



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 4000K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
Test Engineer:	Daniel Duan
Report Number:	RSZ160309514-10
Test Date:	2016-03-14
Report Date:	2016-03-14
Reviewed By:	Jeanne Han/Safety Manager
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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 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 π 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	0.0757	8.975	0.988

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
687.213	2.318	76.57	3756	0.002

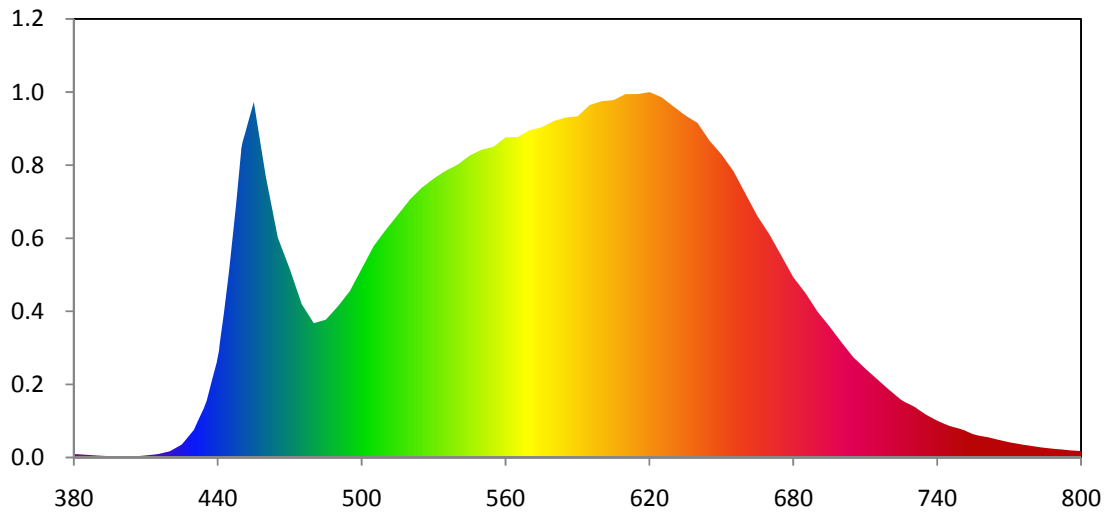
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3936	0.3890	0.2288	0.3392	0.2288	0.5088

Color Rendering Index

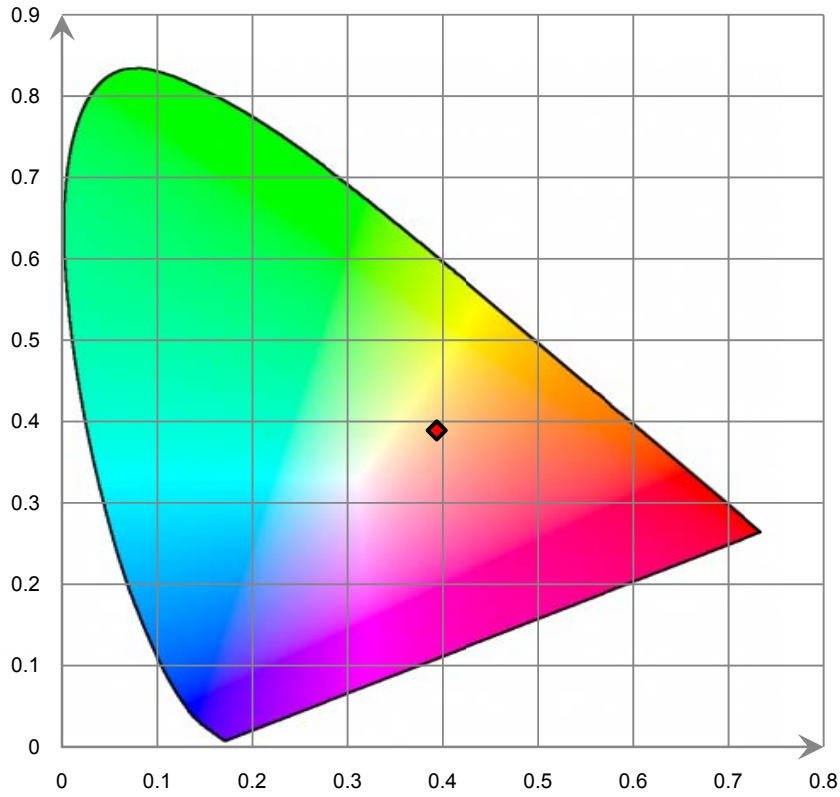
Ra 91.8			
R1 92	R2 95	R3 96	R4 91
R5 90	R6 92	R7 94	R8 85
R9 62	R10 86	R11 90	R12 68
R13 93	R14 97	R15 89	

Relative Spectral Power Distribution

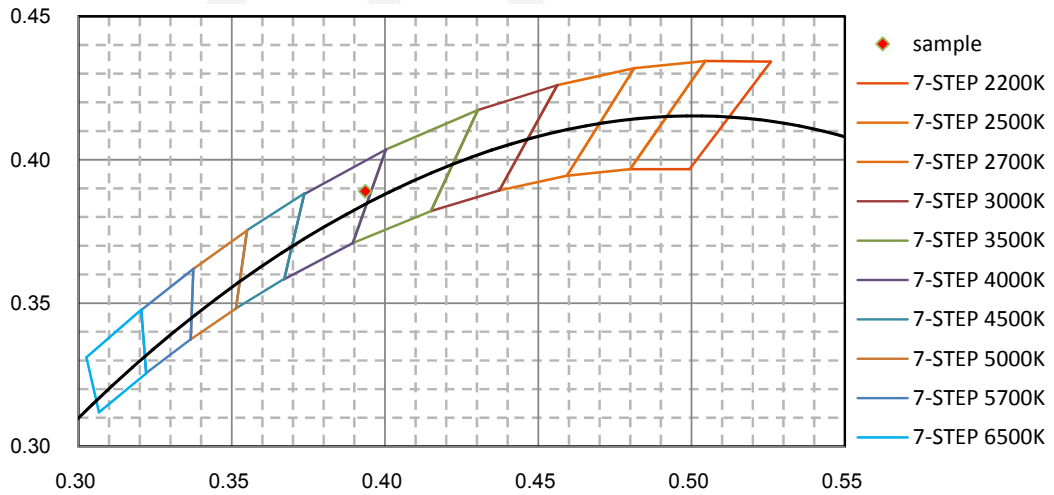


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.856E-04	465	3.054E-02	550	4.274E-02	635	4.747E-02	720	9.385E-03
385	3.823E-04	470	2.616E-02	555	4.315E-02	640	4.646E-02	725	7.972E-03
390	2.590E-04	475	2.128E-02	560	4.447E-02	645	4.398E-02	730	7.136E-03
395	1.787E-04	480	1.864E-02	565	4.449E-02	650	4.208E-02	735	6.005E-03
400	1.535E-04	485	1.914E-02	570	4.545E-02	655	3.974E-02	740	5.100E-03
405	1.403E-04	490	2.099E-02	575	4.585E-02	660	3.660E-02	745	4.382E-03
410	2.932E-04	495	2.311E-02	580	4.671E-02	665	3.350E-02	750	3.945E-03
415	4.768E-04	500	2.626E-02	585	4.720E-02	670	3.099E-02	755	3.216E-03
420	8.722E-04	505	2.935E-02	590	4.740E-02	675	2.800E-02	760	2.902E-03
425	1.835E-03	510	3.161E-02	595	4.895E-02	680	2.501E-02	765	2.492E-03
430	3.848E-03	515	3.368E-02	600	4.947E-02	685	2.286E-02	770	2.111E-03
435	7.497E-03	520	3.581E-02	605	4.963E-02	690	2.028E-02	775	1.856E-03
440	1.384E-02	525	3.745E-02	610	5.047E-02	695	1.820E-02	780	1.537E-03
445	2.661E-02	530	3.873E-02	615	5.046E-02	700	1.601E-02		
450	4.338E-02	535	3.982E-02	620	5.074E-02	705	1.389E-02		
455	4.936E-02	540	4.067E-02	625	5.002E-02	710	1.234E-02		
460	3.901E-02	545	4.194E-02	630	4.875E-02	715	1.081E-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**

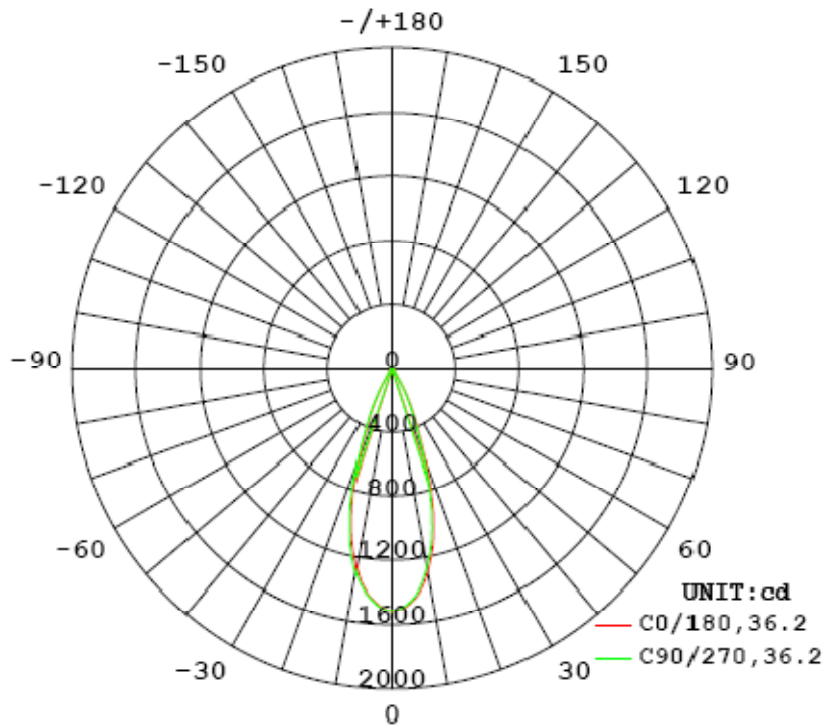
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.02	60	0.0755	9.01	0.9943

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
693.851	77.01	1512	0.57	0.56

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	36.2	37.8	36.2	38.0	37.1
Field Angle (10% I _{max}):	59.8	65.8	59.7	65.6	62.7

Luminous Intensity (cd) Distribution Data

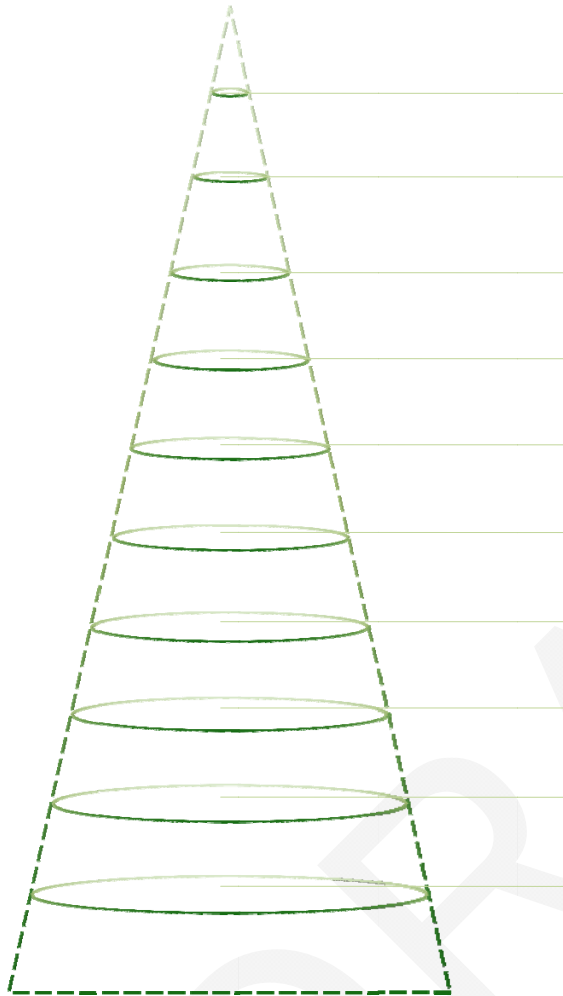
C \ Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1512	1512	1512	1512	1512	1512	1512	1512
5.0°	1445	1447	1449	1454	1453	1453	1457	1452
10.0°	1268	1277	1289	1294	1295	1296	1297	1282
15.0°	970	991	1005	1009	1011	1018	1014	998
20.0°	598	652	706	669	641	694	715	641
25.0°	326	365	445	368	351	387	445	344
30.0°	142	200	223	200	160	212	216	177
35.0°	49	71	134	71	55	79	122	62
40.0°	30	33	57	33	31	35	58	33
45.0°	25	27	28	27	26	28	28	28
50.0°	23	24	23	24	23	24	24	24
55.0°	20	21	20	21	21	21	21	22
60.0°	17	17	17	18	18	18	17	19
65.0°	13	14	13	14	14	15	14	15
70.0°	10	10	10	11	11	11	11	12
75.0°	7	7	7	8	8	8	8	8
80.0°	4	4	4	5	5	5	5	5
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°	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	0	0	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°	1512	1512	1512	1512	1512	1512	1512	1512
5.0°	1458	1460	1456	1453	1449	1444	1445	1448
10.0°	1293	1287	1281	1268	1262	1267	1270	1278
15.0°	1012	1001	987	977	966	976	983	991
20.0°	621	656	682	625	577	623	685	653
25.0°	324	352	416	329	303	337	421	361
30.0°	153	187	194	166	133	179	202	187
35.0°	48	70	107	58	43	64	119	65
40.0°	32	34	50	33	31	33	50	33
45.0°	27	28	28	28	26	27	27	27
50.0°	24	25	24	25	23	24	23	24
55.0°	22	22	21	22	21	21	20	21
60.0°	19	19	18	19	18	18	17	18
65.0°	16	16	15	15	15	15	14	14
70.0°	12	12	11	11	11	11	10	11
75.0°	9	8	8	8	8	7	7	7
80.0°	5	5	5	5	4	4	4	4
85.0°	2	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	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	0	0	1	1	1

Average Area Illumination Figure

Angle:37.1° Flux out:377.7lm



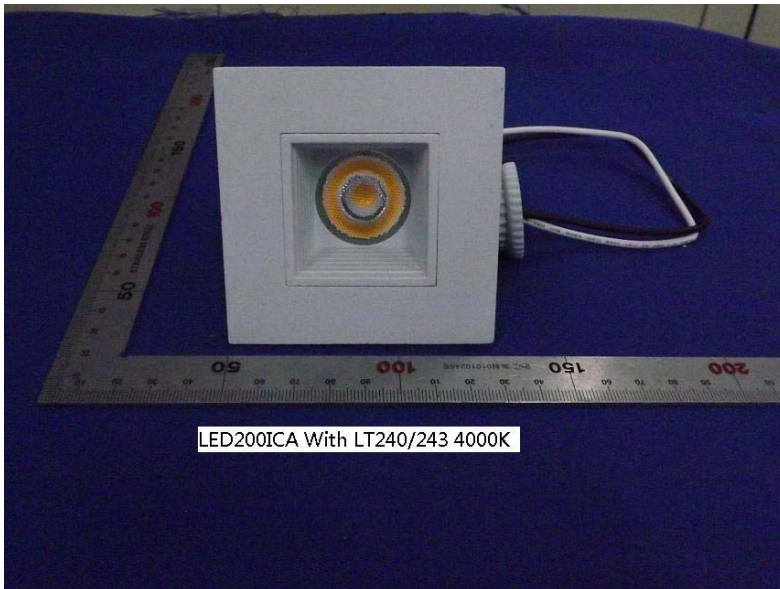
Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	33.56	4056.0	6084.0
1.0	67.11	1014.0	1521.0
1.5	100.67	450.7	676.0
2.0	134.23	253.5	380.2
2.5	167.78	162.2	243.3
3.0	201.34	112.7	169.0
3.5	234.90	82.8	124.2
4.0	268.45	63.4	95.1
4.5	302.01	50.1	75.1
5.0	335.57	40.6	60.8

Zonal Lumen Density Measurement

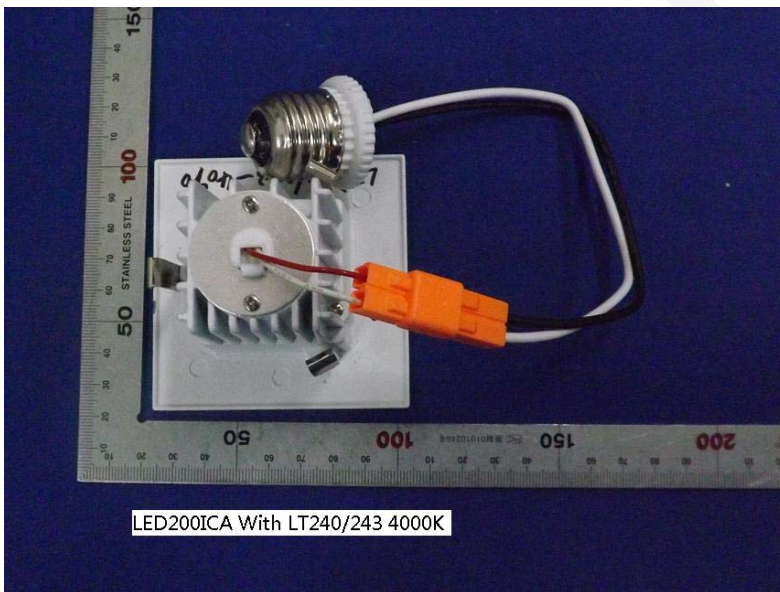
Deg	Flux (lm)	%
0-5	35.4	5.10
5-10	97.9	14.11
10-15	134.9	19.44
15-20	134.7	19.41
20-25	103.9	14.97
25-30	67.8	9.77
30-35	35.6	5.14
35-40	17.8	2.56
40-45	11.6	1.67
45-50	10.2	1.48
50-55	9.7	1.40
55-60	9.0	1.30
60-65	7.9	1.13
65-70	6.4	0.93
70-75	4.9	0.70
75-80	3.2	0.47
80-85	1.7	0.23
85-90	0.5	0.07
90-95	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	35.4	5.10
0-10	133.3	19.21
0-15	268.2	38.65
0-20	402.9	58.06
0-25	506.8	73.03
0-30	574.5	82.80
0-35	610.2	87.94
0-40	627.9	90.50
0-45	639.5	92.17
0-50	649.8	93.65
0-55	659.5	95.05
0-60	668.5	96.35
0-65	676.4	97.48
0-70	682.8	98.41
0-75	687.7	99.11
0-80	690.9	99.58
0-85	692.6	99.81
0-90	693.0	99.88
0-95	693.0	99.88
0-100	693.0	99.88
0-105	693.0	99.88
0-110	693.0	99.88
0-115	693.0	99.88
0-120	693.0	99.88
0-125	693.0	99.88
0-130	693.1	99.89
0-135	693.1	99.89
0-140	693.2	99.90
0-145	693.2	99.91
0-150	693.4	99.93
0-155	693.5	99.95
0-160	693.6	99.97
0-165	693.7	99.98
0-170	693.8	99.99
0-175	693.8	100.00
0-180	693.9	100.00

6. Product Photo



LED200ICA With LT240/243 4000K



LED200ICA With LT240/243 4000K

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