

IES LM-79-08

MEASUREMENT AND TEST REPORT For

ATG Electronics Corp.

9020 Rancho Park Court Rancho Cucamonga, CA 91730

Test Model: AES-HB320-ATG50K-D

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, THD, Power Factor
Test Engineer:	Daniel Duan <i>Daniel Duan</i>
Report Number:	RSZ150922501-10
Test Date:	2015-09-23 to 2015-09-24
Report Date:	2015-10-09
Reviewed By:	Jeanne Han/Safety Manager <i>Jeanne Han</i>
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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.

STATEMENT: This test may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). The test data was only valid for the test sample(s). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

1. Product Description

General Information:

One sample was received on 2015-09-22 and used for testing. Sample No.: RSZ150922501-S01 Model: AES-HB320-ATG50K-D

Model Tested: AES-HB320-ATG50K-D
 Manufacturer: ATG Electronics Corp.
 Brand Name: ATG
 Product Designation: High-bay Luminaires for Commercial and Industrial Buildings
 Dimmable: Continuous Dimming
 Dimming Range: 10% to 100%
 Burning Time Before Test: 0 hour (For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277VAC 50Hz/60Hz
 Rated Power: 320W
 Nominal Light Output: 30000 lm
 Nominal CCT: 5000K
 Nominal CRI: 70

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	2015-03-24	2016-03-24
Spectral photometer	SENSING	SPR3000	90902027	380nm~800nm	2015-03-24	2016-03-24
Power Meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/300/600 V	2015-03-05	2016-03-05
AC Power Supply	ALL Power	APW-105N	970613	0V-300V 50-400Hz	2015-03-05	2016-03-05
Standard Light Source	EVERFINE	D204	201311	N/A	2014-10-31	2015-10-31
Thermal Meter	SENSING	N/A	N/A	25°C,45°C,55°C	2015-03-05	2016-03-05
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~60V	2015-03-05	2016-03-05
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2015-03-05	2016-03-05
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2015-03-05	2016-03-05
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2015-03-05	2016-03-05
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2015-03-20	2016-03-20
Thermal Meter	Victor	VC230	EE091	0~40°C 0~90%	2013-04-01	2016-03-31
Standard Light Source	EVERFINE	D908	1012003	N/A	2015-05-15	2016-05-14

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. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards.

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 $U=32\text{K}$ ($K=2$), 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. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

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.

Additional Test

The Additional Test item may not be covered by IESNA LM-79-2008. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$. Test voltage for THD and power factor test would be equal to rated voltage or, in case of a voltage range, maximum value of that range.

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.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **2.0 hours**

Test orientation: **Downward**

Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.00	60.0	2.6843	320.83	0.996

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
30881.42	53.038	96.255	5160	3.95E-03

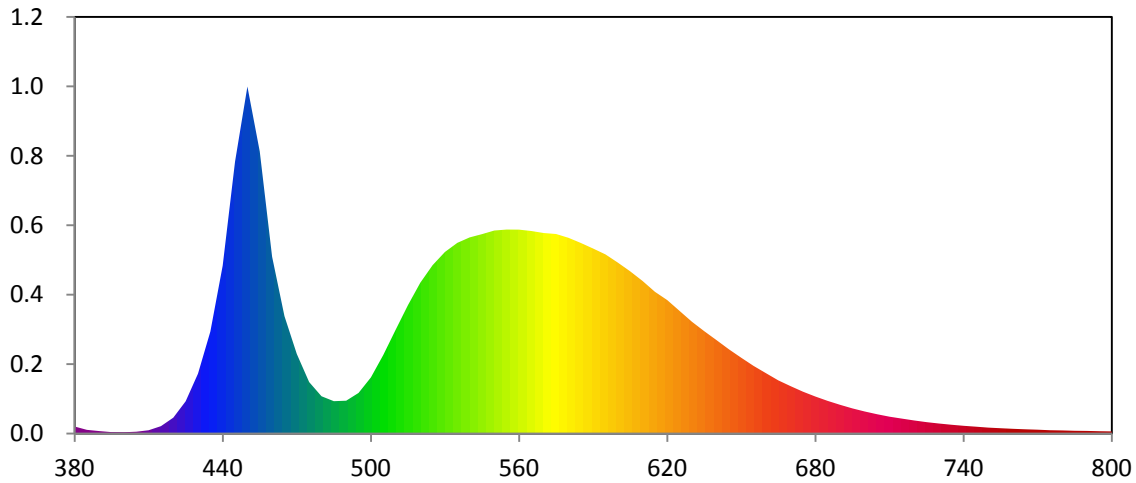
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3413	0.3564	0.2070	0.3243	0.2070	0.4864

Color Rendering Index

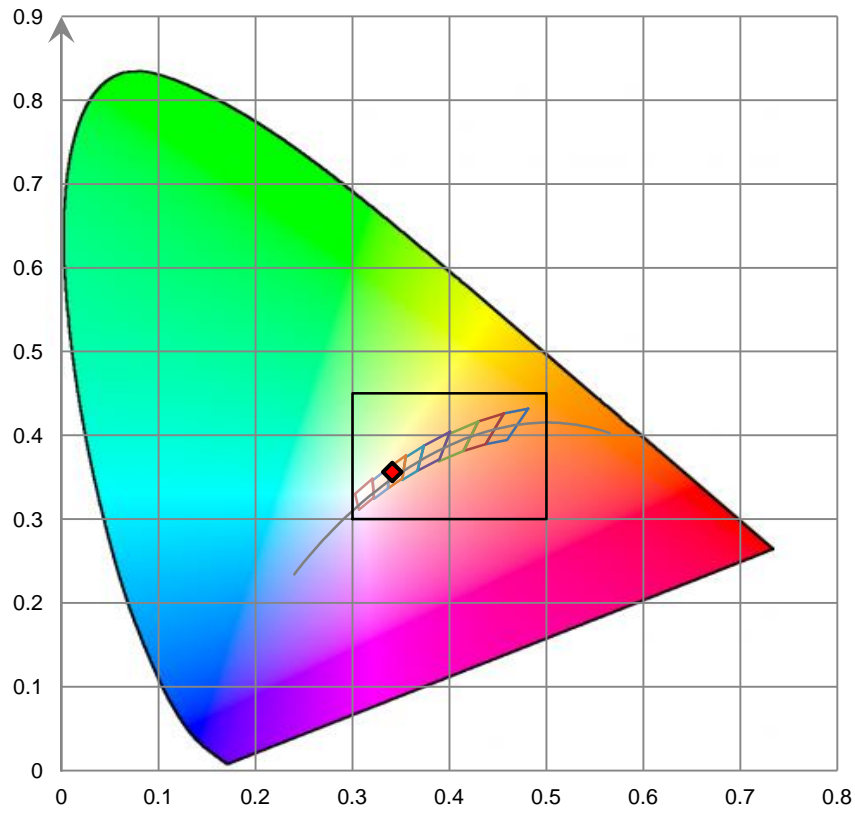
Ra			
70.9			
R1 69	R2 76	R3 79	R4 71
R5 68	R6 65	R7 81	R8 58
R9 -28	R10 40	R11 67	R12 36
R13 70	R14 88	R15 65	

Relative Spectral Power Distribution

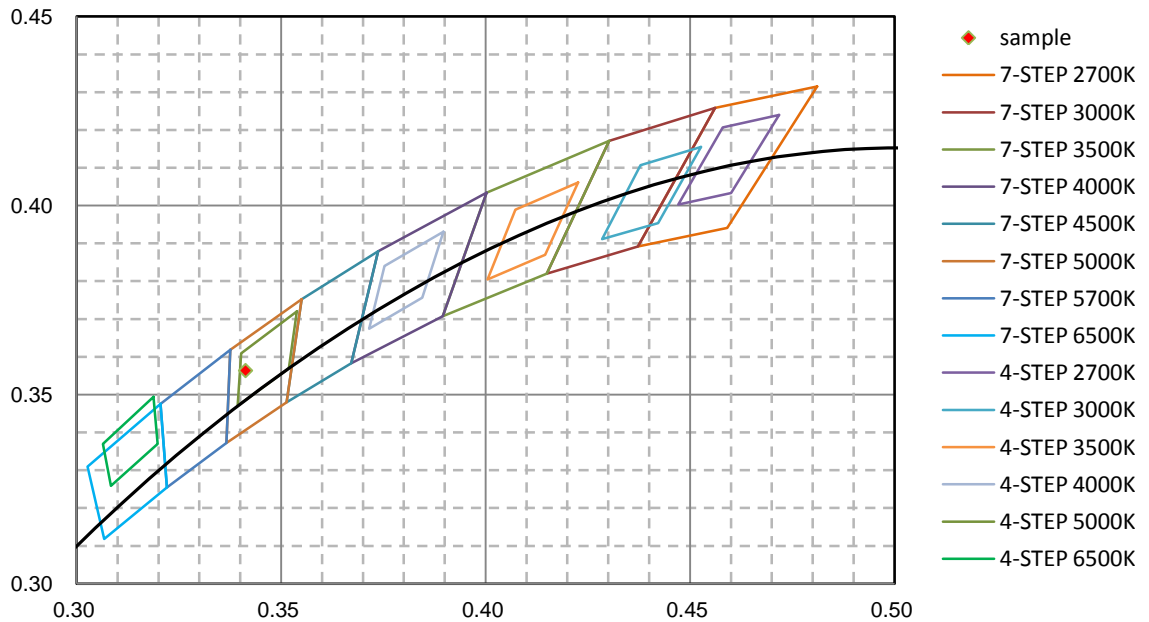


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.208E-02	465	8.639E-01	550	1.493E+00	635	7.528E-01	720	9.648E-02
385	2.741E-02	470	5.854E-01	555	1.500E+00	640	6.867E-01	725	8.406E-02
390	1.825E-02	475	3.787E-01	560	1.500E+00	645	6.194E-01	730	7.401E-02
395	1.072E-02	480	2.744E-01	565	1.490E+00	650	5.572E-01	735	6.507E-02
400	9.727E-03	485	2.382E-01	570	1.475E+00	655	4.972E-01	740	5.721E-02
405	1.360E-02	490	2.418E-01	575	1.468E+00	660	4.439E-01	745	5.078E-02
410	2.440E-02	495	2.988E-01	580	1.440E+00	665	3.910E-01	750	4.385E-02
415	5.464E-02	500	4.127E-01	585	1.402E+00	670	3.484E-01	755	3.931E-02
420	1.170E-01	505	5.772E-01	590	1.361E+00	675	3.079E-01	760	3.499E-02
425	2.373E-01	510	7.622E-01	595	1.318E+00	680	2.722E-01	765	3.138E-02
430	4.408E-01	515	9.441E-01	600	1.257E+00	685	2.401E-01	770	2.848E-02
435	7.499E-01	520	1.109E+00	605	1.193E+00	690	2.115E-01	775	2.460E-02
440	1.235E+00	525	1.239E+00	610	1.123E+00	695	1.849E-01	780	2.295E-02
445	2.000E+00	530	1.336E+00	615	1.043E+00	700	1.623E-01	785	2.047E-02
450	2.552E+00	535	1.403E+00	620	9.817E-01	705	1.421E-01	790	1.955E-02
455	2.075E+00	540	1.443E+00	625	9.021E-01	710	1.241E-01	795	1.727E-02
460	1.301E+00	545	1.467E+00	630	8.224E-01	715	1.101E-01	800	1.601E-02

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **2.0 hours**

Test orientation: **Downward**

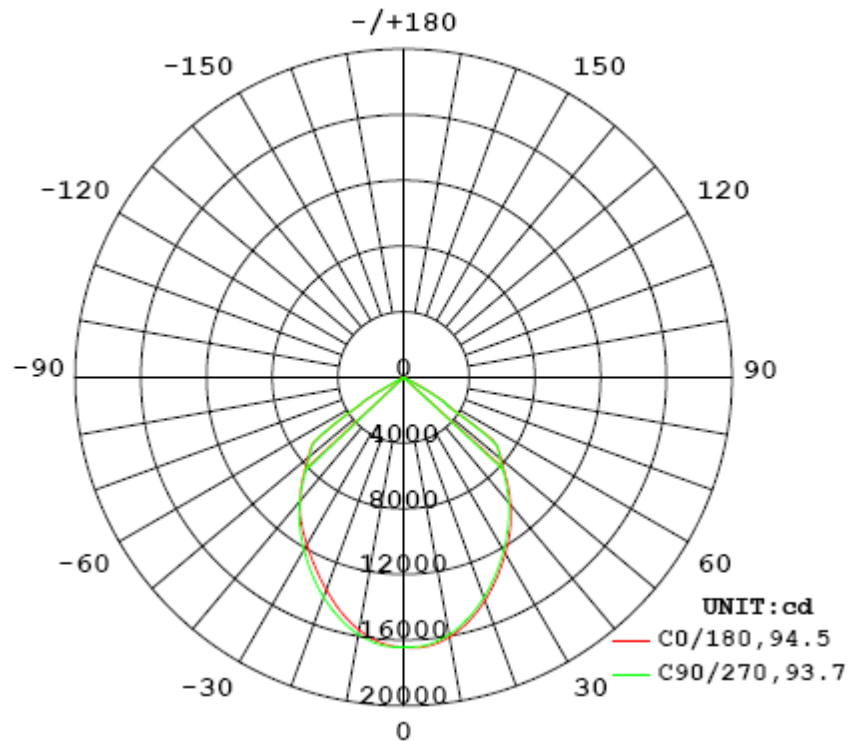
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60.0	2.682	320.4	0.9954

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
30913.3	96.48	16483	1.14	1.12

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	94.5	96.7	93.7	96.0	95.2
Field Angle (10% I _{max}):	121.4	119.8	121.0	118.1	120.1

Luminous Intensity (cd) Distribution Data

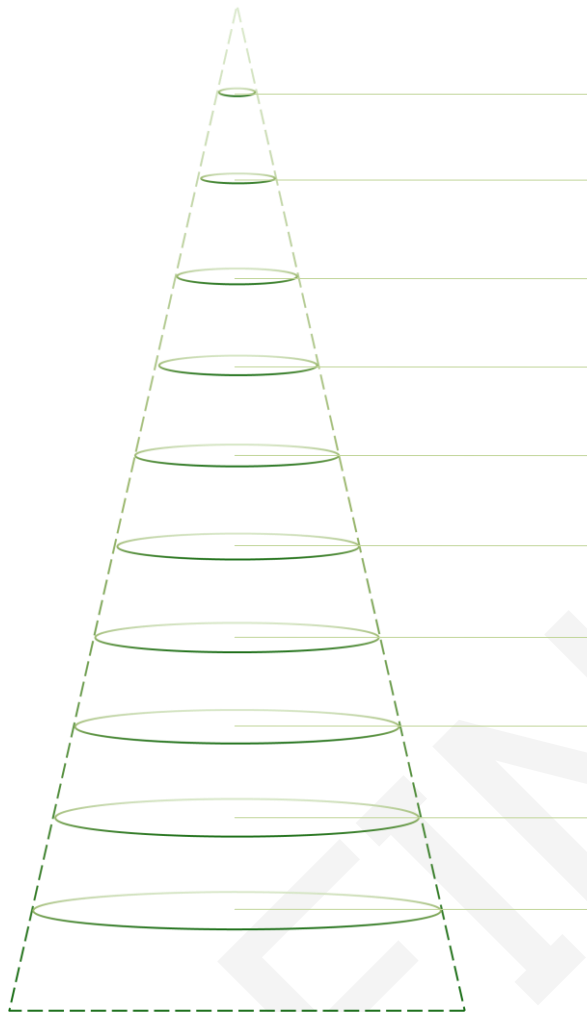
C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	16429	16429	16429	16429	16429	16429	16429	16429
5.0°	16210	16218	16243	16288	16337	16380	16419	16446
10.0°	15620	15640	15698	15778	15893	15983	16043	16094
15.0°	14773	14828	14925	15029	15160	15306	15375	15405
20.0°	13768	13887	14034	14128	14246	14415	14492	14497
25.0°	12750	12946	13096	13137	13222	13417	13486	13460
30.0°	11782	12090	12194	12126	12130	12379	12448	12330
35.0°	10852	11267	11324	11062	11027	11279	11369	11179
40.0°	9824	10249	10285	9928	9851	10065	10166	9961
45.0°	8689	8990	9024	8712	8587	8769	8888	8711
50.0°	7607	7761	7738	7522	7482	7651	7801	7637
55.0°	6038	6114	6318	6552	6154	5336	5359	5548
60.0°	1977	1612	1592	2594	2051	1384	1304	1527
65.0°	70	72	74	69	69	74	75	77
70.0°	41	41	39	38	40	42	44	46
75.0°	23	22	22	21	22	23	24	25
80.0°	11	11	10	10	10	11	11	12
85.0°	3	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°	1	1	1	1	1	1	1	1
105.0°	2	2	2	2	2	2	2	1
110.0°	2	2	2	2	2	2	2	2
115.0°	3	3	3	3	3	3	3	3
120.0°	3	3	3	3	3	3	3	3
125.0°	3	4	4	4	4	4	4	3
130.0°	4	4	5	5	5	5	4	4
135.0°	6	6	6	6	6	6	6	6
140.0°	7	8	8	8	8	8	8	7
145.0°	10	10	11	11	11	11	11	10
150.0°	12	13	14	14	14	14	13	12
155.0°	14	15	15	16	16	16	15	15
160.0°	16	16	16	17	16	17	17	16
165.0°	16	16	16	16	16	16	16	16
170.0°	15	15	15	15	15	15	15	15
175.0°	15	14	14	14	14	14	14	15
180.0°	13	13	12	12	12	13	13	13

Luminous Intensity (cd) Distribution Data (cont.)

C \ y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	16429	16429	16429	16429	16429	16429	16429	16429
5.0°	16443	16445	16433	16398	16350	16301	16248	16210
10.0°	16061	16067	16054	15995	15920	15823	15726	15630
15.0°	15372	15409	15386	15289	15196	15104	14963	14782
20.0°	14472	14539	14493	14370	14283	14215	14053	13808
25.0°	13452	13544	13494	13331	13259	13262	13104	12776
30.0°	12389	12562	12518	12269	12189	12329	12191	11773
35.0°	11323	11551	11522	11197	11092	11379	11262	10759
40.0°	10151	10484	10490	10038	9953	10325	10224	9697
45.0°	8891	9178	9217	8844	8751	9096	9037	8574
50.0°	7743	7942	7987	7740	7677	7938	7913	7616
55.0°	6570	6234	6158	6320	6186	5966	5552	5323
60.0°	2348	1763	1607	2144	2141	1731	1215	1156
65.0°	76	72	67	61	60	65	68	66
70.0°	43	40	37	34	34	36	38	40
75.0°	23	21	19	18	18	19	20	22
80.0°	11	10	9	8	8	8	9	10
85.0°	3	3	2	2	2	2	3	3
90.0°	0	0	0	1	1	1	1	1
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	1	1	1	0	0
110.0°	1	1	1	1	1	1	1	1
115.0°	1	1	1	1	1	1	1	1
120.0°	1	2	2	2	2	2	2	1
125.0°	2	2	2	2	2	2	2	2
130.0°	3	3	3	3	3	3	3	3
135.0°	4	4	4	4	4	4	4	4
140.0°	5	5	5	5	5	5	5	5
145.0°	7	7	7	7	7	7	7	7
150.0°	8	8	8	8	8	8	8	8
155.0°	9	8	9	9	9	9	9	9
160.0°	10	9	10	10	10	10	9	10
165.0°	10	10	10	10	10	10	10	10
170.0°	11	11	10	10	10	10	10	10
175.0°	12	11	11	11	11	10	11	11
180.0°	13	13	13	12	12	12	12	13

Average Area Illumination Figure

Angle:95.20 °. Flux out: 24448.0 lm.



Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	109.5	25236.0	65947.0
1.0	219.0	6309.0	16487.0
1.5	328.5	2804.0	7327.0
2.0	438.1	1577.0	4122.0
2.5	547.6	1009.0	2638.0
3.0	657.1	701.0	1832.0
3.5	766.6	515.0	1346.0
4.0	876.1	394.3	1030.0
4.5	985.6	311.6	814.2
5.0	1095.1	252.4	659.5

Zonal Lumen Density Measurement

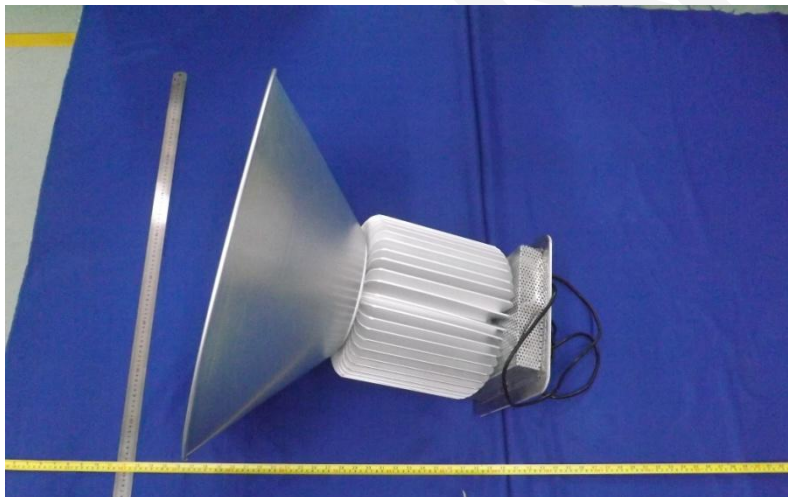
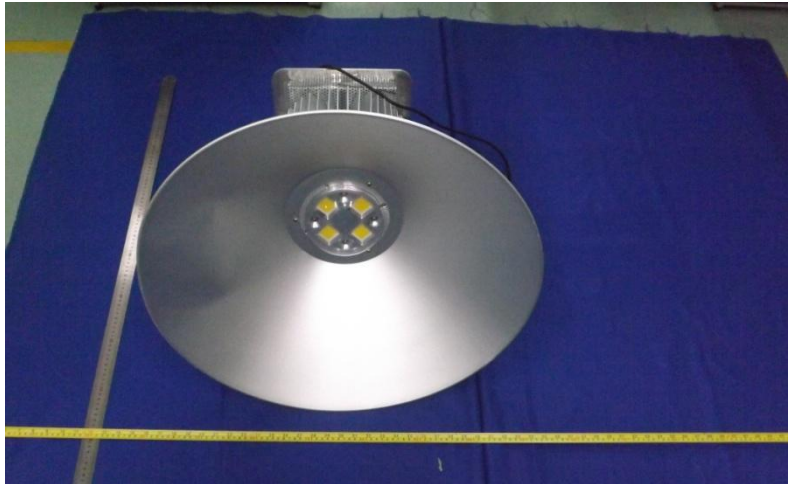
Deg	Flux (lm)	%
0-5	392.0	1.27
5-10	1152.5	3.73
10-15	1839.5	5.95
15-20	2419.4	7.82
20-25	2877.4	9.31
25-30	3219.0	10.41
30-35	3450.0	11.16
35-40	3557.8	11.51
40-45	3513.5	11.37
45-50	3338.2	10.80
50-55	3105.8	10.04
55-60	1695.3	5.49
60-65	273.4	0.88
65-70	26.5	0.09
70-75	15.6	0.05
75-80	8.2	0.02
80-85	3.3	0.02
85-90	0.5	0.00
90-95	0.2	0.00
95-100	0.2	0.00
100-105	0.4	0.00
105-110	0.7	0.00
110-115	0.9	0.01
115-120	1.0	0.00
120-125	1.2	0.00
125-130	1.4	0.01
130-135	1.8	0.00
135-140	2.1	0.01
140-145	2.5	0.01
145-150	2.8	0.01
150-155	2.9	0.01
155-160	2.6	0.00
160-165	2.1	0.01
165-170	1.5	0.01
170-175	0.9	0.00
175-180	0.3	0.00

Deg	Flux (lm)	%
0-5	392.0	1.27
0-10	1544.5	5.00
0-15	3384.0	10.95
0-20	5803.3	18.77
0-25	8680.8	28.08
0-30	11899.8	38.49
0-35	15349.8	49.65
0-40	18907.6	61.16
0-45	22421.1	72.53
0-50	25759.3	83.33
0-55	28865.1	93.37
0-60	30560.4	98.86
0-65	30833.7	99.74
0-70	30860.2	99.83
0-75	30875.8	99.88
0-80	30883.9	99.90
0-85	30887.3	99.92
0-90	30887.8	99.92
0-95	30888.0	99.92
0-100	30888.2	99.92
0-105	30888.6	99.92
0-110	30889.3	99.92
0-115	30890.2	99.93
0-120	30891.2	99.93
0-125	30892.3	99.93
0-130	30893.8	99.94
0-135	30895.5	99.94
0-140	30897.6	99.95
0-145	30900.1	99.96
0-150	30903.0	99.97
0-155	30905.8	99.98
0-160	30908.5	99.98
0-165	30910.6	99.99
0-170	30912.1	100.00
0-175	30913.0	100.00
0-180	30913.3	100.00

[Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	277	60	0.9455
Total Harmonic Distortion:	120	60	6.96%
Total Harmonic Distortion:	277	60	10.41%

6. Product Photo



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