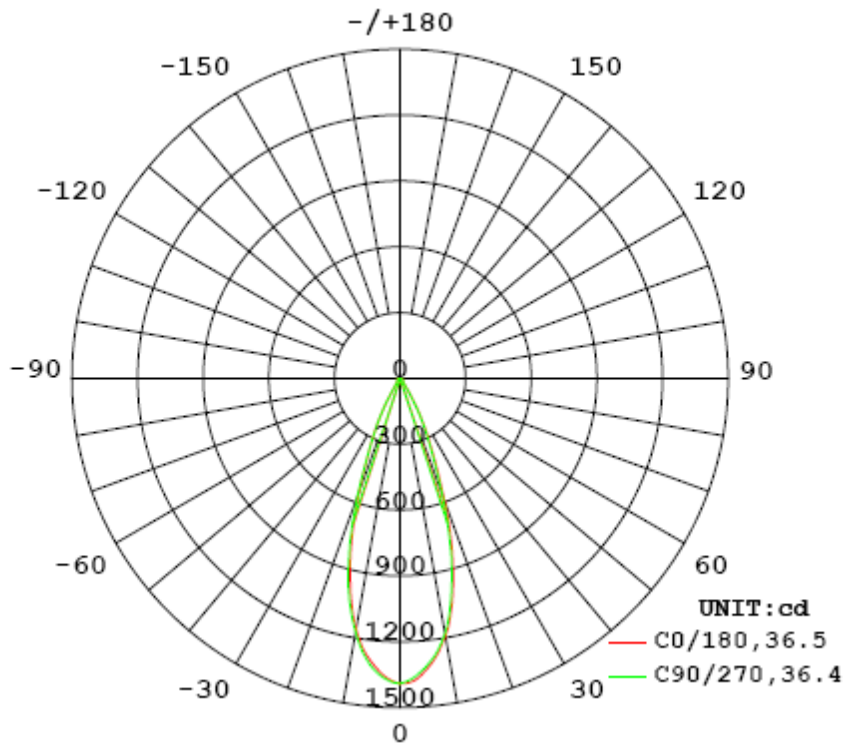
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.03	60	0.0742	8.85	0.9937

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
630.814	71.28	1390	0.58	0.57

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	36.5	37.7	36.4	37.6	37.1
Field Angle (10% I _{max}):	59.9	65.9	59.5	65.6	62.7

Luminous Intensity (cd) Distribution Data

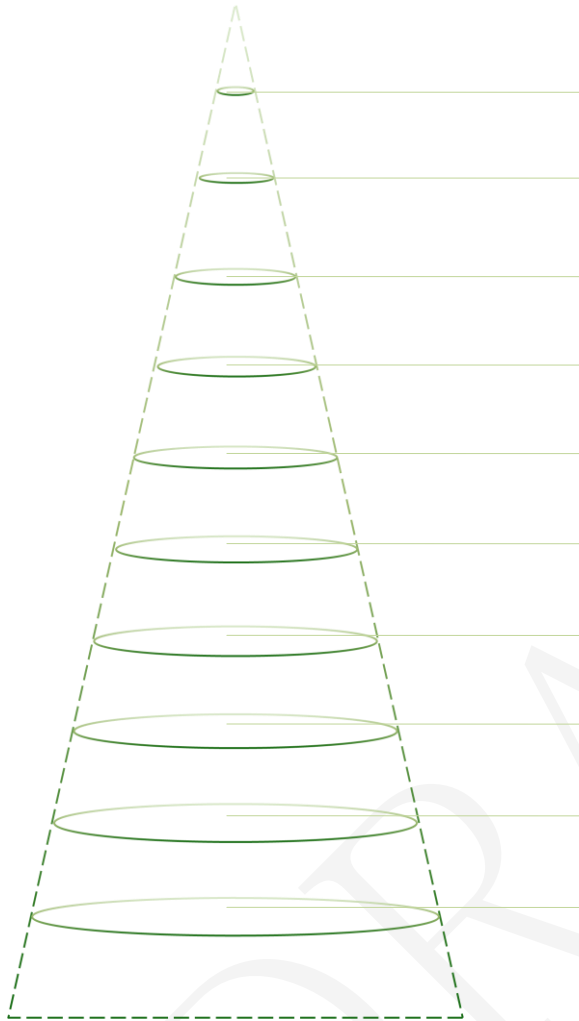
C \ y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1389	1389	1389	1389	1389	1389	1389	1389
5.0°	1318	1321	1326	1327	1336	1337	1334	1328
10.0°	1159	1163	1174	1167	1174	1182	1188	1178
15.0°	886	901	912	913	920	919	915	914
20.0°	549	589	629	597	573	606	635	604
25.0°	293	323	388	319	294	326	398	333
30.0°	124	171	186	168	130	175	194	173
35.0°	42	58	111	57	42	60	110	57
40.0°	27	28	47	27	25	27	51	26
45.0°	22	23	23	22	21	22	22	21
50.0°	19	20	19	20	18	19	18	19
55.0°	18	18	17	17	17	17	16	17
60.0°	15	15	14	15	15	15	14	14
65.0°	12	12	12	12	12	12	11	12
70.0°	9	9	9	9	9	9	9	9
75.0°	6	7	6	7	7	7	6	7
80.0°	4	4	4	4	4	4	4	4
85.0°	1	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°	1389	1389	1389	1389	1389	1389	1389	1389
5.0°	1335	1332	1330	1322	1323	1321	1319	1322
10.0°	1191	1182	1186	1178	1181	1178	1179	1175
15.0°	940	932	927	919	913	916	911	919
20.0°	594	625	638	599	559	598	631	604
25.0°	314	342	399	323	300	327	388	329
30.0°	150	188	198	171	134	176	191	174
35.0°	44	68	115	57	39	59	113	58
40.0°	26	29	49	27	25	27	46	27
45.0°	21	23	23	23	21	23	23	22
50.0°	19	20	19	20	19	20	19	20
55.0°	17	17	17	18	17	18	17	18
60.0°	14	15	14	15	15	15	14	15
65.0°	12	12	12	12	12	12	12	12
70.0°	9	9	9	9	9	9	9	9
75.0°	7	7	6	6	6	6	6	6
80.0°	4	4	4	4	4	4	4	4
85.0°	2	2	2	2	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:37.1°. Flux out:347.2lm



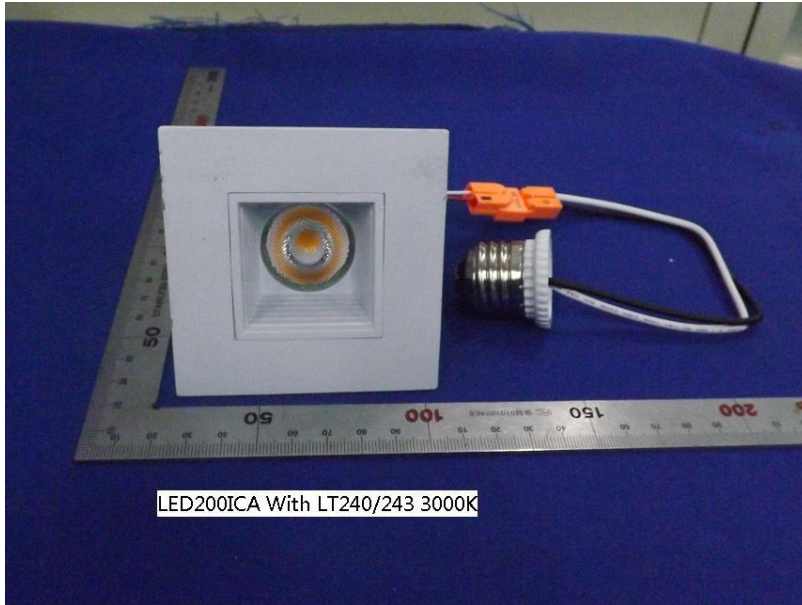
Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	33.56	3729.0	5566.0
1.0	67.11	932.2	1392.0
1.5	100.67	414.3	618.5
2.0	134.23	233.1	347.9
2.5	167.78	149.2	222.6
3.0	201.34	103.6	154.6
3.5	234.90	76.1	113.6
4.0	268.45	58.3	87.0
4.5	302.01	46.0	68.7
5.0	335.57	37.3	55.7

Zonal Lumen Density Measurement

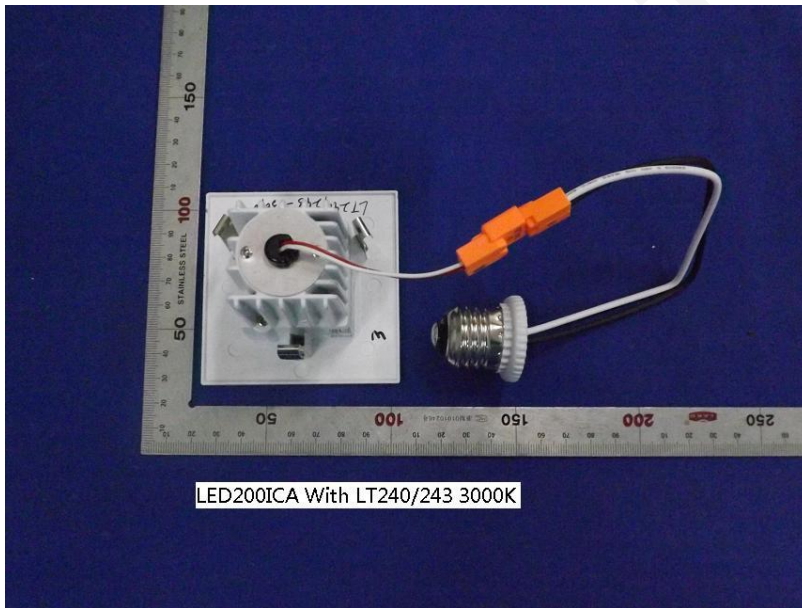
Deg	Flux (lm)	%
0-5	32.4	5.14
5-10	89.6	14.21
10-15	124.2	19.69
15-20	124.1	19.68
20-25	95.5	15.14
25-30	62.4	9.89
30-35	32.6	5.16
35-40	15.5	2.46
40-45	9.6	1.53
45-50	8.3	1.32
50-55	7.9	1.25
55-60	7.4	1.17
60-65	6.5	1.03
65-70	5.3	0.84
70-75	4.1	0.65
75-80	2.7	0.43
80-85	1.4	0.23
85-90	0.4	0.06
90-95	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	0.02
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	32.4	5.14
0-10	122.0	19.35
0-15	246.3	39.04
0-20	370.4	58.72
0-25	465.9	73.86
0-30	528.3	83.75
0-35	560.9	88.91
0-40	576.4	91.37
0-45	586.0	92.90
0-50	594.3	94.22
0-55	602.3	95.47
0-60	609.6	96.64
0-65	616.1	97.67
0-70	621.4	98.51
0-75	625.5	99.16
0-80	628.2	99.59
0-85	629.7	99.82
0-90	630.1	99.88
0-95	630.1	99.88
0-100	630.1	99.88
0-105	630.1	99.88
0-110	630.1	99.88
0-115	630.1	99.88
0-120	630.1	99.88
0-125	630.1	99.88
0-130	630.1	99.89
0-135	630.1	99.89
0-140	630.2	99.90
0-145	630.3	99.91
0-150	630.4	99.93
0-155	630.5	99.95
0-160	630.6	99.97
0-165	630.7	99.98
0-170	630.8	99.99
0-175	630.8	100.00
0-180	630.8	100.00

6. Product Photo



LED200ICA With LT240/243 3000K



LED200ICA With LT240/243 3000K

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