

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### 3NLED LIGHTING USA, INC.

4507 POTER COURT, SAN JOSE, CA 95127

**Test Model: SNHB-150W 5000K**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, THD, Off-state Power
<b>Test Engineer:</b>	Daniel Duan
<b>Report Number:</b>	RSZ140418524-10
<b>Test Date:</b>	2014-05-06 to 2014-05-07
<b>Report Date:</b>	2013-05-14
<b>Reviewed By:</b>	Jeanne Han/Safety Manager
<b>Prepared By:</b>	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
<b>Test Facility:</b>	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
<b>Accreditation:</b>	The NVLAP Lab Code is 200707-0.

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## 1. Product Description

### General Information:

One sample was received on 2014-05-04 and used for testing. Sample No.: RSZ140418524-S01 Model: SNHB-150W 5000K

Model Tested: SNHB-150W 5000K  
 Manufacturer: SHENZHEN 3NLED LIGHTING CO.,LTD  
 Brand Name: 3NLED  
 Product Designation: High-Bay Luminaires for Commercial and Industrial buildings  
 Burning Time Before Test: 0 hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 100-277VAC 50/60Hz  
 Rated Power: 150W  
 Nominal CCT: 5000K

## 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
Integrating Sphere	SENSING	SPR-600	S09008	25~50℃	2014-03-16
Spectral photometer	SENSING	SPR3000	90902027	350nm~800nm	2014-03-16
Power Meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/300/600 V	2014-03-12
AC Power Supply	ALL Power	APW-105N	970613	0V-300V 50-400Hz	2014-03-12
Standard Light Source	EVERFINE	D204	201311	N/A	2013-09-26
Thermal Meter	SENSING	N/A	T-08-EE006-1	25℃	2014-03-16
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~60V	2014-03-12
AC Power Supply	EVERFINE	VPS1060 PWM	1101006	0-150V, 0-300V	2014-03-12
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2014-03-12
Power Meter	YOKOGAWA	WT-210	91KB35700	N/A	2014-03-12
Goniophotometer	EVERFINE	GO-R5000	YG108492N1 0120001	1600mm,3000W/10A	2014-03-04
Thermal Meter	Victor	VC230	EE091	0~40℃0~90%	2013-04-01
Standard Light Source	EVERFINE	D908	1012001	N/A	2013-05-28
Digital Power Meter	EVERFINE	PF9811	507047	0~35V DC	2013-11-12
AC POWER SUPPLY	SZHPC	HPA 1103	0003394	3KVA	2014-03-12

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.

$4\pi$  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  $U=1.64\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=21\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=1.6$  ( $K=2$ ), 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: **1.5 hours**

Test orientation: **Downward**

#### Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.12	60.0	1.2427	148.39	0.994

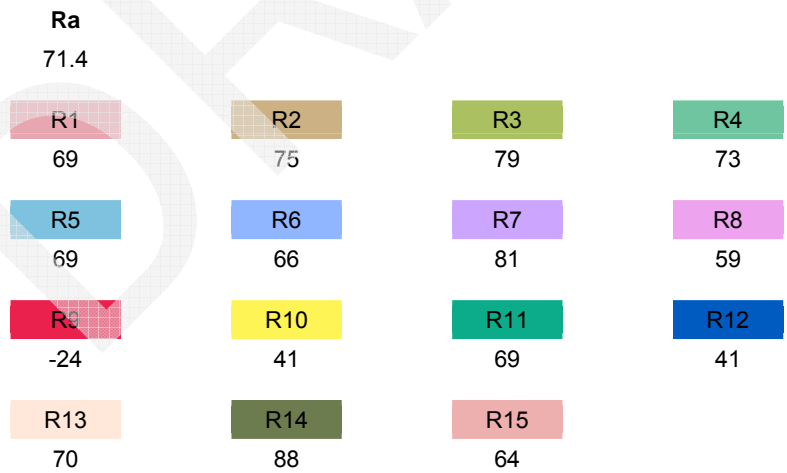
#### Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
12027.660	30.121	81.054	4855	3.90E-03

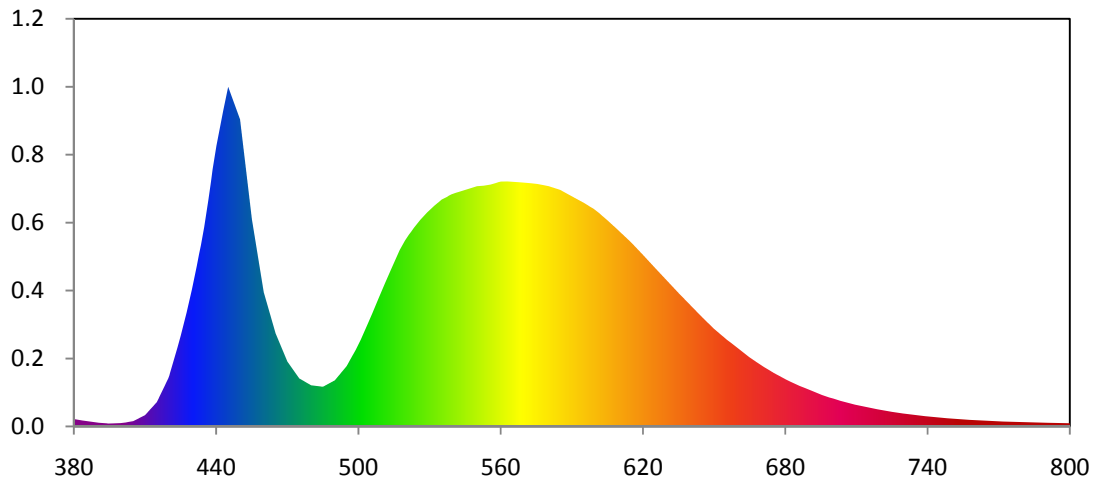
#### Chromaticity Coordinate

x	y	u	v	u'	v'
0.3503	0.3636	0.2103	0.3274	0.2103	0.4912

#### Color Rendering Index

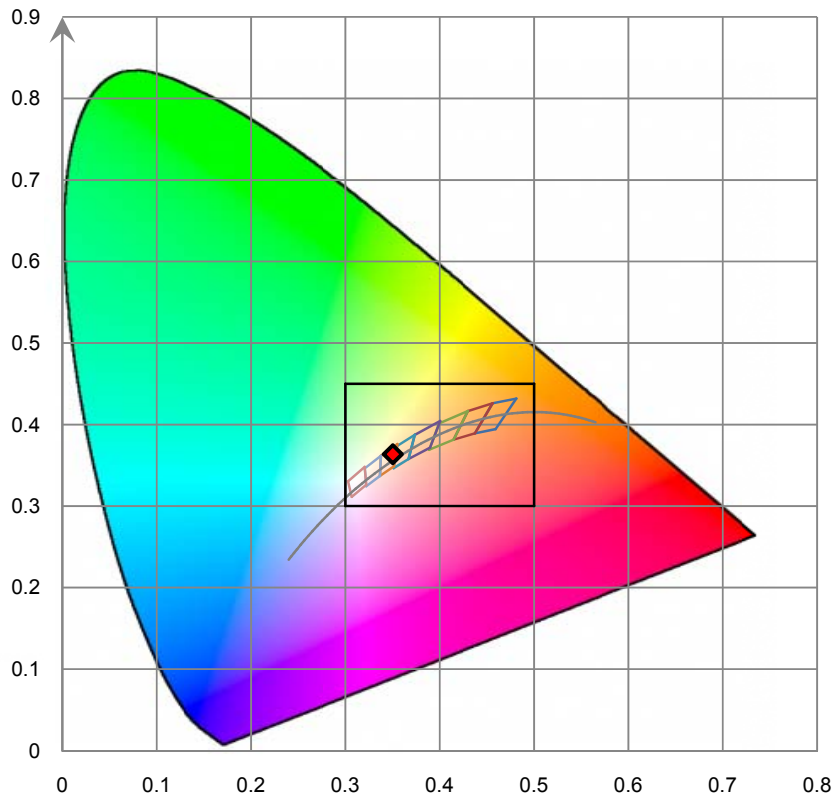


Relative Spectral Power Distribution

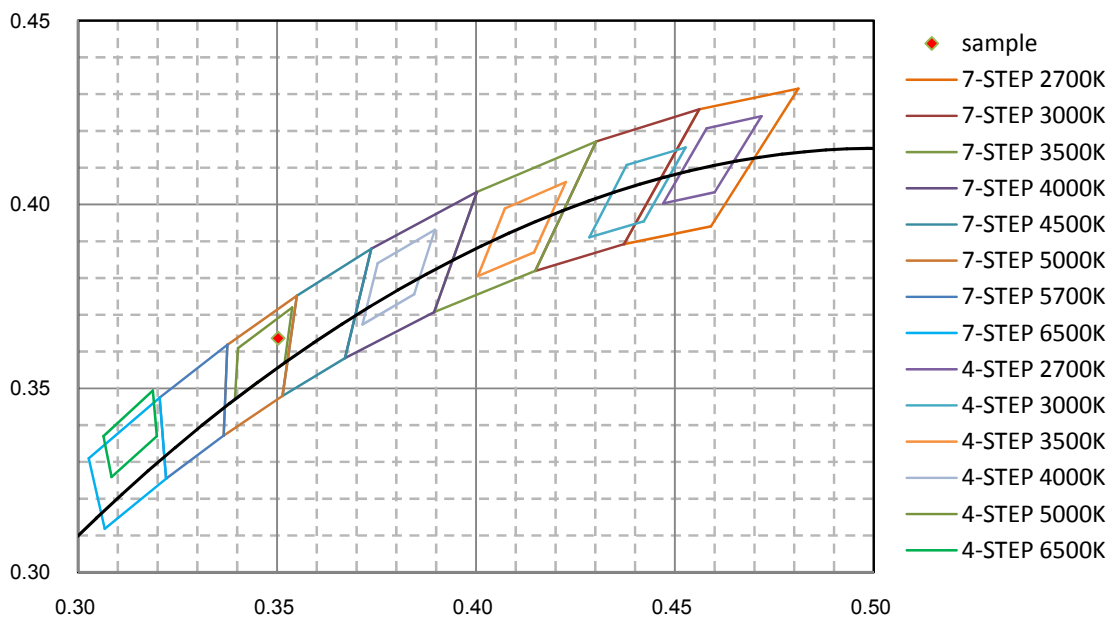


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.579E-02	465	3.148E-01	550	8.110E-01	635	4.502E-01	720	5.648E-02
385	1.815E-02	470	2.190E-01	555	8.149E-01	640	4.092E-01	725	4.964E-02
390	1.313E-02	475	1.624E-01	560	8.270E-01	645	3.681E-01	730	4.369E-02
395	1.034E-02	480	1.392E-01	565	8.258E-01	650	3.295E-01	735	3.848E-02
400	1.178E-02	485	1.345E-01	570	8.225E-01	655	2.953E-01	740	3.366E-02
405	1.836E-02	490	1.557E-01	575	8.187E-01	660	2.640E-01	745	3.021E-02
410	3.874E-02	495	2.040E-01	580	8.116E-01	665	2.325E-01	750	2.685E-02
415	8.278E-02	500	2.759E-01	585	7.986E-01	670	2.056E-01	755	2.392E-02
420	1.662E-01	505	3.662E-01	590	7.762E-01	675	1.814E-01	760	2.167E-02
425	3.032E-01	510	4.627E-01	595	7.547E-01	680	1.599E-01	765	1.950E-02
430	4.678E-01	515	5.546E-01	600	7.301E-01	685	1.402E-01	770	1.749E-02
435	6.752E-01	520	6.337E-01	605	6.952E-01	690	1.243E-01	775	1.599E-02
440	9.492E-01	525	6.884E-01	610	6.584E-01	695	1.072E-01	780	1.479E-02
445	1.146E+00	530	7.315E-01	615	6.207E-01	700	9.464E-02	785	1.370E-02
450	1.037E+00	535	7.656E-01	620	5.784E-01	705	8.250E-02	790	1.269E-02
455	6.997E-01	540	7.859E-01	625	5.355E-01	710	7.259E-02	795	1.180E-02
460	4.533E-01	545	7.984E-01	630	4.930E-01	715	6.396E-02	800	1.141E-02

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



**[Goniophotometer System]**

Total operating time for luminous intensity distribution: **1.5 hours**

Test orientation: **Downward**

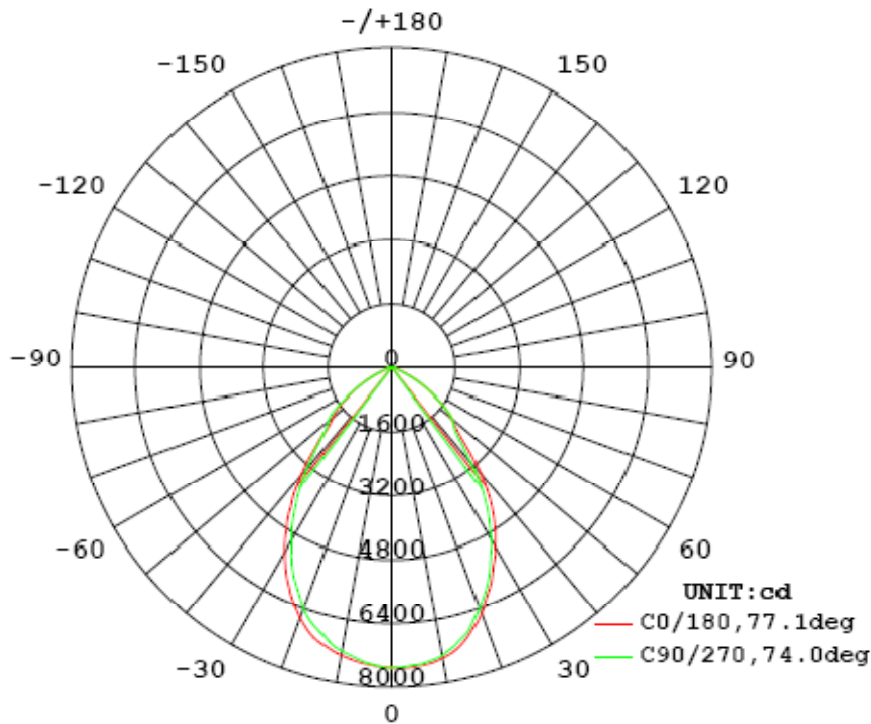
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60.0	1.244	148.5	0.9941

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
12076.5	81.32	7515	1.09	1.05

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% Imax):	77.1	74.4	74.0	75.6	75.3
Field Angle (10% Imax):	124.5	124.2	124.2	125.1	124.5

Luminous Intensity (cd) Distribution Data

C \ Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	7515	7515	7515	7515	7515	7515	7515	7515
5.0°	7453	7426	7431	7408	7416	7454	7472	7512
10.0°	7314	7264	7191	7197	7206	7236	7291	7359
15.0°	7088	6979	6929	6836	6856	6947	6978	7073
20.0°	6660	6535	6428	6398	6407	6416	6435	6528
25.0°	6049	5873	5790	5722	5771	5770	5744	5829
30.0°	5327	5182	5038	4991	4973	5013	5010	5106
35.0°	4474	4344	4189	4143	4144	4183	4233	4369
40.0°	3517	3406	3328	3270	3268	3305	3359	3451
45.0°	2540	2506	2483	2449	2469	2486	2513	2542
50.0°	1938	2011	2015	2062	2094	2063	2058	2005
55.0°	1481	1559	1634	1559	1574	1643	1605	1522
60.0°	968	1021	997	1005	985	1032	1048	976
65.0°	506	535	501	488	481	494	534	517
70.0°	145	175	164	134	130	148	173	136
75.0°	105	116	105	96	94	99	114	98
80.0°	79	87	79	71	69	77	88	75
85.0°	93	109	91	81	76	91	98	90
90.0°	100	113	102	84	86	105	107	105
95.0°	84	88	82	69	72	85	79	77
100.0°	40	51	43	33	32	38	37	32
105.0°	17	16	15	12	10	13	14	13
110.0°	7	7	0	4	3	5	0	7
115.0°	5	6	5	0	4	0	10	9
120.0°	1	1	1	0	0	0	1	1
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	1	1	0	0	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	1	0	0	0	1	1	1

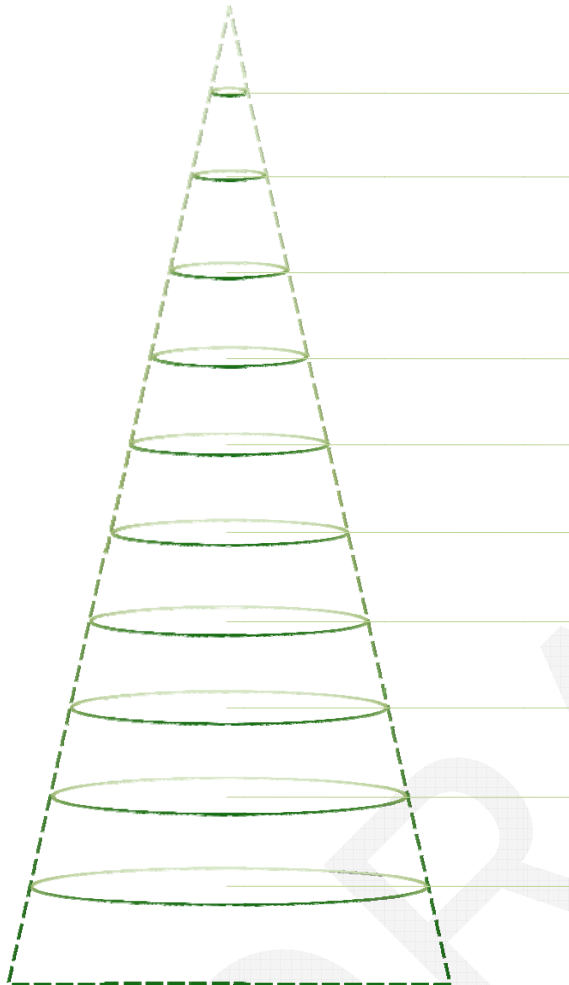


Luminous Intensity (cd) Distribution Data (cont.)

C \ Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	7515	7515	7515	7515	7515	7515	7515	7515
5.0°	7502	7508	7498	7478	7468	7469	7468	7470
10.0°	7385	7380	7393	7368	7321	7315	7312	7322
15.0°	7079	7073	7023	6982	6968	6955	7040	7066
20.0°	6550	6464	6455	6459	6397	6457	6470	6608
25.0°	5895	5785	5762	5826	5748	5767	5843	6040
30.0°	5161	5053	5011	5018	4970	5004	5130	5313
35.0°	4397	4244	4138	4112	4067	4131	4284	4438
40.0°	3479	3327	3206	3138	3103	3227	3349	3484
45.0°	2487	2424	2350	2280	2290	2329	2421	2514
50.0°	1980	2022	1984	2005	1988	1960	2004	1935
55.0°	1483	1531	1553	1486	1479	1522	1537	1470
60.0°	966	1002	977	940	947	964	992	973
65.0°	498	494	445	422	431	445	494	514
70.0°	156	155	145	121	123	144	169	153
75.0°	96	109	98	87	88	100	123	108
80.0°	68	83	69	58	60	75	94	82
85.0°	83	97	87	75	74	98	110	100
90.0°	95	103	95	80	80	112	108	109
95.0°	75	67	66	58	63	73	78	78
100.0°	32	14	29	26	26	30	38	32
105.0°	16	9	9	9	10	12	13	15
110.0°	7	8	0	5	5	6	0	7
115.0°	7	13	10	0	0	0	10	6
120.0°	1	1	0	0	0	0	1	1
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	1	1	1

Average Area Illumination Figure

Angle: 75.3°. Flux out: 7486.0 lm.



Height (m)	Diameter (cm)	$E_{avg}(lx)$	$E_{max}(lx)$
0.5	77.2	15615.0	30134.0
1.0	154.3	3904.0	7533.0
1.5	231.5	1735.0	3348.0
2.0	308.6	975.9	1883.0
2.5	385.8	624.6	1205.0
3.0	462.9	433.7	837.1
3.5	540.1	318.7	615.0
4.0	617.2	244.0	470.8
4.5	694.4	192.8	372.0
5.0	771.5	156.1	301.3

Zonal Lumen Density Measurement

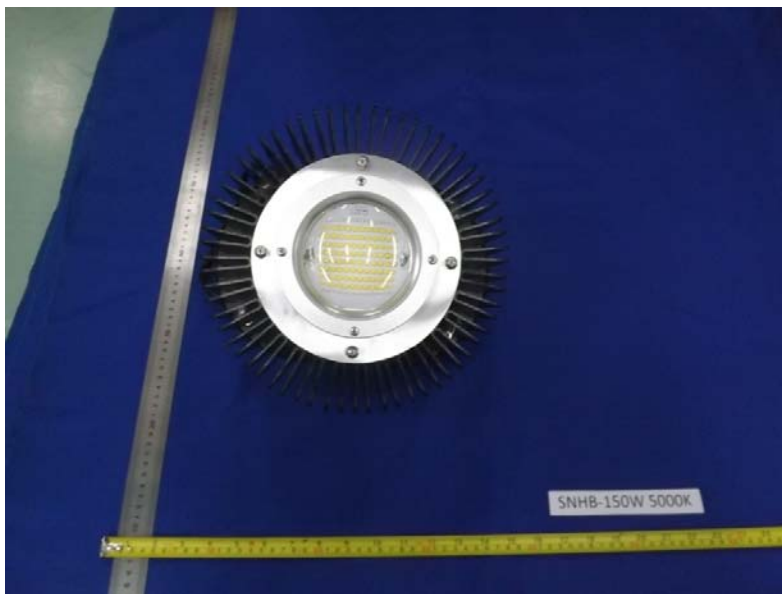
Deg	Flux (lm)	%
0-5	179.1	1.48
5-10	527.9	4.37
10-15	848.5	7.03
15-20	1111.1	9.20
20-25	1289.0	10.67
25-30	1379.9	11.43
30-35	1373.4	11.37
35-40	1261.4	10.45
40-45	1058.9	8.77
45-50	883.1	7.31
50-55	781.1	6.47
55-60	579.1	4.79
60-65	354.8	2.94
65-70	144.8	1.20
70-75	63.0	0.52
75-80	46.3	0.38
80-85	44.3	0.37
85-90	53.9	0.45
90-95	47.7	0.39
95-100	29.3	0.25
100-105	11.5	0.09
105-110	3.9	0.03
110-115	2.4	0.02
115-120	1.4	0.01
120-125	0.1	0.00
125-130	0.0	0.00
130-135	0.1	0.01
135-140	0.1	0.00
140-145	0.1	0.00
145-150	0.1	0.00
150-155	0.1	0.00
155-160	0.1	0.00
160-165	0.1	0.00
165-170	0.1	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	179.1	1.48
0-10	707.0	5.85
0-15	1555.5	12.88
0-20	2666.7	22.08
0-25	3955.6	32.75
0-30	5335.6	44.18
0-35	6709.0	55.55
0-40	7970.4	66.00
0-45	9029.3	74.77
0-50	9912.4	82.08
0-55	10693.5	88.55
0-60	11272.5	93.34
0-65	11627.3	96.28
0-70	11772.1	97.48
0-75	11835.1	98.00
0-80	11881.4	98.38
0-85	11925.7	98.75
0-90	11979.6	99.20
0-95	12027.3	99.59
0-100	12056.7	99.84
0-105	12068.1	99.93
0-110	12072.0	99.96
0-115	12074.3	99.98
0-120	12075.7	99.99
0-125	12075.8	99.99
0-130	12075.8	99.99
0-135	12075.9	100.00
0-140	12076.0	100.00
0-145	12076.0	100.00
0-150	12076.1	100.00
0-155	12076.2	100.00
0-160	12076.3	100.00
0-165	12076.4	100.00
0-170	12076.4	100.00
0-175	12076.5	100.00
0-180	12076.5	100.00

**Additional Test]**

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	277	60	0.947
Total Harmonic Distortion:	120	60	8.56%
Total Harmonic Distortion:	277	60	10.71%
Off State Power (W):	120	60	0.0

**6. Product Photo**



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