

IES LM-79-08

MEASUREMENT AND TEST REPORT For

3NLED LIGHTING USA, INC.
4507 POTER COURT, SAN JOSE, CA 95127

Test Model: SNHB-120W 5000K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, THD, Off-state Power
Test Engineer:	Daniel Duan
Report Number:	RSZ140418522-10
Test Date:	2014-05-06 to 2014-05-07
Report Date:	2013-05-14
Reviewed By:	Jeanne Han/Safety Manager
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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 2014-05-04 and used for testing. Sample No.: RSZ140418522-S01 Model: SNHB-120W 5000K

Model Tested: SNHB-120W 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: 120W
 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.

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 $U=1.64\%$ ($K=2$), 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	0.9872	117.91	0.994

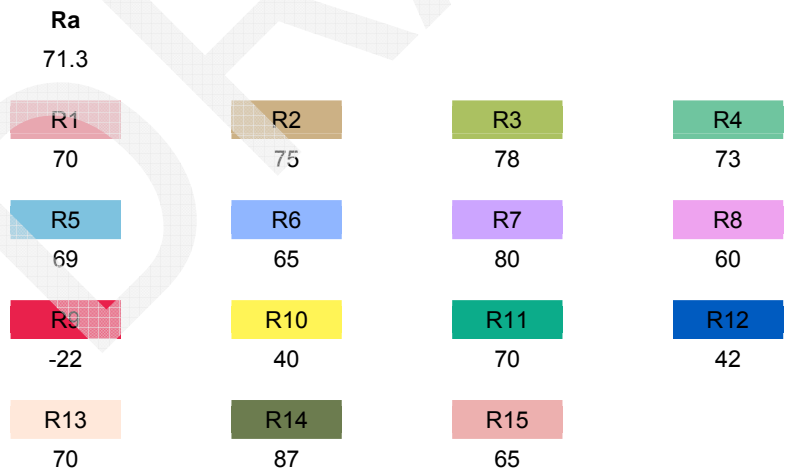
Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
9468.793	23.097	80.305	4956	3.12E-03

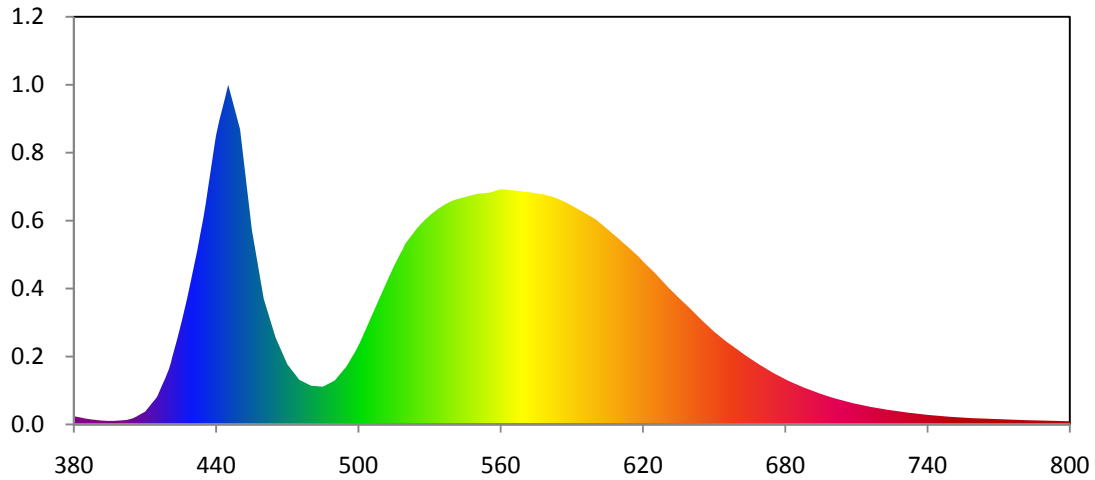
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3470	0.3594	0.2097	0.3258	0.2097	0.4887

Color Rendering Index

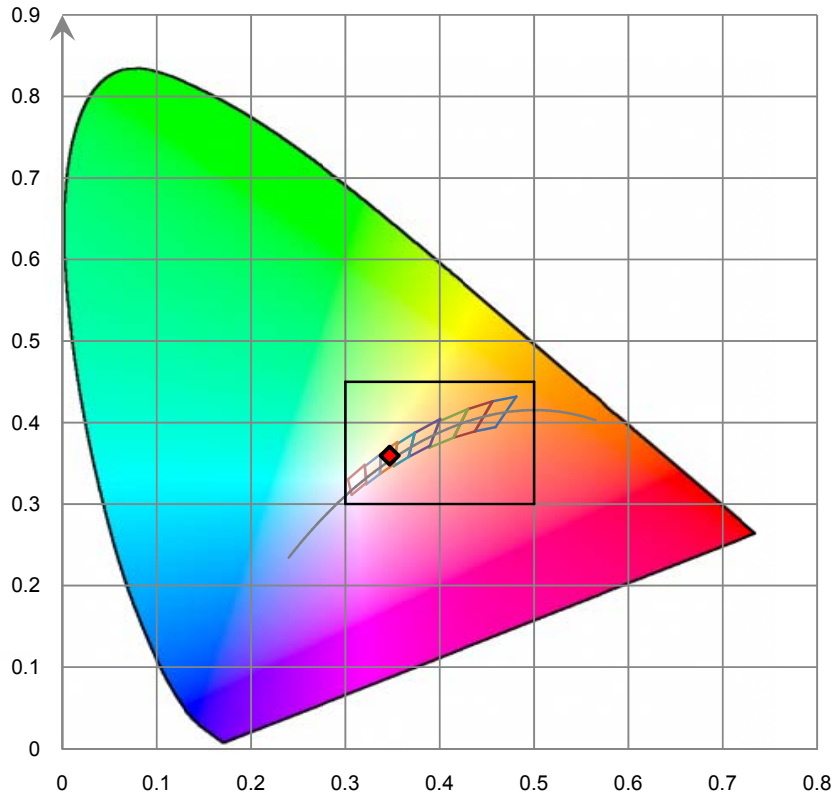


Relative Spectral Power Distribution

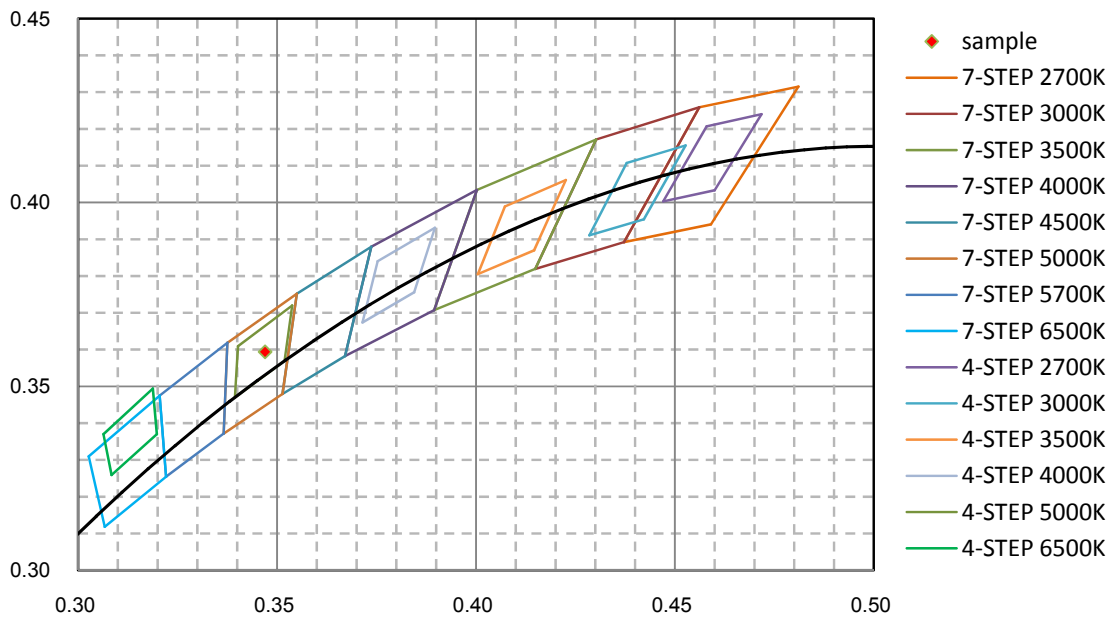


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.237E-02	465	2.322E-01	550	6.161E-01	635	3.390E-01	720	4.259E-02
385	1.574E-02	470	1.607E-01	555	6.188E-01	640	3.089E-01	725	3.777E-02
390	1.146E-02	475	1.197E-01	560	6.286E-01	645	2.774E-01	730	3.323E-02
395	9.530E-03	480	1.035E-01	565	6.255E-01	650	2.480E-01	735	2.888E-02
400	1.050E-02	485	1.010E-01	570	6.218E-01	655	2.221E-01	740	2.603E-02
405	1.680E-02	490	1.177E-01	575	6.181E-01	660	1.992E-01	745	2.260E-02
410	3.455E-02	495	1.558E-01	580	6.116E-01	665	1.763E-01	750	2.052E-02
415	7.332E-02	500	2.103E-01	585	6.008E-01	670	1.563E-01	755	1.850E-02
420	1.455E-01	505	2.814E-01	590	5.844E-01	675	1.374E-01	760	1.684E-02
425	2.628E-01	510	3.546E-01	595	5.664E-01	680	1.204E-01	765	1.505E-02
430	3.999E-01	515	4.245E-01	600	5.480E-01	685	1.059E-01	770	1.383E-02
435	5.674E-01	520	4.860E-01	605	5.213E-01	690	9.352E-02	775	1.259E-02
440	7.780E-01	525	5.269E-01	610	4.944E-01	695	8.136E-02	780	1.166E-02
445	9.073E-01	530	5.589E-01	615	4.664E-01	700	7.116E-02	785	1.066E-02
450	7.890E-01	535	5.830E-01	620	4.352E-01	705	6.276E-02	790	1.039E-02
455	5.196E-01	540	5.989E-01	625	4.048E-01	710	5.513E-02	795	9.639E-03
460	3.357E-01	545	6.078E-01	630	3.706E-01	715	4.811E-02	800	8.930E-03

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**

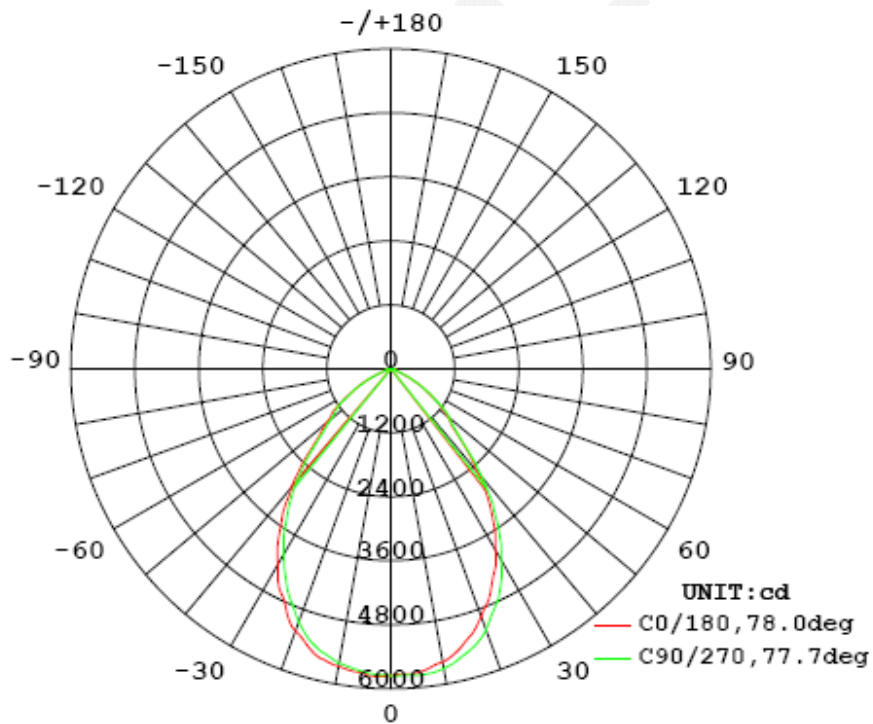
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60.0	0.9894	118.1	0.9940

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
9559.47	80.94	5753	1.12	1.08

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% Imax):	78.0	77.7	77.7	77.6	77.8
Field Angle (10% Imax):	124.6	124.9	124.4	124.4	124.6

Luminous Intensity (cd) Distribution Data

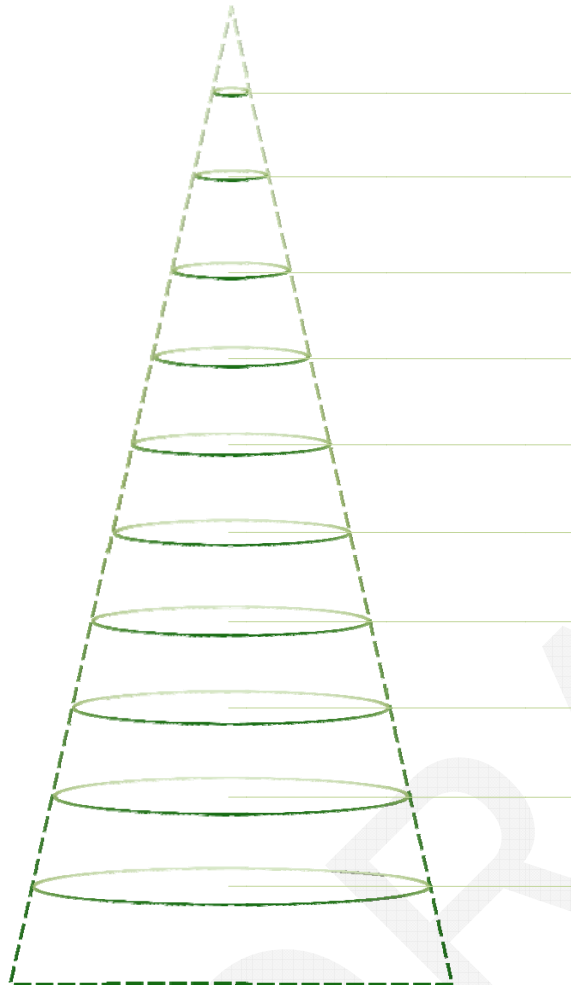
C \ Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	5753	5753	5753	5753	5753	5753	5753	5753
5.0°	5740	5731	5716	5715	5710	5694	5691	5698
10.0°	5667	5647	5638	5635	5605	5596	5586	5553
15.0°	5537	5490	5488	5424	5406	5368	5360	5318
20.0°	5237	5183	5179	5105	5053	5026	4973	4941
25.0°	4760	4783	4726	4640	4586	4540	4496	4493
30.0°	4241	4255	4188	4128	4024	4028	3996	3976
35.0°	3608	3614	3551	3513	3406	3398	3332	3334
40.0°	2903	2892	2826	2787	2755	2678	2654	2615
45.0°	2099	2176	2108	2078	1999	1976	1929	1890
50.0°	1589	1613	1596	1537	1459	1497	1488	1395
55.0°	1216	1250	1305	1194	1188	1127	1156	1065
60.0°	798	849	834	797	795	739	722	697
65.0°	468	483	487	478	446	425	384	354
70.0°	134	176	187	165	153	145	149	119
75.0°	74	82	98	92	85	94	108	96
80.0°	49	55	72	69	64	74	83	76
85.0°	44	56	72	67	66	77	85	82
90.0°	45	58	72	67	66	71	75	73
95.0°	43	49	53	51	54	51	54	49
100.0°	25	27	30	30	33	31	30	23
105.0°	10	12	14	15	15	14	15	12
110.0°	6	6	0	6	4	5	0	5
115.0°	1	1	1	0	1	0	4	3
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	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°	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 \ Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	5753	5753	5753	5753	5753	5753	5753	5753
5.0°	5722	5732	5734	5749	5766	5763	5765	5753
10.0°	5585	5591	5647	5693	5706	5731	5726	5692
15.0°	5321	5371	5465	5502	5513	5530	5559	5557
20.0°	4948	4992	5092	5141	5213	5281	5259	5245
25.0°	4471	4583	4611	4709	4768	4830	4830	4841
30.0°	3927	4031	4076	4117	4127	4237	4300	4310
35.0°	3298	3330	3342	3392	3452	3548	3599	3652
40.0°	2530	2584	2558	2621	2654	2732	2769	2863
45.0°	1817	1867	1885	1858	1848	1961	2014	2102
50.0°	1391	1393	1443	1391	1422	1438	1541	1577
55.0°	1025	1001	1049	1051	1029	1113	1212	1213
60.0°	650	659	650	669	668	726	756	803
65.0°	339	315	334	332	336	371	402	434
70.0°	109	117	145	122	112	121	153	153
75.0°	90	96	106	91	84	89	101	81
80.0°	70	74	81	72	59	59	65	52
85.0°	75	79	80	74	65	65	63	51
90.0°	73	70	72	67	66	68	62	55
95.0°	51	45	50	44	48	51	52	44
100.0°	20	11	27	25	25	26	28	11
105.0°	9	10	10	11	13	12	12	8
110.0°	3	4	0	4	6	5	0	5
115.0°	3	6	7	0	0	0	2	2
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: 77.8°. Flux out: 6166.0 lm.



Height (m)	Diameter (cm)	$E_{avg}(lx)$	$E_{max}(lx)$
0.5	80.7	11971.0	23086.0
1.0	161.4	2993.0	5771.0
1.5	242.1	1330.0	2565.0
2.0	322.8	748.2	1443.0
2.5	403.5	478.9	923.4
3.0	484.1	332.5	641.3
3.5	564.8	244.3	471.1
4.0	645.5	187.1	360.7
4.5	726.2	147.8	285.0
5.0	806.9	119.7	230.9

Zonal Lumen Density Measurement

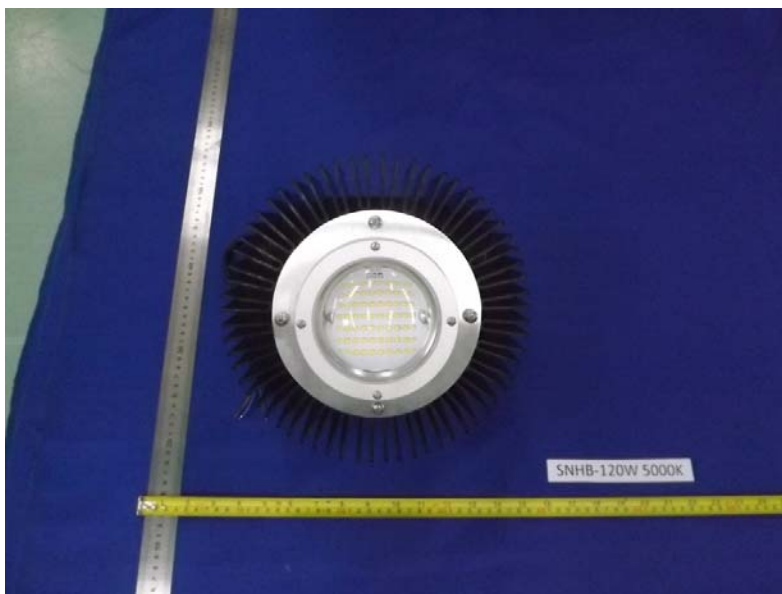
Deg	Flux (lm)	%
0-5	137.3	1.44
5-10	406.8	4.25
10-15	658.5	6.89
15-20	871.7	9.12
20-25	1026.2	10.73
25-30	1112.8	11.64
30-35	1117.8	11.70
35-40	1029.4	10.77
40-45	865.5	9.05
45-50	684.1	7.15
50-55	574.9	6.02
55-60	430.0	4.50
60-65	274.5	2.87
65-70	130.5	1.36
70-75	55.9	0.59
75-80	42.3	0.44
80-85	36.1	0.38
85-90	38.4	0.40
90-95	31.4	0.33
95-100	20.7	0.21
100-105	9.0	0.10
105-110	3.6	0.03
110-115	1.2	0.02
115-120	0.6	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	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	137.3	1.44
0-10	544.1	5.69
0-15	1202.5	12.58
0-20	2074.3	21.70
0-25	3100.5	32.43
0-30	4213.3	44.07
0-35	5331.0	55.77
0-40	6360.4	66.54
0-45	7225.9	75.59
0-50	7909.9	82.74
0-55	8484.8	88.76
0-60	8914.8	93.26
0-65	9189.3	96.13
0-70	9319.8	97.49
0-75	9375.6	98.08
0-80	9417.9	98.52
0-85	9453.9	98.90
0-90	9492.4	99.30
0-95	9523.8	99.63
0-100	9544.5	99.84
0-105	9553.5	99.94
0-110	9557.1	99.97
0-115	9558.3	99.99
0-120	9558.9	99.99
0-125	9558.9	99.99
0-130	9559.0	99.99
0-135	9559.0	100.00
0-140	9559.1	100.00
0-145	9559.1	100.00
0-150	9559.2	100.00
0-155	9559.2	100.00
0-160	9559.3	100.00
0-165	9559.4	100.00
0-170	9559.4	100.00
0-175	9559.5	100.00
0-180	9559.5	100.00

Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	277	60	0.9159
Total Harmonic Distortion:	120	60	6.33%
Total Harmonic Distortion:	277	60	15.78%
Off State Power (W):	120	60	0.0

6. Product Photo



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