NVLAP LAB CODE 200707-0

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

Elec-Tech International Co., Ltd

NO.1 JINFENG ROAD ,TANGJIAWAN TOWN,XIANGZHOU DISTRICT,ZHUHAI CITY,GUANGDONG PROVINCE，P.R China

Test Model: 54652141

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
Test Engineer:	Daniel Duan
Report Number:	R2DG141113064-10A1-M1
Test Date:	2014-11-16 to 2014-11-17
Report Date:	2014-11-28
Reviewed By:	Jeanne Han/Safety Manager
Revised Note:	This version report “No. R2DG141113064-10A1-M1” at 2014-11-28 replaced the previous report “No. R2DG141113064-10A1” at 2014-11-19
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 2014-11-13 and used for testing. Sample Model：54652141

Model Tested:	54652141
Manufacturer:	Elec-Tech International Co., Ltd
Brand Name:	ETI; Commercial Electric;Hampton Bay
Product Designation:	LED Ceiling Luminare
Burning Time Before Test:	0 hour(For New Products)

Rated Values:

Rated Voltage/Frequency:	120 VAC 60Hz
Rated Power:	22W
Nominal CCT:	4000K
Nominal Lumen Output:	1600 lm

Family Declaration:

The manufacturer declares that the following models are the same to tested model except for the brand number. The test model is 54652141

Brand Name	Model Name	Difference	Note
ETI	546521XX	Just the brand name is different	The XX in the model may be 41 through 50 indentifies different market.
Commercial Electric or Hampton Bay	546521XX	Just the brand name is different	The XX in the model may be 41 through 50 indentifies different market.

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	SPR-600	S09008	1.5 meter	2014-03-16	2015-03-16
Spectral photometer	SENSING	SPR3000	90902027	350nm～800nm	2014-03-16	2015-03-16
Power Meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/300/600 V	2014-03-12	2015-03-12
AC Power Supply	ALL Power	APW-105N	970613	0V-300V 50-400Hz	2014-03-12	2015-03-12
Standard Light Source	EVERFINE	D204	01331191	N/A	2013-12-04	2014-12-04
Thermal Meter	SENSING	N/A	N/A	25℃,45℃,55℃	2014-03-16	2015-03-16
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~60V	2014-03-12	2015-03-12

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
AC Power Supply	EVERFINE	VPS1060 PWM	1101006	0-150V， 0-300V	2014-03-12	2015-03-12
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2014-03-12	2015-03-12
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2014-03-12	2015-03-12
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2014-03-04	2015-03-04
Thermal Meter	Victor	VC230	EE091	0~40℃0~90%	2013-04-01	2016-03-31
Standard Light Source	EVERFINE	D908	1012001	N/A	2014-05-06	2015-05-06

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=1.60% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level. The uncertainty of the CRI is U=1.3(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
120.0	60.0	0.1806	21.543	0.994

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
1605.884	5.189	74.543	4116	-2.99E-03

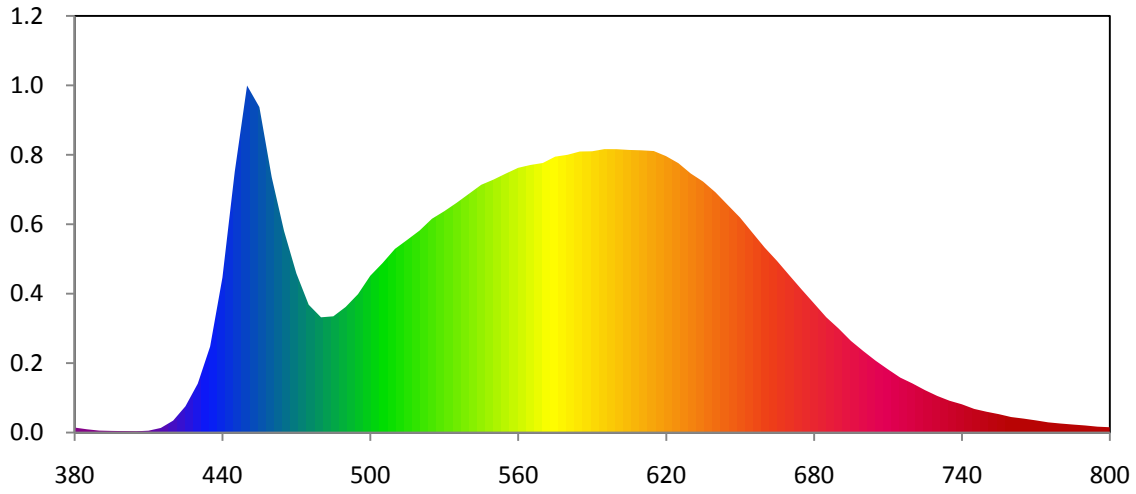
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3736	0.3662	0.2248	0.3305	0.2248	0.4958

Color Rendering Index

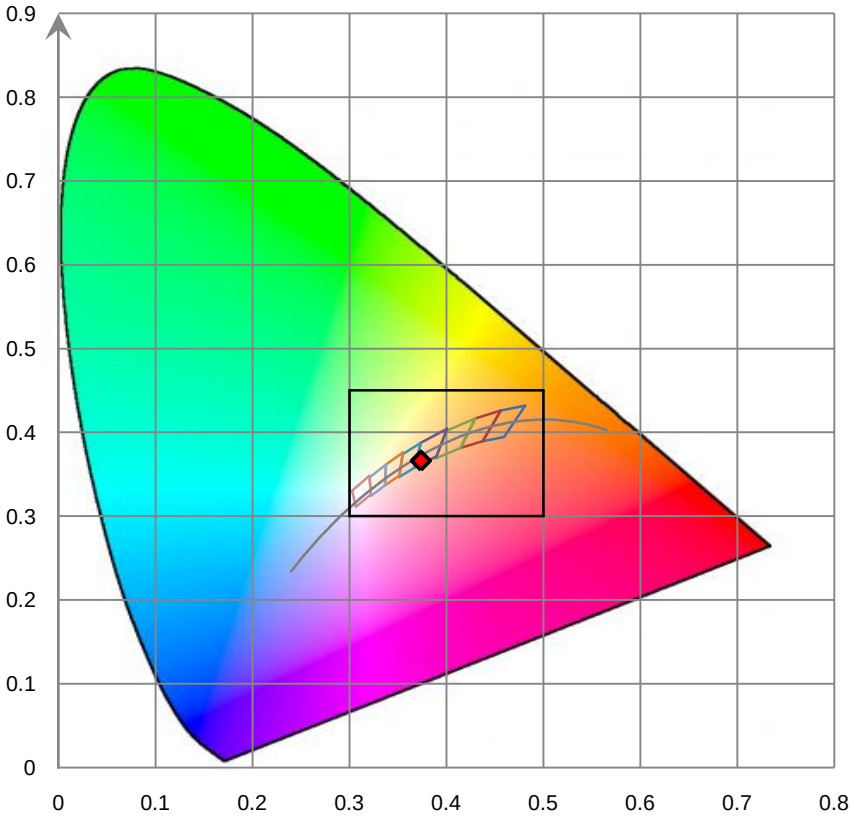
Ra			
89.9			
R1	R2	R3	R4
90	94	95	89
R5	R6	R7	R8
89	89	92	82
R9	R10	R11	R12
54	84	87	68
R13	R14	R15	
91	97	88	

Relative Spectral Power Distribution

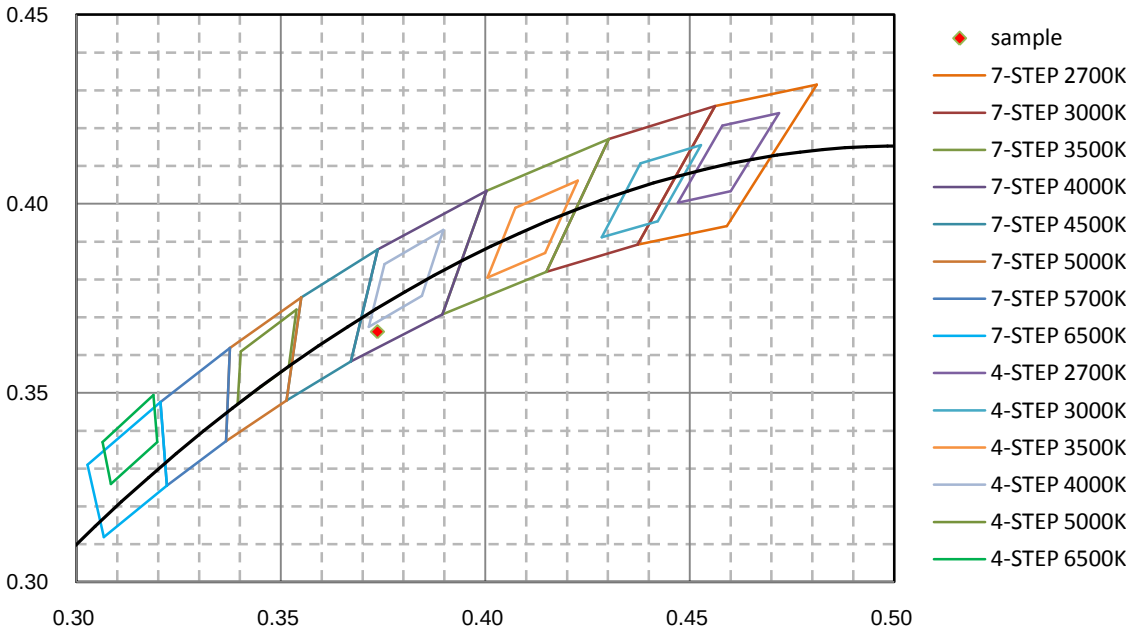


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.160E-03	465	8.671E-02	550	1.088E-01	635	1.079E-01	720	2.110E-02
385	1.411E-03	470	6.845E-02	555	1.114E-01	640	1.034E-01	725	1.827E-02
390	8.498E-04	475	5.496E-02	560	1.138E-01	645	9.789E-02	730	1.576E-02
395	7.121E-04	480	4.957E-02	565	1.151E-01	650	9.246E-02	735	1.368E-02
400	6.326E-04	485	4.998E-02	570	1.159E-01	655	8.598E-02	740	1.216E-02
405	5.589E-04	490	5.401E-02	575	1.186E-01	660	7.954E-02	745	1.018E-02
410	8.084E-04	495	5.950E-02	580	1.194E-01	665	7.382E-02	750	8.966E-03
415	1.992E-03	500	6.743E-02	585	1.208E-01	670	6.763E-02	755	7.922E-03
420	5.135E-03	505	7.291E-02	590	1.209E-01	675	6.152E-02	760	6.683E-03
425	1.130E-02	510	7.898E-02	595	1.219E-01	680	5.557E-02	765	6.008E-03
430	2.104E-02	515	8.288E-02	600	1.218E-01	685	4.958E-02	770	5.241E-03
435	3.698E-02	520	8.687E-02	605	1.215E-01	690	4.474E-02	775	4.391E-03
440	6.664E-02	525	9.192E-02	610	1.214E-01	695	3.941E-02	780	3.889E-03
445	1.121E-01	530	9.517E-02	615	1.210E-01	700	3.506E-02	785	3.457E-03
450	1.492E-01	535	9.877E-02	620	1.188E-01	705	3.092E-02	790	3.055E-03
455	1.400E-01	540	1.026E-01	625	1.158E-01	710	2.720E-02	795	2.535E-03
460	1.098E-01	545	1.065E-01	630	1.114E-01	715	2.365E-02	800	2.293E-03

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

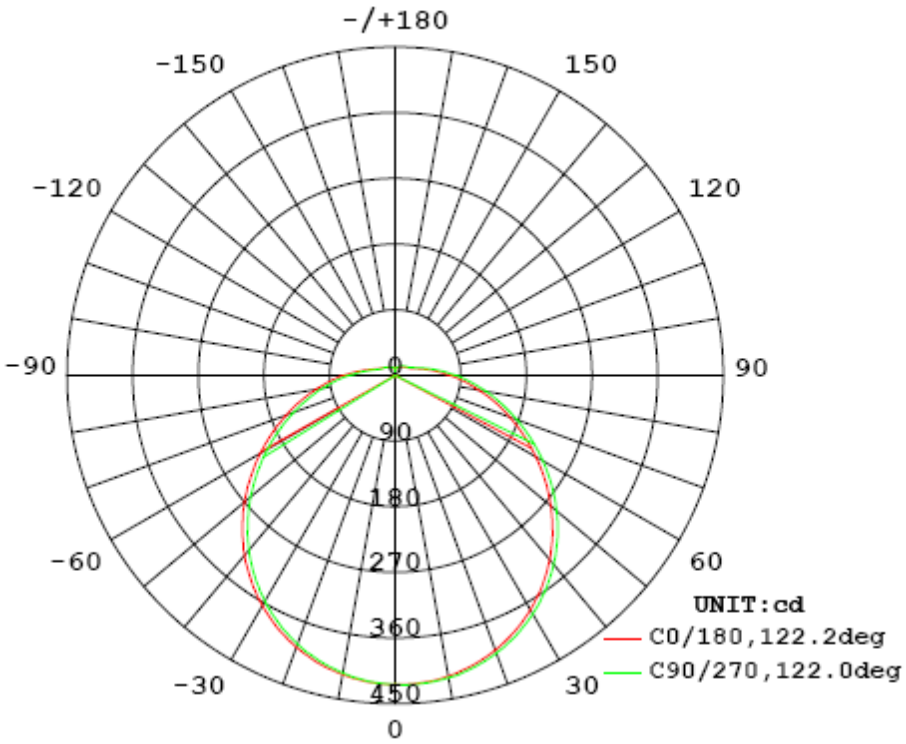
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60.0	0.1801	21.45	0.9927

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
1611.28	75.12	424	1.28	1.26

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% Imax):	122.2	122.1	122.0	122.0	122.08
Field Angle (10% Imax):	201.8	201.7	201.6	201.4	201.63

Luminous Intensity (cd) Distribution Data

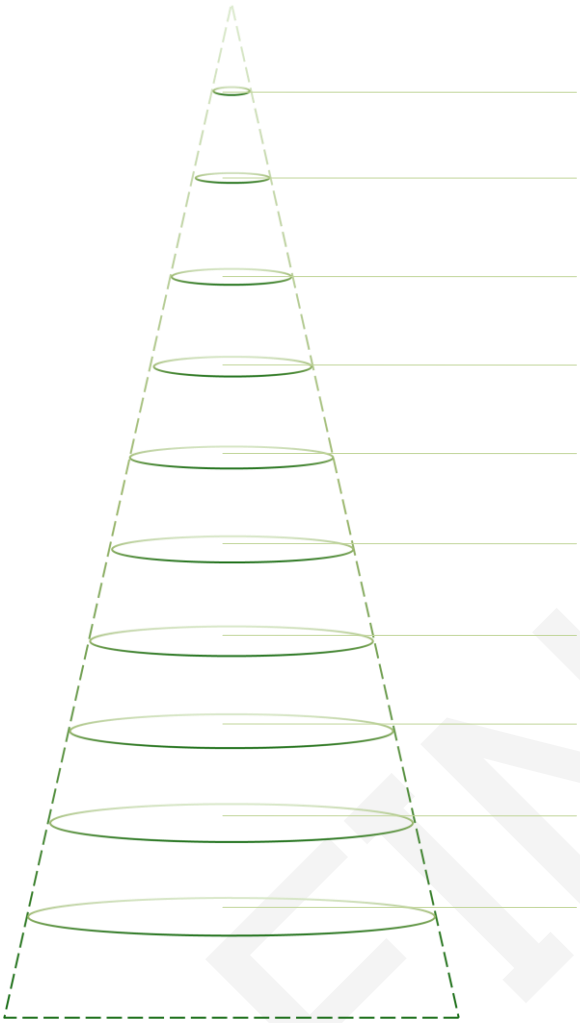
C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	424	424	424	424	424	424	424	424
5.0°	422	421	420	421	421	420	421	422
10.0°	416	415	414	414	414	415	416	417
15.0°	408	406	404	405	404	405	407	409
20.0°	396	394	392	392	392	393	395	397
25.0°	382	379	376	376	376	377	380	383
30.0°	365	361	358	357	357	360	362	366
35.0°	344	340	337	336	336	338	341	346
40.0°	321	317	313	312	312	315	318	323
45.0°	296	292	287	286	286	289	293	298
50.0°	270	265	260	259	259	262	266	271
55.0°	242	237	232	231	231	234	238	243
60.0°	214	209	203	202	203	206	209	215
65.0°	186	181	176	175	175	178	182	187
70.0°	159	154	149	148	148	152	154	160
75.0°	134	129	125	123	124	126	130	134
80.0°	111	106	102	101	101	103	106	110
85.0°	89	85	82	81	81	83	86	89
90.0°	71	68	65	63	64	65	68	71
95.0°	55	53	50	49	49	51	52	55
100.0°	43	41	39	38	38	39	40	43
105.0°	33	32	30	30	30	31	32	33
110.0°	27	26	25	25	25	25	26	27
115.0°	23	22	22	22	22	22	22	23
120.0°	20	20	20	20	20	20	20	20
125.0°	19	18	18	18	19	20	19	19
130.0°	17	17	17	17	17	18	17	18
135.0°	16	16	16	16	16	16	16	16
140.0°	15	15	14	16	15	15	15	15
145.0°	14	13	13	14	15	14	14	14
150.0°	13	12	12	13	13	13	13	13
155.0°	12	11	11	12	12	12	12	12
160.0°	11	11	11	11	12	11	11	11
165.0°	11	11	11	11	11	12	11	11
170.0°	10	10	10	10	10	10	10	10
175.0°	7	7	7	7	7	7	8	9
180.0°	6	6	6	6	6	6	6	6

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	424	424	424	424	424	424	424	424
5.0°	423	423	423	424	424	423	423	423
10.0°	419	420	420	421	421	420	419	418
15.0°	411	413	413	414	414	413	412	410
20.0°	401	403	404	405	405	404	402	400
25.0°	387	390	392	393	393	391	389	386
30.0°	371	374	376	377	377	375	373	369
35.0°	351	355	358	359	359	356	354	350
40.0°	329	333	337	338	338	335	332	328
45.0°	305	310	313	315	315	311	308	303
50.0°	279	284	288	289	289	286	282	277
55.0°	251	256	261	262	262	258	254	249
60.0°	222	228	232	234	234	230	226	221
65.0°	194	200	204	206	205	202	198	193
70.0°	167	172	177	178	178	174	171	166
75.0°	142	146	151	152	152	148	145	140
80.0°	117	122	125	127	127	124	120	116
85.0°	95	100	103	104	104	101	98	95
90.0°	76	80	82	84	83	81	78	75
95.0°	59	63	65	66	66	64	62	59
100.0°	46	48	51	51	51	49	48	46
105.0°	36	38	39	40	40	38	37	36
110.0°	28	30	31	31	31	30	29	28
115.0°	24	24	25	26	26	25	24	24
120.0°	21	21	22	22	22	22	22	21
125.0°	19	20	20	21	20	20	20	19
130.0°	18	18	19	19	19	19	19	18
135.0°	17	17	17	18	18	18	17	17
140.0°	16	16	16	17	17	16	16	16
145.0°	14	15	15	16	16	15	15	14
150.0°	13	13	14	15	15	15	14	13
155.0°	12	13	13	13	14	13	13	12
160.0°	12	12	12	12	13	12	12	11
165.0°	11	11	11	11	11	12	11	11
170.0°	10	11	11	11	10	11	11	10
175.0°	9	9	9	9	9	9	8	8
180.0°	6	6	6	6	6	6	6	6

Average Area Illumination Figure

Angle: 122.08°. Flux out: 1044.0 lm.



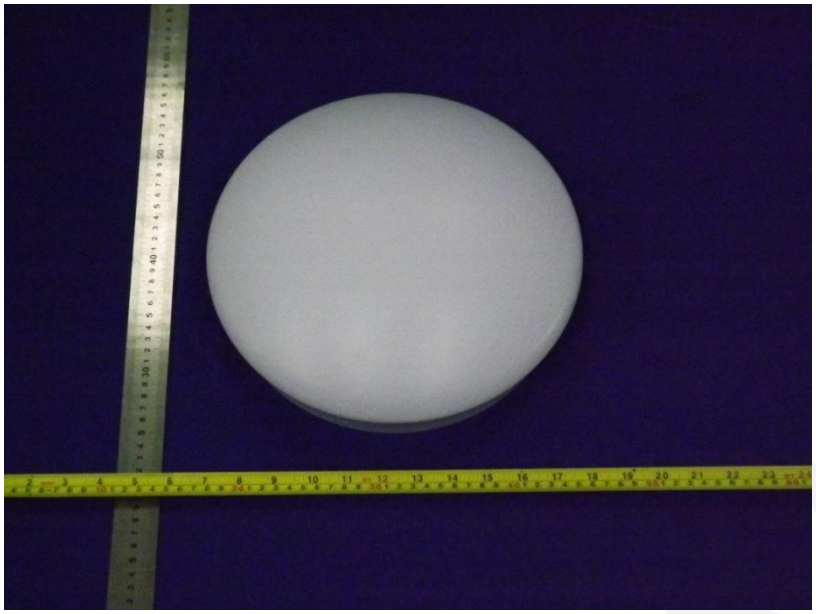
Height (m)	Diameter (cm)	E_{avg}(lx)	E_{max}(lx)
0.5	180.7	375.6	1697.2
1.0	361.4	93.9	424.3
1.5	542.1	41.7	188.6
2.0	722.8	23.5	106.1
2.5	903.5	15.0	67.9
3.0	1084.2	10.4	47.2
3.5	1264.9	7.7	34.6
4.0	1445.6	5.9	26.5
4.5	1626.3	4.6	21.0
5.0	1807.0	3.8	17.0

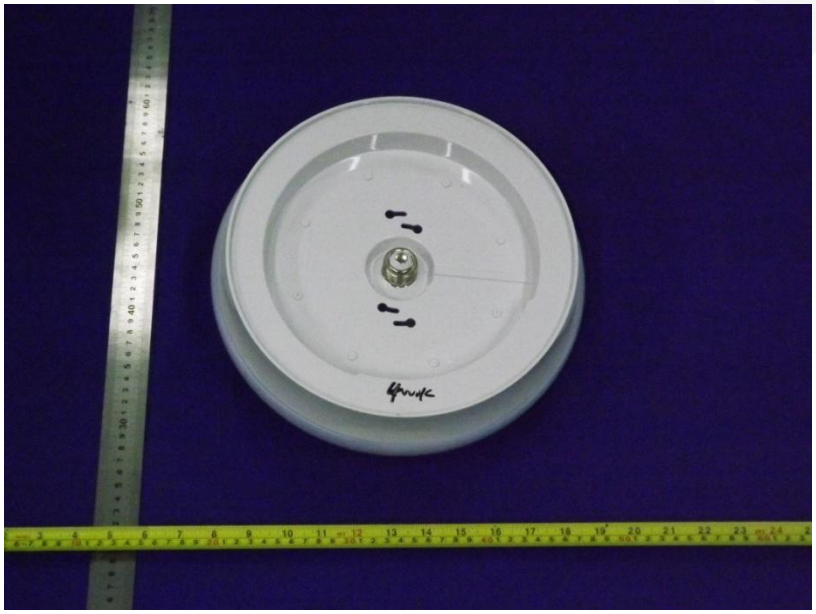
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	10.1	0.63
5-10	30.0	1.86
10-15	49.0	3.04
15-20	66.6	4.14
20-25	82.1	5.09
25-30	95.1	5.91
30-35	105.3	6.53
35-40	112.3	6.97
40-45	115.9	7.19
45-50	116.1	7.20
50-55	113.1	7.02
55-60	107.2	6.66
60-65	99.1	6.15
65-70	89.3	5.54
70-75	78.5	4.87
75-80	67.1	4.17
80-85	55.8	3.46
85-90	45.2	2.80
90-95	35.7	2.22
95-100	27.5	1.71
100-105	21.1	1.30
105-110	16.2	1.01
110-115	12.9	0.80
115-120	10.7	0.67
120-125	9.3	0.58
125-130	8.1	0.50
130-135	7.0	0.43
135-140	6.0	0.37
140-145	5.0	0.32
145-150	4.1	0.25
150-155	3.3	0.20
155-160	2.5	0.16
160-165	1.9	0.12
165-170	1.3	0.08
170-175	0.7	0.04
175-180	0.2	0.01

Deg	Flux (lm)	%
0-5	0.6	0.63
0-10	40.1	2.49
0-15	89.2	5.53
0-20	155.7	9.67
0-25	237.8	14.76
0-30	333.0	20.67
0-35	438.3	27.20
0-40	550.5	34.17
0-45	666.4	41.36
0-50	782.5	48.56
0-55	895.6	55.58
0-60	1002.8	62.24
0-65	1101.9	68.39
0-70	1191.2	73.93
0-75	1269.7	78.80
0-80	1336.8	82.97
0-85	1392.6	86.43
0-90	1437.8	89.23
0-95	1473.5	91.45
0-100	1501.0	93.16
0-105	1522.1	94.46
0-110	1538.3	95.47
0-115	1551.2	96.27
0-120	1562.0	96.94
0-125	1571.2	97.52
0-130	1579.4	98.02
0-135	1586.4	98.45
0-140	1592.3	98.82
0-145	1597.4	99.14
0-150	1601.5	99.39
0-155	1604.8	99.59
0-160	1607.3	99.75
0-165	1609.1	99.87
0-170	1610.4	99.95
0-175	1611.1	99.99
0-180	1611.3	100.00

6. Product Photo





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