NVLAP LAB CODE 200707-0

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

L-TECH CORPORATION

Shaogangtou District, Qiaotou Town Dongguan City, Guangdong, China

Test Model: LRKT488 3000K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
Test Engineer:	Daniel Duan
Report Number:	RSZ160526516-10
Test Date:	2016-06-02 to 2016-06-03
Report Date:	2016-06-06
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 2016-05-26 and used for testing.

Model Tested:	LRKT488 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 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
2.0m integrating sphere	EVERFINE	R98	11010018	R98	2015-11-09	2016-11-08
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2016-03-10	2017-03-09
DC Power Supply	EVERFINE	WY305-V1	1101047	30V/5A	2015-07-27	2016-07-26
Thermal Meter	Anymetre	JR900A	N/A	25°C	2016-01-12	2017-01-11
Standard Light Source	SENSING	N/A	LSD090808	N/A	2015-09-25	2016-09-24
AC Power Supply	EVERFINE	DPS1010-YF	1011001T	30V/5A	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	2016-03-10	2017-03-09
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C; -20°C~60°C	2016-03-21	2017-03-20
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°C±1°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=2.1% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=32K (K=2), at the 95% confidence level. The uncertainty of the CRI is U=2.1 (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=1.6% (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
120.0	60	0.07495	8.872	0.9867

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
611.18	2.140	68.89	3091	-0.00218

Chromaticity Coordinate

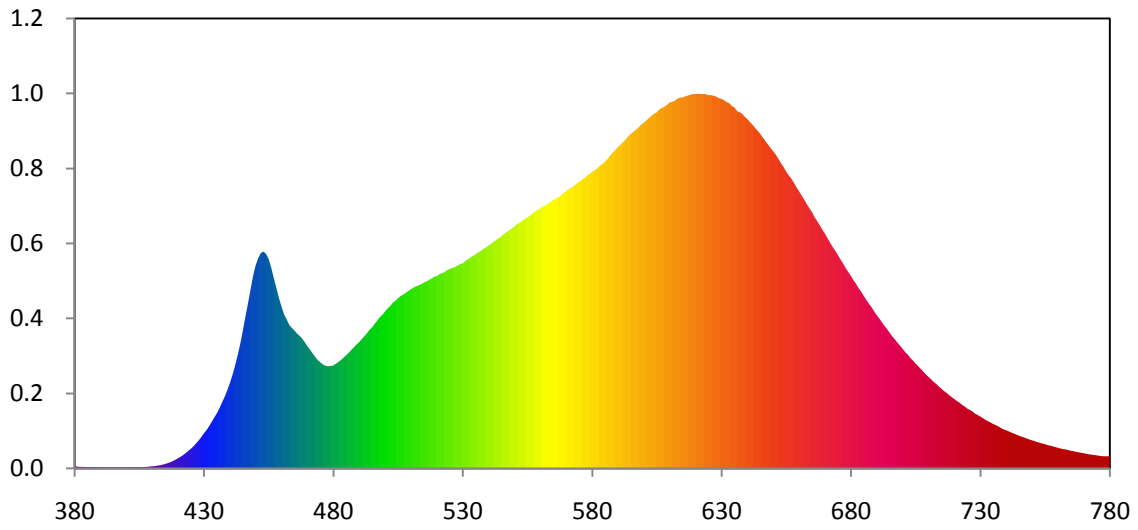
x	y	u	v	u'	v'
0.4277	0.3954	0.2483	0.3444	0.2483	0.5165

Color Rendering Index

Ra
94.4

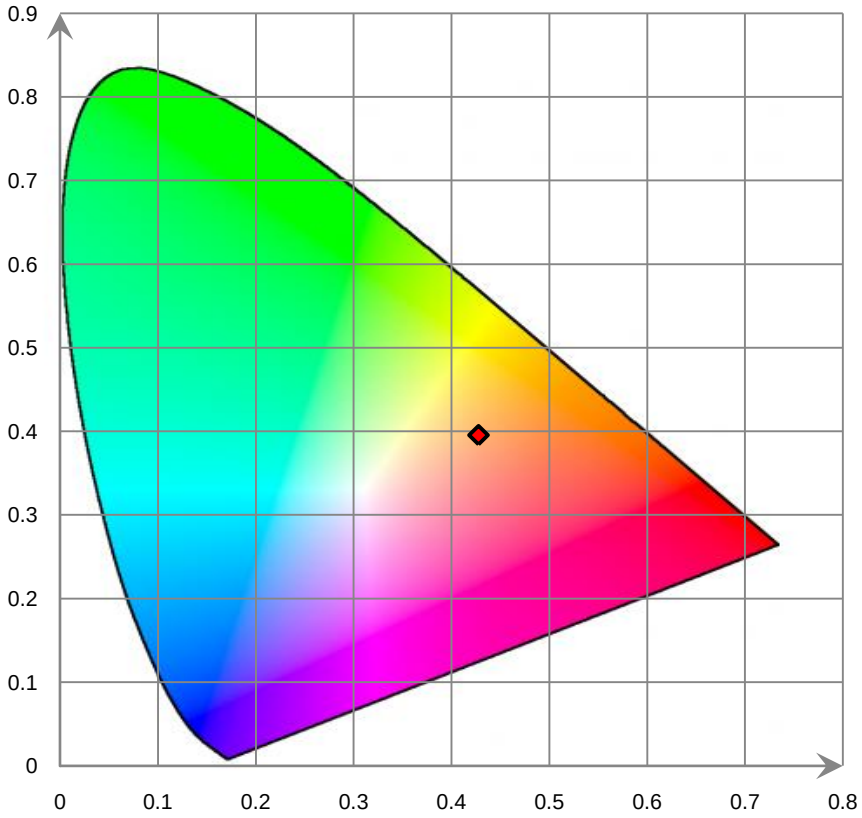
R1	R2	R3	R4
95	99	98	94
R5	R6	R7	R8
95	97	92	85
R9	R10	R11	R12
67	96	95	85
R13	R14	R15	
96	100	92	

Relative Spectral Power Distribution

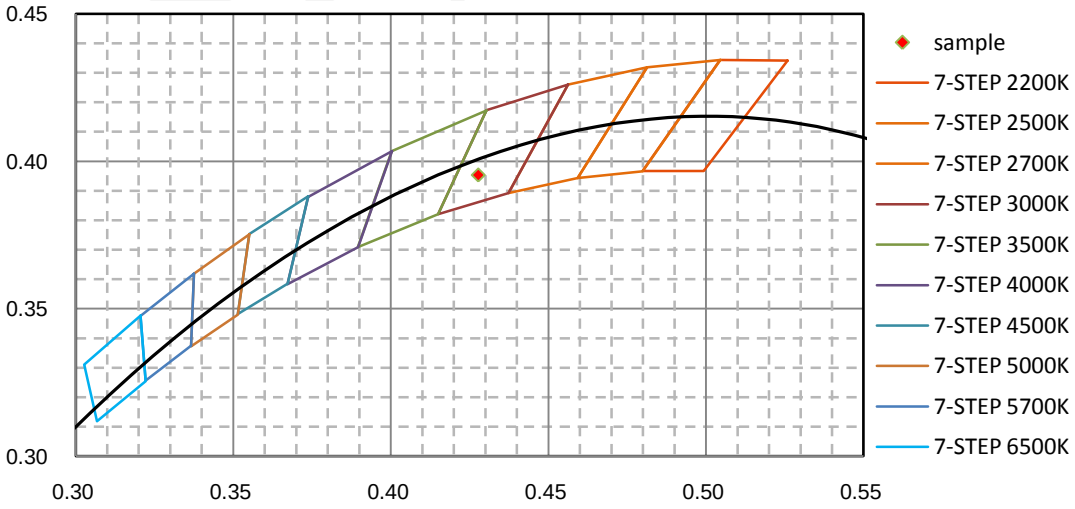


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	8.017E-02	465	4.451E+00	550	7.812E+00	635	1.165E+01	720	2.240E+00
385	4.905E-02	470	3.947E+00	555	8.120E+00	640	1.128E+01	725	1.931E+00
390	3.399E-02	475	3.425E+00	560	8.399E+00	645	1.080E+01	730	1.677E+00
395	3.274E-02	480	3.327E+00	565	8.668E+00	650	1.024E+01	735	1.436E+00
400	3.791E-02	485	3.661E+00	570	8.958E+00	655	9.584E+00	740	1.234E+00
405	4.217E-02	490	4.080E+00	575	9.258E+00	660	8.943E+00	745	1.056E+00
410	6.987E-02	495	4.560E+00	580	9.577E+00	665	8.270E+00	750	9.097E-01
415	1.463E-01	500	5.071E+00	585	9.911E+00	670	7.577E+00	755	7.834E-01
420	3.321E-01	505	5.496E+00	590	1.038E+01	675	6.885E+00	760	6.678E-01
425	6.411E-01	510	5.789E+00	595	1.081E+01	680	6.214E+00	765	5.712E-01
430	1.137E+00	515	6.008E+00	600	1.117E+01	685	5.568E+00	770	4.912E-01
435	1.782E+00	520	6.211E+00	605	1.150E+01	690	4.947E+00	775	4.246E-01
440	2.753E+00	525	6.442E+00	610	1.182E+01	695	4.377E+00	780	3.952E-01
445	4.432E+00	530	6.625E+00	615	1.198E+01	700	3.860E+00		
450	6.564E+00	535	6.913E+00	620	1.209E+01	705	3.386E+00		
455	6.767E+00	540	7.206E+00	625	1.205E+01	710	2.954E+00		
460	5.224E+00	545	7.502E+00	630	1.193E+01	715	2.572E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

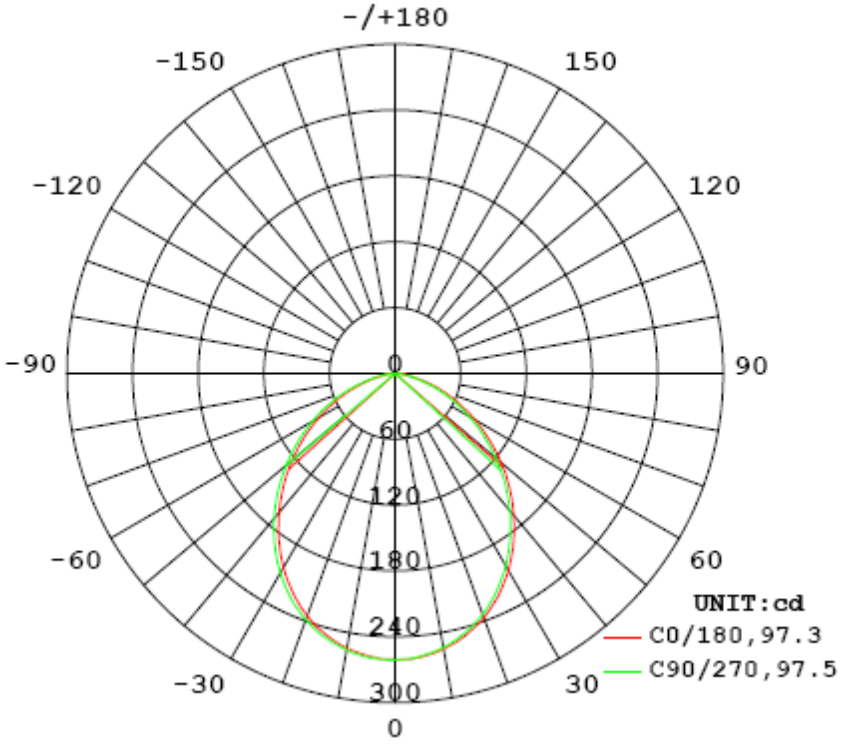
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.07	60	0.075	8.88	0.9861

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
614.273	69.17	261.3	1.19	1.16

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% Imax):	97.3	97.6	97.5	97.3	97.4
Field Angle (10% Imax):	150.0	150.0	149.9	149.9	150.0

Luminous Intensity (cd) Distribution Data

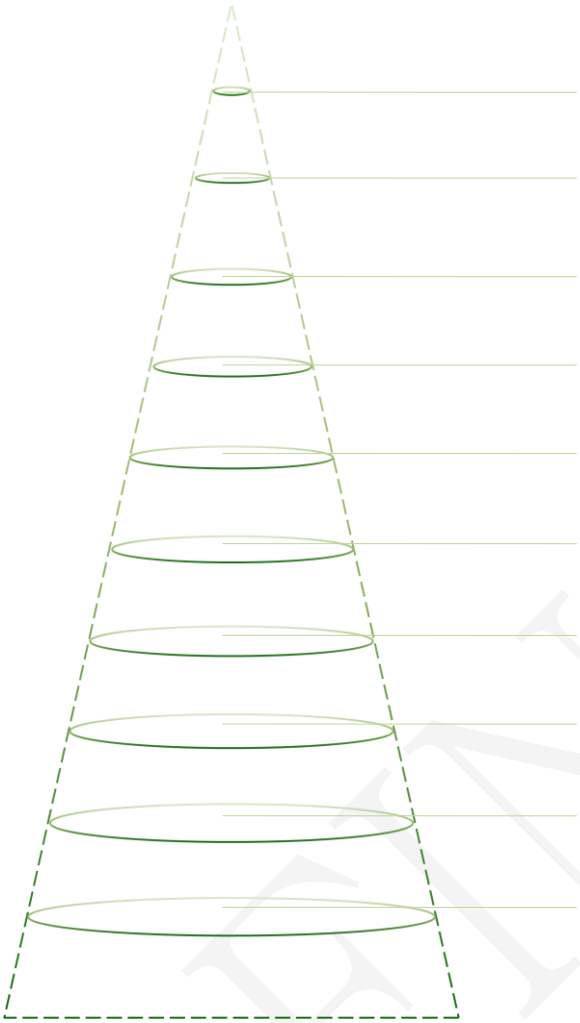
C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	261	261	261	261	261	261	261	261
5.0°	259	260	260	260	260	260	260	259
10.0°	254	255	255	256	256	256	256	255
15.0°	246	247	248	248	249	249	248	247
20.0°	235	237	238	239	239	238	238	237
25.0°	221	223	224	225	226	225	225	223
30.0°	204	206	208	210	210	210	209	207
35.0°	185	188	190	191	192	192	190	189
40.0°	165	168	170	172	172	172	171	169
45.0°	144	147	149	151	152	151	150	148
50.0°	123	126	128	130	130	130	129	127
55.0°	102	104	106	108	109	108	107	106
60.0°	81	83	85	87	87	87	86	85
65.0°	61	63	65	67	67	67	66	65
70.0°	42	44	46	47	47	47	47	45
75.0°	25	26	28	29	30	30	29	28
80.0°	11	12	13	14	15	15	14	13
85.0°	3	3	4	5	5	5	5	4
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

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	261	261	261	261	261	261	261	261
5.0°	260	259	259	259	259	259	259	259
10.0°	255	255	254	254	253	253	254	255
15.0°	247	247	246	245	245	245	245	246
20.0°	237	236	235	234	234	234	234	235
25.0°	223	222	221	220	219	219	220	221
30.0°	207	206	204	203	202	202	203	204
35.0°	189	187	185	184	183	183	184	185
40.0°	169	167	165	164	163	163	164	165
45.0°	148	146	144	143	142	142	143	144
50.0°	126	124	122	121	120	120	120	122
55.0°	105	103	101	99	99	99	99	101
60.0°	84	82	80	79	78	78	79	80
65.0°	64	62	60	59	58	58	59	60
70.0°	45	43	41	40	39	39	40	41
75.0°	28	26	24	23	22	22	23	24
80.0°	13	12	11	10	9	9	10	11
85.0°	4	3	3	3	3	3	3	3
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:97.4°. Flux out:415.9lm



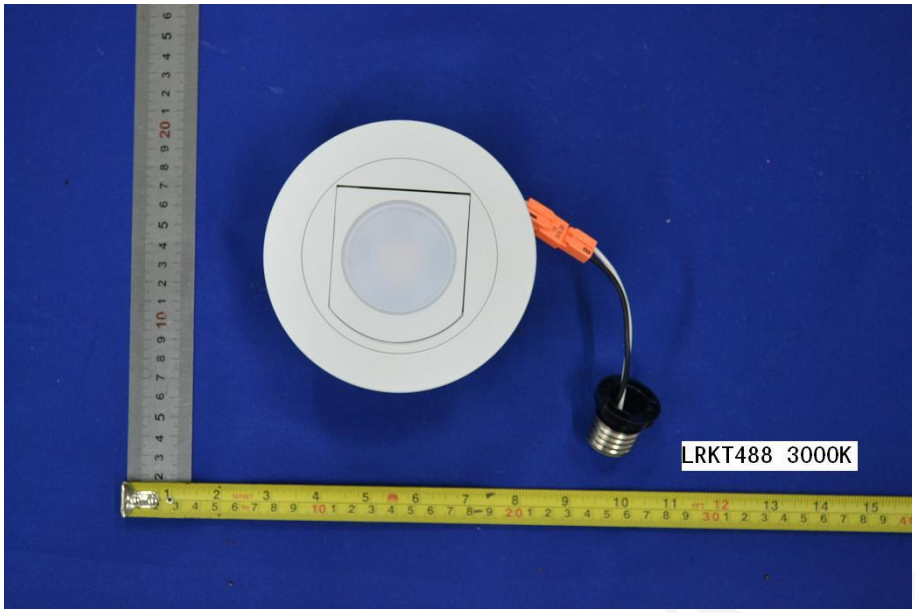
Height (m)	Diameter (cm)	E_{avg}(lx)	E_{max}(lx)
0.5	113.83	400.1	1049.0
1.0	227.66	100.0	262.3
1.5	341.48	44.5	116.6
2.0	455.31	25.0	65.6
2.5	569.14	16.0	42.0
3.0	682.97	11.1	29.2
3.5	796.79	8.2	21.4
4.0	910.62	6.3	16.4
4.5	1024.45	4.9	13.0
5.0	1138.28	4.0	10.5

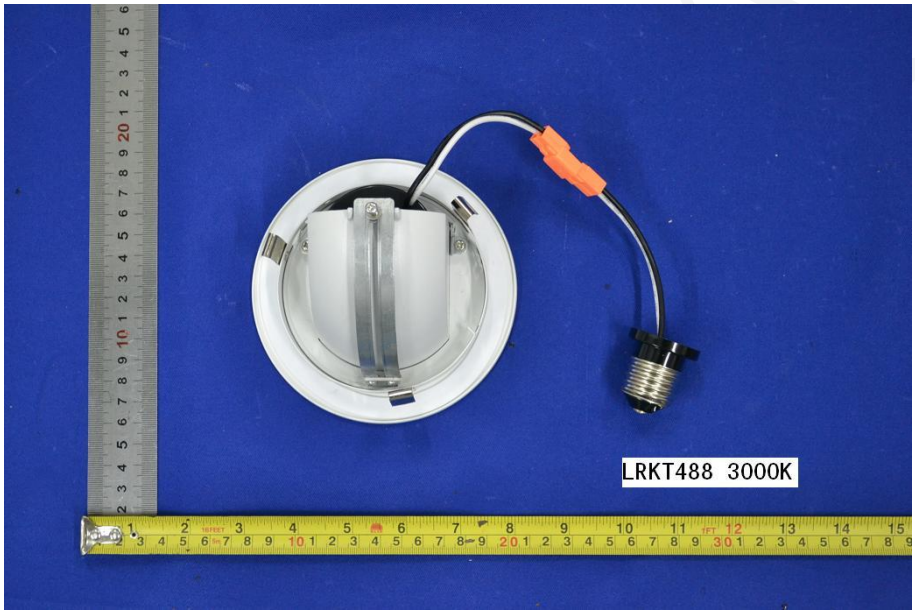
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	6.2	1.01
5-10	18.4	3.00
10-15	29.8	4.84
15-20	39.8	6.48
20-25	48.1	7.83
25-30	54.2	8.83
30-35	57.9	9.42
35-40	59.1	9.63
40-45	58.1	9.46
45-50	54.8	8.92
50-55	49.6	8.07
55-60	42.9	6.99
60-65	35.2	5.73
65-70	26.8	4.35
70-75	18.1	2.94
75-80	10.0	1.63
80-85	3.9	0.64
85-90	0.9	0.14
90-95	0.0	0.00
95-100	0.0	0.01
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.01
115-120	0.0	0.00
120-125	0.0	0.01
125-130	0.0	0.00
130-135	0.0	0.01
135-140	0.0	0.00
140-145	0.0	0.01
145-150	0.1	0.01
150-155	0.1	0.01
155-160	0.0	0.01
160-165	0.0	0.00
165-170	0.0	0.01
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	6.2	1.01
0-10	24.6	4.01
0-15	54.4	8.85
0-20	94.2	15.33
0-25	142.3	23.16
0-30	196.5	31.99
0-35	254.4	41.41
0-40	313.5	51.04
0-45	371.6	60.50
0-50	426.4	69.42
0-55	476.0	77.49
0-60	518.9	84.48
0-65	554.1	90.21
0-70	580.9	94.56
0-75	598.9	97.50
0-80	608.9	99.13
0-85	612.8	99.77
0-90	613.7	99.91
0-95	613.7	99.91
0-100	613.8	99.92
0-105	613.8	99.92
0-110	613.8	99.92
0-115	613.8	99.93
0-120	613.8	99.93
0-125	613.9	99.94
0-130	613.9	99.94
0-135	613.9	99.95
0-140	614.0	99.95
0-145	614.0	99.96
0-150	614.1	99.97
0-155	614.1	99.98
0-160	614.2	99.99
0-165	614.2	99.99
0-170	614.3	100.00
0-175	614.3	100.00
0-180	614.3	100.00

6. Product Photo





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