

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### 3NLED LIGHTING USA, INC.

4507 POTER COURT, SAN JOSE, CA 95127

**Test Model: SNHB-200W 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>	RSZ140418526-10
<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.: RSZ140418526-S01 Model: SNHB-200W 5000K

Model Tested: SNHB-200W 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: 200W  
 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
120.16	60.0	1.6479	196.84	0.994

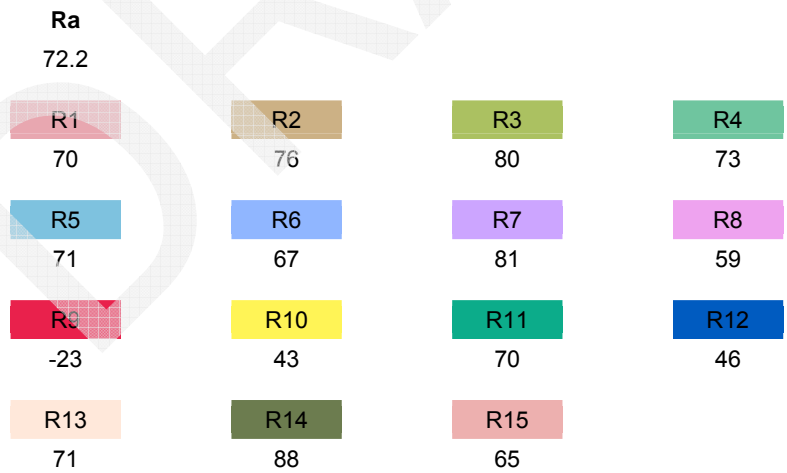
#### Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
16085.24	39.461	81.717	5026	3.18E-03

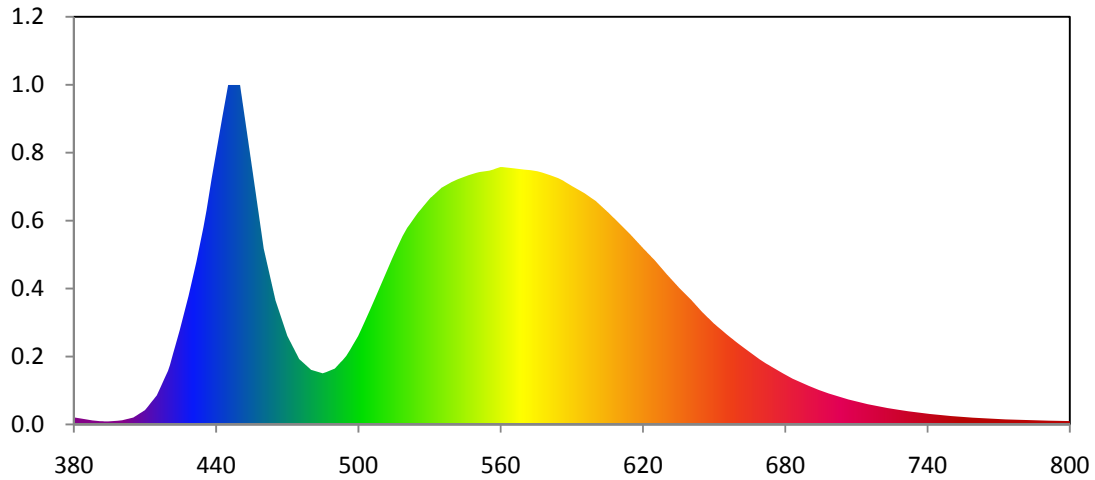
#### Chromaticity Coordinate

x	y	u	v	u'	v'
0.3450	0.3579	0.2089	0.3251	0.2089	0.4877

#### Color Rendering Index

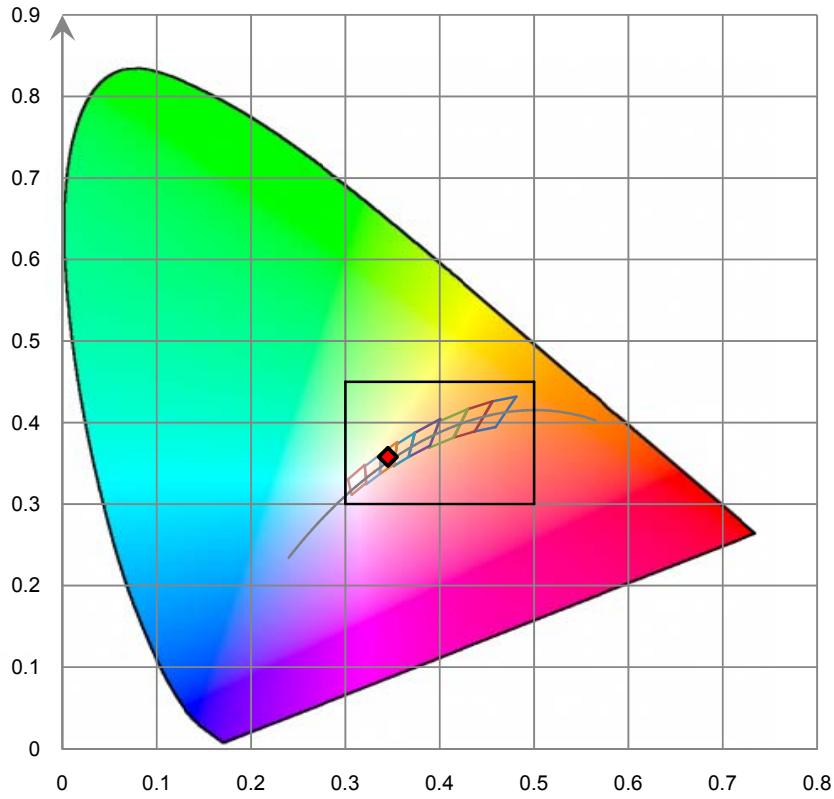


Relative Spectral Power Distribution

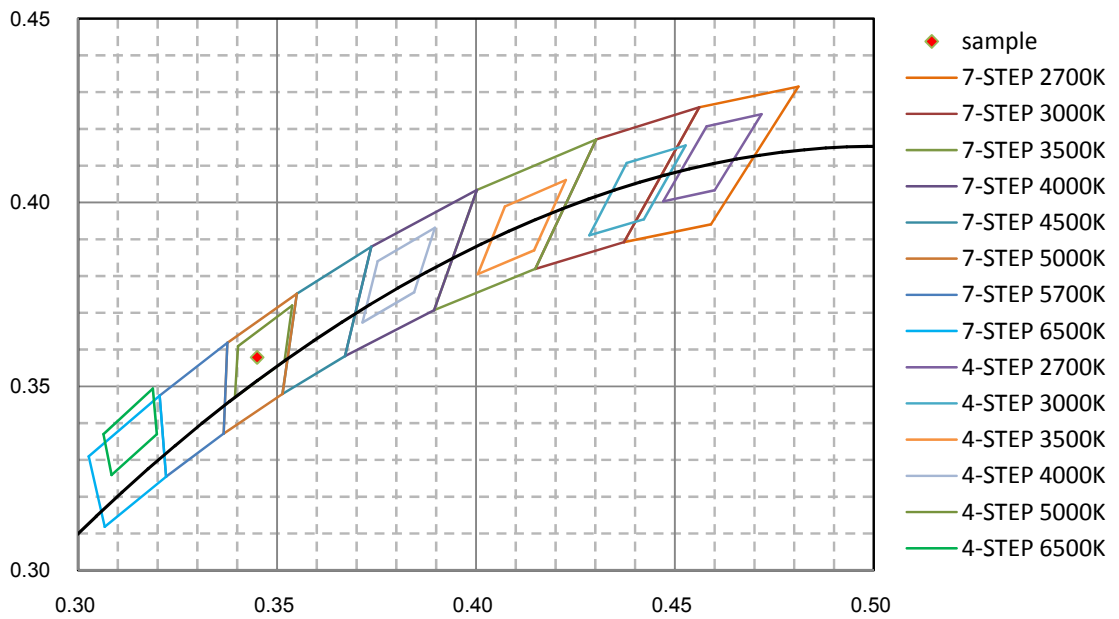


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.036E-02	465	5.159E-01	550	1.051E+00	635	5.726E-01	720	7.461E-02
385	2.136E-02	470	3.686E-01	555	1.058E+00	640	5.229E-01	725	6.555E-02
390	1.480E-02	475	2.730E-01	560	1.074E+00	645	4.685E-01	730	5.796E-02
395	1.316E-02	480	2.280E-01	565	1.068E+00	650	4.205E-01	735	5.061E-02
400	1.694E-02	485	2.132E-01	570	1.063E+00	655	3.779E-01	740	4.509E-02
405	2.902E-02	490	2.337E-01	575	1.058E+00	660	3.378E-01	745	3.964E-02
410	6.036E-02	495	2.875E-01	580	1.043E+00	665	3.013E-01	750	3.524E-02
415	1.227E-01	500	3.715E-01	585	1.024E+00	670	2.656E-01	755	3.197E-02
420	2.313E-01	505	4.812E-01	590	9.939E-01	675	2.358E-01	760	2.823E-02
425	4.069E-01	510	5.963E-01	595	9.663E-01	680	2.074E-01	765	2.502E-02
430	6.022E-01	515	7.115E-01	600	9.318E-01	685	1.827E-01	770	2.298E-02
435	8.408E-01	520	8.131E-01	605	8.864E-01	690	1.606E-01	775	2.072E-02
440	1.141E+00	525	8.826E-01	610	8.383E-01	695	1.403E-01	780	1.909E-02
445	1.416E+00	530	9.419E-01	615	7.882E-01	700	1.243E-01	785	1.735E-02
450	1.416E+00	535	9.875E-01	620	7.348E-01	705	1.086E-01	790	1.605E-02
455	1.076E+00	540	1.015E+00	625	6.838E-01	710	9.619E-02	795	1.504E-02
460	7.331E-01	545	1.035E+00	630	6.260E-01	715	8.413E-02	800	1.434E-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**

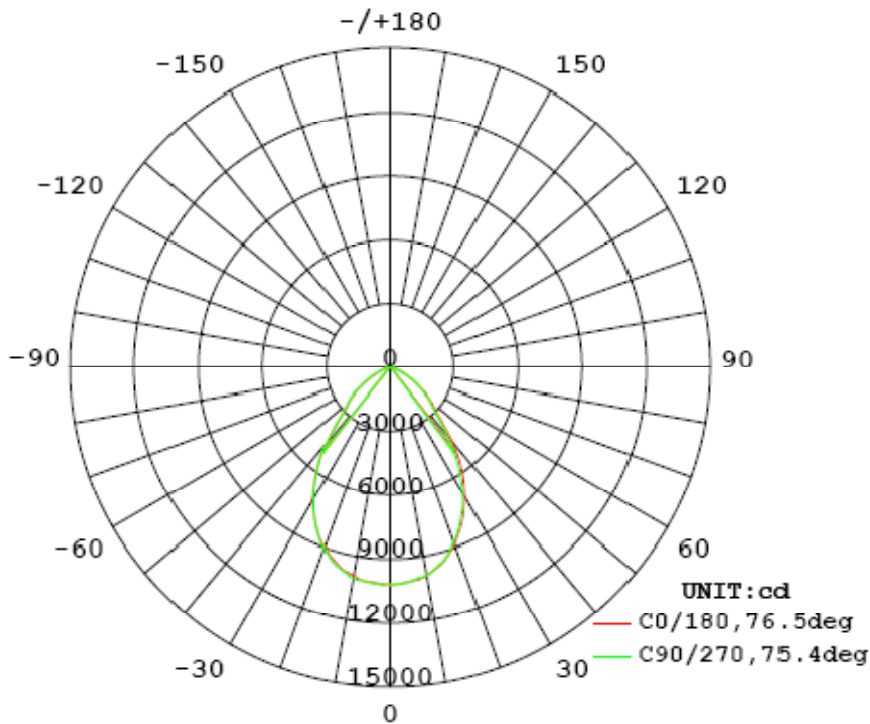
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60.0	1.657	197.6	0.9941

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
16178.3	81.87	10161	1.09	1.09

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% Imax):	76.5	75.6	75.4	75.6	75.8
Field Angle (10% Imax):	121.9	122.3	122.5	122.5	122.3

Luminous Intensity (cd) Distribution Data

C \ Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	10161	10161	10161	10161	10161	10161	10161	10161
5.0°	10096	10132	10087	10105	10134	10095	10108	10131
10.0°	9916	9905	9969	10013	10034	9987	9948	9921
15.0°	9582	9606	9631	9612	9654	9613	9628	9516
20.0°	8995	9045	9085	9064	9042	9036	8932	8875
25.0°	8195	8227	8192	8197	8191	8152	8122	8096
30.0°	7217	7211	7186	7148	7145	7144	7082	7125
35.0°	6029	6038	5981	5993	5994	5936	5892	5968
40.0°	4679	4668	4650	4708	4673	4654	4598	4622
45.0°	3301	3354	3386	3373	3331	3386	3352	3304
50.0°	2552	2593	2643	2573	2587	2662	2659	2552
55.0°	1831	1901	2026	1931	1931	1973	1993	1899
60.0°	1132	1219	1257	1259	1242	1266	1248	1208
65.0°	548	630	652	642	665	651	636	600
70.0°	191	215	252	218	209	221	230	191
75.0°	143	159	183	161	157	163	170	142
80.0°	113	125	139	122	118	122	128	104
85.0°	117	136	141	130	119	126	120	105
90.0°	111	124	125	118	113	117	112	97
95.0°	90	92	96	87	90	87	86	73
100.0°	42	48	51	47	47	46	44	39
105.0°	14	20	22	20	19	19	19	0
110.0°	8	9	11	8	8	9	9	8
115.0°	5	6	0	8	6	8	0	7
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	1	1	1	1	1	1

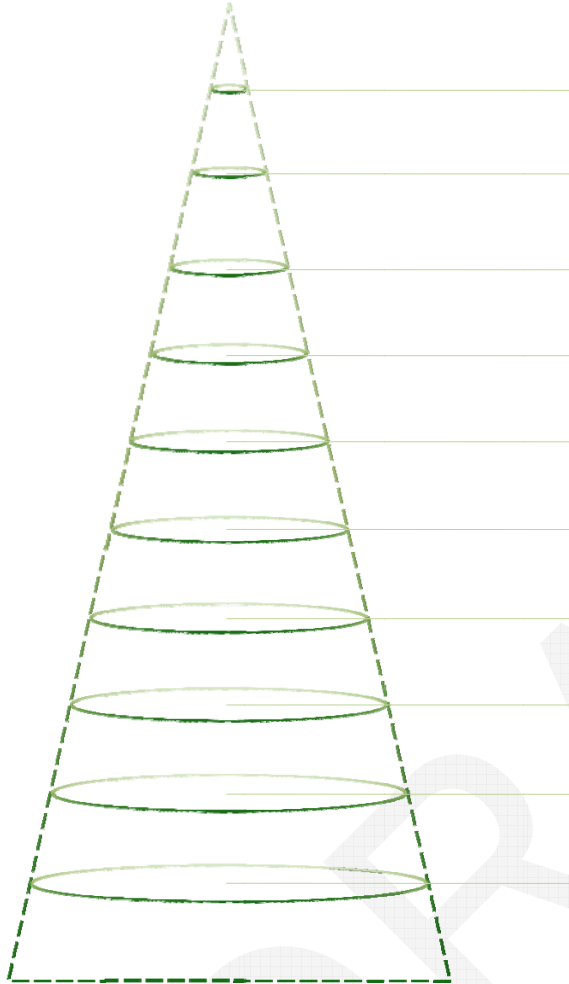


Luminous Intensity (cd) Distribution Data (cont.)

C \ Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	10161	10161	10161	10161	10161	10161	10161	10161
5.0°	10076	10073	10054	10077	10095	10078	10053	10076
10.0°	9894	9884	9832	9857	9902	9843	9861	9895
15.0°	9487	9430	9458	9421	9451	9457	9489	9537
20.0°	8841	8756	8739	8733	8735	8776	8825	8900
25.0°	8024	7923	7798	7852	7868	7924	7973	8100
30.0°	7011	6915	6811	6823	6843	6916	6969	7109
35.0°	5875	5773	5603	5600	5595	5621	5716	5892
40.0°	4535	4442	4325	4264	4243	4287	4370	4538
45.0°	3217	3188	3130	3074	3036	3085	3158	3223
50.0°	2519	2490	2537	2404	2410	2410	2521	2495
55.0°	1780	1809	1802	1745	1710	1716	1835	1807
60.0°	1109	1140	1099	1082	1115	1098	1113	1158
65.0°	512	531	520	477	495	496	521	550
70.0°	171	182	196	178	175	196	217	204
75.0°	127	133	149	130	126	143	164	148
80.0°	91	104	115	106	100	115	130	122
85.0°	90	99	112	112	108	128	144	132
90.0°	81	86	98	97	100	116	131	122
95.0°	65	63	72	67	78	80	90	84
100.0°	36	36	38	36	37	38	41	42
105.0°	0	18	18	17	16	17	17	1
110.0°	7	8	6	8	7	8	8	8
115.0°	4	6	1	4	4	6	0	6
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	1	1	1	1	1

Average Area Illumination Figure

Angle: 75.8°. Flux out: 10287.0 lm.



Height (m)	Diameter (cm)	E <sub>avg</sub> (lx)	E <sub>max</sub> (lx)
0.5	77.9	21458.0	40774.0
1.0	155.7	5365.0	10194.0
1.5	233.5	2384.0	4530.0
2.0	311.4	1341.0	2548.0
2.5	389.9	858.3	1631.0
3.0	467.1	596.1	1133.0
3.5	544.9	437.9	832.1
4.0	622.8	335.3	637.1
4.5	700.6	264.9	503.4
5.0	778.5	214.6	407.7

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	242.2	1.50
5-10	716.0	4.42
10-15	1154.6	7.14
15-20	1520.8	9.40
20-25	1778.6	10.99
25-30	1909.4	11.81
30-35	1898.3	11.73
35-40	1728.3	10.68
40-45	1425.7	8.82
45-50	1150.1	7.10
50-55	965.8	5.97
55-60	693.5	4.29
60-65	418.7	2.59
65-70	176.0	1.09
70-75	90.9	0.56
75-80	69.2	0.43
80-85	63.8	0.39
85-90	65.0	0.40
90-95	52.5	0.33
95-100	33.0	0.20
100-105	14.6	0.09
105-110	5.9	0.04
110-115	3.3	0.02
115-120	1.1	0.00
120-125	0.1	0.00
125-130	0.1	0.00
130-135	0.1	0.00
135-140	0.1	0.01
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	242.2	1.50
0-10	958.2	5.92
0-15	2112.8	13.06
0-20	3633.6	22.46
0-25	5412.2	33.45
0-30	7321.7	45.26
0-35	9220.0	56.99
0-40	10948.3	67.67
0-45	12374.0	76.49
0-50	13524.1	83.59
0-55	14489.8	89.56
0-60	15183.3	93.85
0-65	15602.0	96.44
0-70	15778.0	97.53
0-75	15869.0	98.09
0-80	15938.2	98.52
0-85	16002.0	98.91
0-90	16066.9	99.31
0-95	16119.4	99.64
0-100	16152.4	99.84
0-105	16167.0	99.93
0-110	16173.0	99.97
0-115	16176.2	99.99
0-120	16177.3	99.99
0-125	16177.3	99.99
0-130	16177.4	99.99
0-135	16177.5	99.99
0-140	16177.5	100.00
0-145	16177.6	100.00
0-150	16177.8	100.00
0-155	16177.9	100.00
0-160	16178.0	100.00
0-165	16178.1	100.00
0-170	16178.2	100.00
0-175	16178.2	100.00
0-180	16178.3	100.00

**Additional Test]**

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	277	60	0.947
Total Harmonic Distortion:	120	60	9.63%
Total Harmonic Distortion:	277	60	12.42%
Off State Power (W):	120	60	0.0

**6. Product Photo**



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