

IES LM-79-08

MEASUREMENT AND TEST REPORT For

SHENZHEN 3NLED LIGHTING CO.,LTD

2nd Floor,3rd Building,Tiankou Industry Zone,Huangtian Village,Xixiang Town,Baoan District,Shenzhen,China. a.

Test Model: SNT8B-12S

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, THD, Power Factor, Off-state Power
Test Engineer:	Daniel Duan <i>Daniel Duan</i>
Report Number:	RSZ141028519-10
Test Date:	2014-10-29 to 2014-11-25
Report Date:	2014-11-25
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.

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1. Product Description

General Information:

Two tubes were received on 2014-10-28 and used for testing. Model: SNT8B-12S. A recessed troffer was used during test as auxiliary equipment detailed as following.

Model Tested: SNT8B-12S
 Manufacturer: SHENZHEN 3NLED LIGHTING CO.,LTD
 Brand Name: 3N LED
 Product Designation: Four-Foot Linear Replacement Lamps
 Burning Time Before Test: 0 hour(For New Products)
 Auxiliary Equipment: Recessed Troffer: Lithonia 2GT8 lensed 2X4 Troffer

Rated Values:

Rated Voltage/Frequency: 100-277 VAC
 Rated Power: 16.5W
 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	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°C,45°C,55°C	2014-03-16	2015-03-16
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~60V	2014-03-12	2015-03-12
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°C 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 $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ 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

Two tubes were tested in a recessed troffer.

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 hour**

Test orientation: **Downward**

Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.12	60.0	0.1387	16.357	0.982

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
2291.529	5.775	140.095	5042	3.41E-03

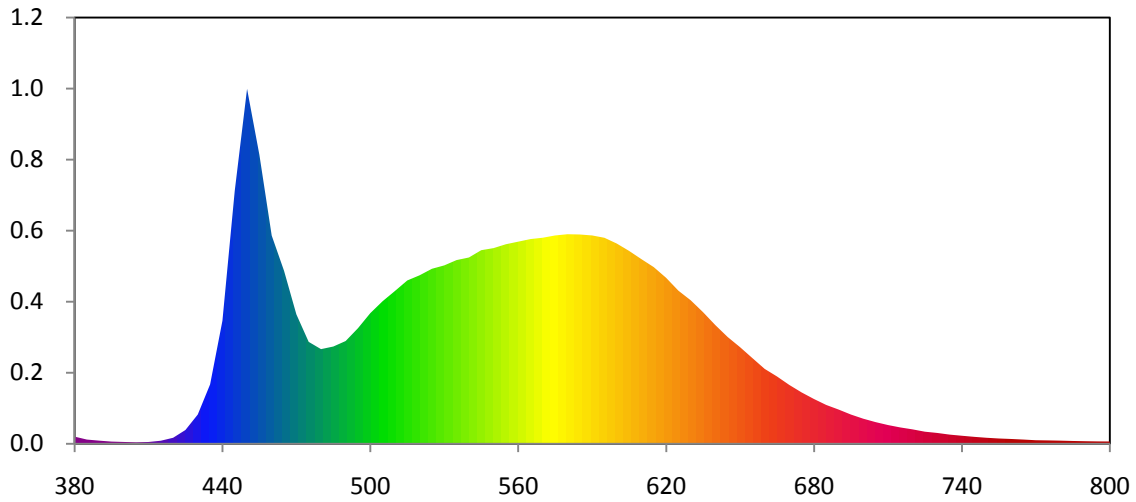
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3445	0.3580	0.2086	0.3251	0.2086	0.4877

Color Rendering Index

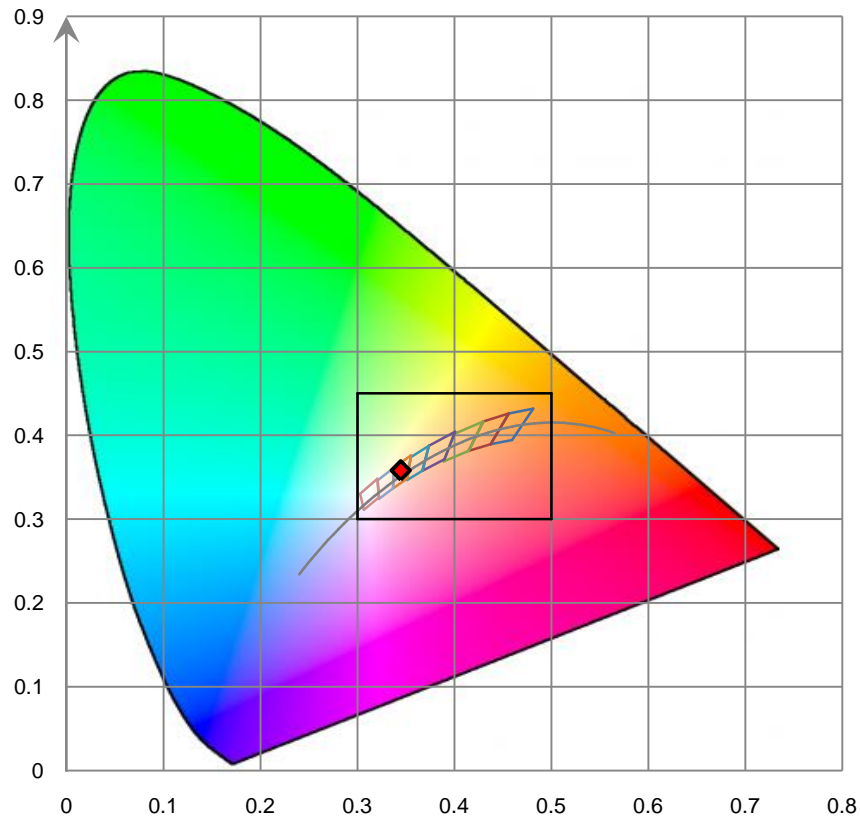
Ra			
82.8			
R1 81	R2 89	R3 94	R4 82
R5 81	R6 84	R7 87	R8 66
R9 5	R10 73	R11 80	R12 60
R13 84	R14 97	R15 75	

Relative Spectral Power Distribution

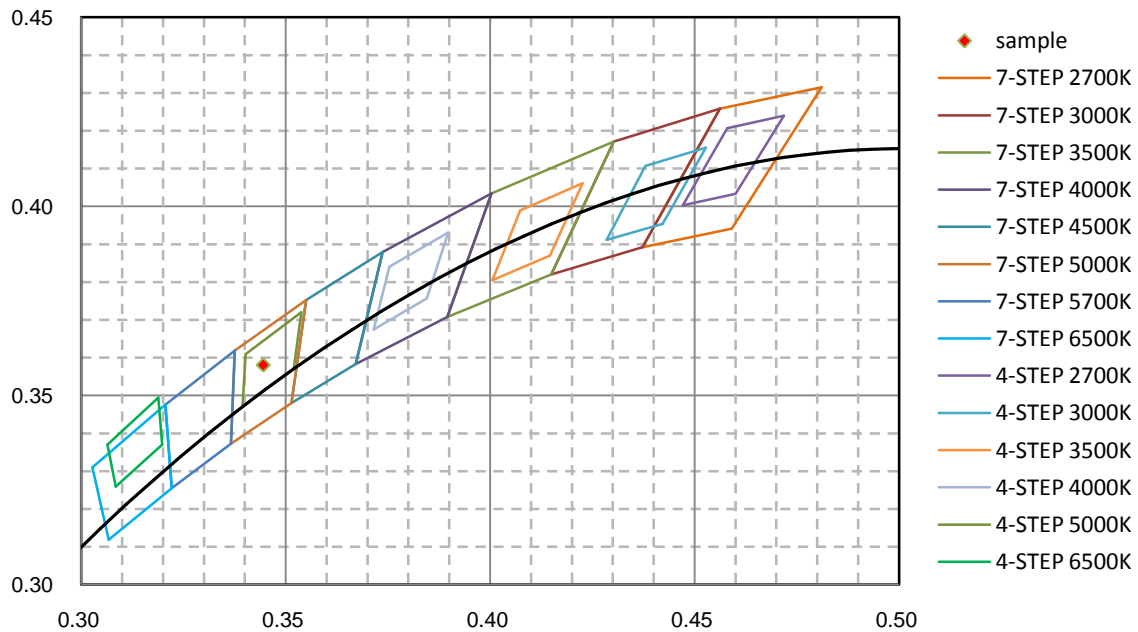


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.069E-03	465	1.212E-01	550	1.371E-01	635	9.222E-02	720	1.014E-02
385	3.021E-03	470	9.069E-02	555	1.398E-01	640	8.314E-02	725	8.518E-03
390	2.253E-03	475	7.142E-02	560	1.416E-01	645	7.481E-02	730	7.644E-03
395	1.598E-03	480	6.634E-02	565	1.434E-01	650	6.774E-02	735	6.495E-03
400	1.339E-03	485	6.817E-02	570	1.444E-01	655	6.008E-02	740	5.678E-03
405	1.060E-03	490	7.201E-02	575	1.459E-01	660	5.251E-02	745	4.927E-03
410	1.319E-03	495	8.099E-02	580	1.468E-01	665	4.720E-02	750	4.258E-03
415	2.196E-03	500	9.152E-02	585	1.466E-01	670	4.125E-02	755	3.766E-03
420	4.259E-03	505	9.989E-02	590	1.459E-01	675	3.601E-02	760	3.434E-03
425	9.719E-03	510	1.071E-01	595	1.443E-01	680	3.141E-02	765	3.020E-03
430	2.053E-02	515	1.144E-01	600	1.403E-01	685	2.723E-02	770	2.554E-03
435	4.165E-02	520	1.180E-01	605	1.351E-01	690	2.402E-02	775	2.410E-03
440	8.620E-02	525	1.226E-01	610	1.293E-01	695	2.054E-02	780	2.241E-03
445	1.772E-01	530	1.250E-01	615	1.238E-01	700	1.761E-02	785	2.016E-03
450	2.486E-01	535	1.287E-01	620	1.163E-01	705	1.522E-02	790	1.864E-03
455	2.024E-01	540	1.305E-01	625	1.073E-01	710	1.320E-02	795	1.718E-03
460	1.459E-01	545	1.356E-01	630	1.005E-01	715	1.150E-02	800	1.664E-03

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1 hour**

Test orientation: **Downward**

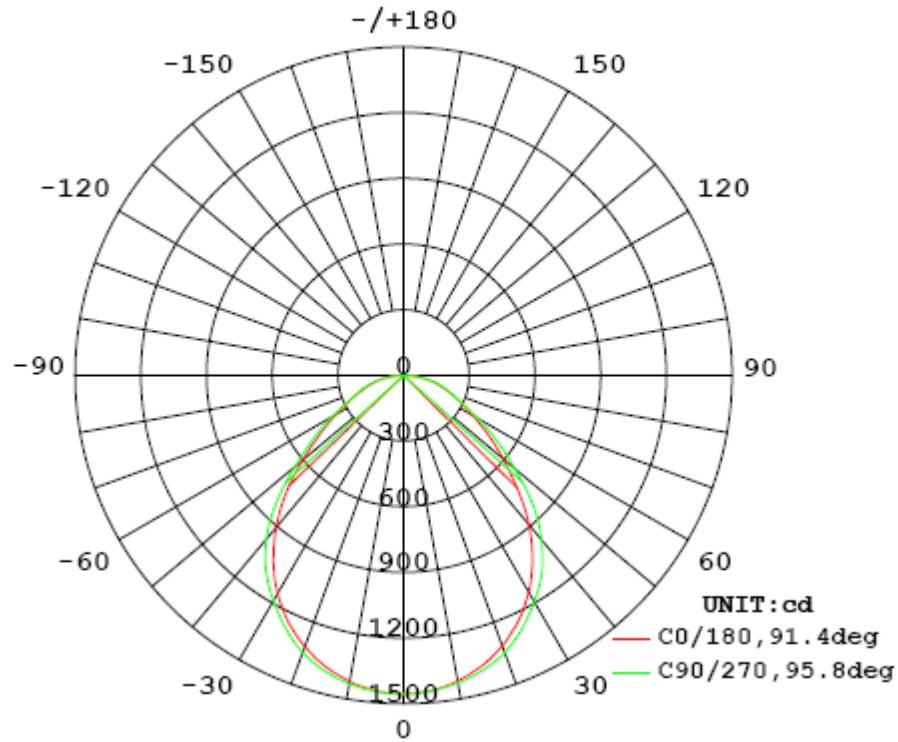
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60.0	0.2747	32.7	0.9918

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
3282	100.37	1454	1.18	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	91.4	93.8	95.8	93.5	93.63
Field Angle (10% I _{max}):	152.4	146.2	154.5	146.4	149.88

Luminous Intensity (cd) Distribution Data

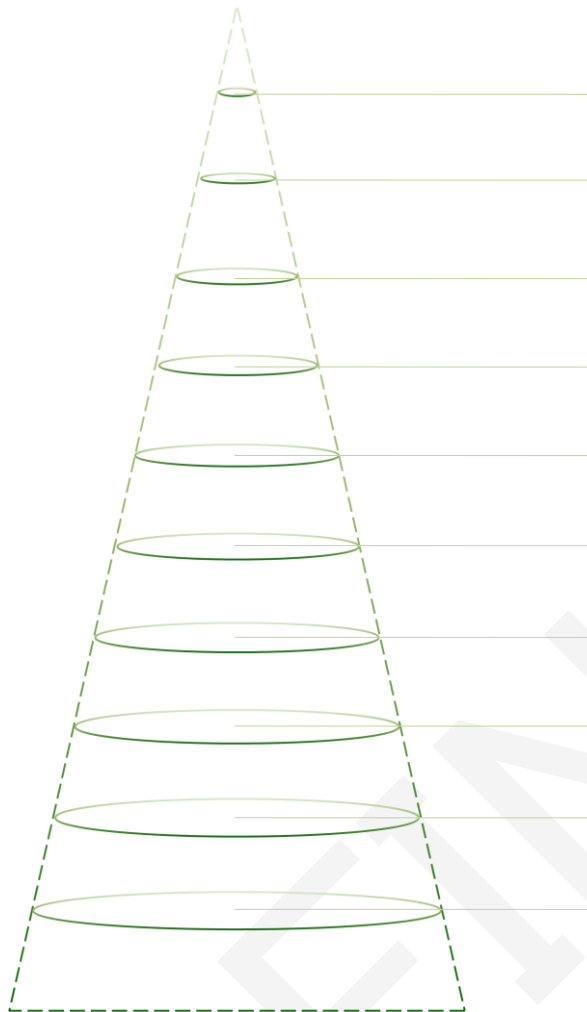
C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1454	1454	1454	1454	1454	1454	1454	1454
5.0°	1445	1447	1450	1449	1450	1448	1448	1447
10.0°	1420	1423	1427	1430	1430	1428	1424	1422
15.0°	1378	1383	1391	1398	1398	1394	1387	1380
20.0°	1319	1325	1337	1347	1348	1346	1336	1321
25.0°	1246	1251	1262	1272	1275	1274	1265	1249
30.0°	1153	1154	1170	1183	1189	1183	1168	1154
35.0°	1038	1040	1064	1088	1096	1074	1051	1036
40.0°	907	912	938	968	976	942	911	899
45.0°	761	763	788	809	823	801	772	753
50.0°	602	612	632	632	650	643	635	615
55.0°	467	469	480	482	504	497	490	476
60.0°	357	338	340	354	379	375	362	356
65.0°	269	242	229	263	279	283	259	268
70.0°	204	181	162	206	218	215	185	204
75.0°	153	137	127	157	168	160	138	153
80.0°	108	95	94	103	105	101	99	103
85.0°	53	46	34	33	31	33	38	52
90.0°	0	0	0	0	0	0	0	0
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	0	0	0	0	0
110.0°	0	1	0	0	0	0	1	1
115.0°	0	1	0	0	0	0	1	1
120.0°	0	1	1	0	0	1	1	0
125.0°	0	0	1	1	1	1	1	0
130.0°	0	0	1	1	1	1	1	0
135.0°	0	0	1	1	1	1	1	0
140.0°	0	0	1	1	1	1	1	0
145.0°	0	0	1	1	1	1	1	0
150.0°	0	0	1	1	1	1	1	0
155.0°	0	0	1	1	1	1	1	0
160.0°	0	0	1	1	1	1	1	0
165.0°	1	1	1	1	1	2	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°	1454	1454	1454	1454	1454	1454	1454	1454
5.0°	1445	1444	1448	1446	1447	1447	1448	1446
10.0°	1418	1420	1424	1427	1427	1426	1422	1420
15.0°	1376	1377	1385	1391	1394	1390	1384	1376
20.0°	1315	1319	1331	1343	1348	1339	1329	1319
25.0°	1238	1246	1262	1270	1277	1268	1255	1245
30.0°	1143	1151	1166	1186	1194	1179	1161	1148
35.0°	1024	1026	1050	1079	1101	1083	1049	1028
40.0°	890	895	912	947	980	966	926	901
45.0°	736	752	776	808	834	816	779	753
50.0°	594	615	643	657	662	649	636	605
55.0°	469	474	500	515	518	494	485	466
60.0°	363	352	370	386	387	368	349	340
65.0°	283	265	264	289	286	269	238	245
70.0°	216	201	187	225	224	209	166	183
75.0°	160	149	140	170	176	161	128	139
80.0°	112	103	101	109	113	105	95	97
85.0°	54	51	40	43	42	41	38	47
90.0°	0	0	0	0	0	0	0	0
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	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
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	1	1	1	0
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

Average Area Illumination Figure

Angle: 93.60 °. Flux out: 2203.0 lm.



Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	106.5	2439.0	5828.0
1.0	213.0	609.7	1457.0
1.5	319.5	271.0	647.5
2.0	426.0	152.4	364.2
2.5	532.4	97.6	233.1
3.0	638.9	67.7	161.9
3.5	745.4	49.8	118.9
4.0	851.9	38.1	91.1
4.5	958.4	30.1	72.0
5.0	1064.9	24.4	58.3

Zonal Lumen Density Measurement

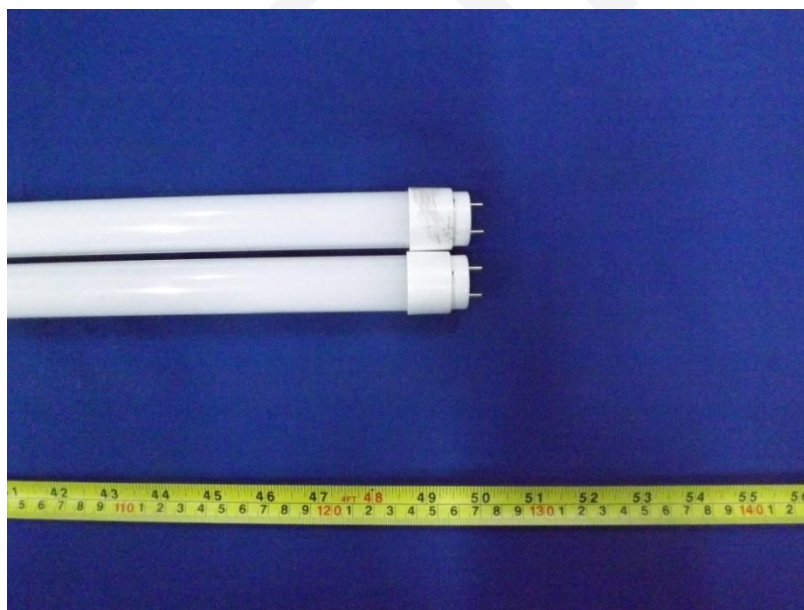
Deg	Flux (lm)	%
0-5	34.7	1.06
5-10	102.7	3.13
10-15	166.7	5.08
15-20	224.1	6.82
20-25	271.9	8.29
25-30	307.2	9.36
30-35	328.0	9.99
35-40	331.7	10.11
40-45	317.0	9.66
45-50	285.1	8.68
50-55	241.9	7.37
55-60	194.8	5.94
60-65	150.6	4.59
65-70	116.3	3.54
70-75	91.2	2.78
75-80	68.2	2.08
80-85	39.7	1.21
85-90	8.6	0.26
90-95	0.0	0.00
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.1	0.00
110-115	0.1	0.01
115-120	0.1	0.00
120-125	0.1	0.01
125-130	0.1	0.00
130-135	0.1	0.01
135-140	0.1	0.00
140-145	0.1	0.00
145-150	0.1	0.01
150-155	0.1	0.00
155-160	0.1	0.00
160-165	0.1	0.00
165-170	0.1	0.01
170-175	0.1	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	34.7	1.06
0-10	137.4	4.19
0-15	304.1	9.27
0-20	528.2	16.09
0-25	800.1	24.38
0-30	1107.3	33.74
0-35	1435.3	43.73
0-40	1767.0	53.84
0-45	2084.0	63.50
0-50	2369.1	72.18
0-55	2611.0	79.55
0-60	2805.8	85.49
0-65	2956.4	90.08
0-70	3072.7	93.62
0-75	3163.9	96.40
0-80	3232.1	98.48
0-85	3271.8	99.69
0-90	3280.4	99.95
0-95	3280.4	99.95
0-100	3280.4	99.95
0-105	3280.5	99.95
0-110	3280.5	99.95
0-115	3280.6	99.96
0-120	3280.8	99.96
0-125	3280.9	99.97
0-130	3281.1	99.97
0-135	3281.2	99.98
0-140	3281.3	99.98
0-145	3281.4	99.98
0-150	3281.5	99.99
0-155	3281.6	99.99
0-160	3281.7	99.99
0-165	3281.8	99.99
0-170	3281.9	100.00
0-175	3282.0	100.00
0-180	3282.0	100.00

[Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	277	60	0.900
Total Harmonic Distortion:	277	60	8.4%
Total Harmonic Distortion:	120	60	3.7%
Off State Power (W):	120	60	0.0

6. Product Photo



Auxiliary Equipment (Recessed Troffer)



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