Photometric Test Report

Relevant Standards

☑IES LM-79-2008

☑ANSI C82.77:2017

Prepared For

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Test Date

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2021/7/27

Prepared By	**Approved By**
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1.0 Test Summary

DLC Technical Requirements v5.0

T8 Four-Foot Linear Replacement Lamps 2-lamp External Driver Lamp-Style Retrofit Kits (UL Type C)				
Requirement Category	**Test Method**	**Requirements**		**Test value**
Luminaire Output (lm)	IES LM-79-2008	2000		1861
Luminaire Efficacy (lm/W)	IES LM-79-2008	120		162.4
Beam Angle	IES LM-79-2008	⩾160		195.5
Total Harmonic Distortion (A%)	ANSI C82.77:2014	20%	120V	9.42%
			277V	12.49%
Power Factor	ANSI C82.77:2014	0.9	120V	0.993
			277V	0.954
Lamp light output (lm)	IES LM-79-2008 CIE 13.3-1995	1600		1847
				1934
Lamp Efficacy (lm/W)	IES LM-79-2008 CIE 13.3-1995	120		161.13
				169.06
Allowable CCTs* (K)	IES LM-79-2008	7 step	3045±175	2993
		7 step	5029±355	4859
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	⩾70		82
				82
Minimum R9	IES LM-79-2008 CIE 13.3-1995	⩾0		2
				7
Minimum Rf	ANSI/IES TM-30-18	⩾70		84
				82
Minimum Rg	ANSI/IES TM-30-18	⩾89		97
				97
IES Rcs,h1	ANSI/IES TM-30-18	-12%⩽IES Rcs,h1⩽+23%		-12%
				-12%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/7/14	L48T8/830/15P-XT (2L)	B1
			L48T8/850/15P-XT (2L)	B2
2	Goniophotometer Test	2021/7/14	L48T8/830/15P-XT (2L)	B1
3	THD and PF Test	2021/7/14	L48T8/830/15P-XT (2L)	B1

Remark(If any)
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2、The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

3.0 Production Description

Luminaire Description: L48T8/830/15P-XT (2L)

Electrical Specification: 120-277V,60HZ

Fixture：

Photos of Luminaire Characteristics

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 3000K

Model No.	L48T8/830/15P-XT (2L)	Sample ID.	B1
Opreate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C.
The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.
The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.
The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.01	60	0.096	11.5	0.993

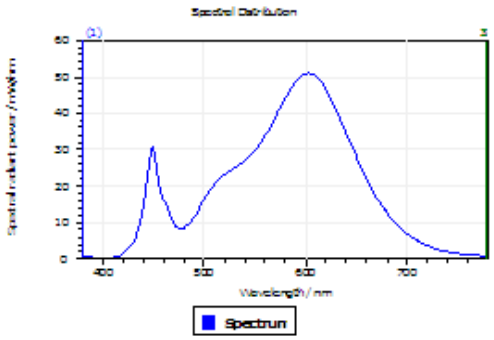
Test Result

CCT (K)	CRI	R9	Duv	THD
2993	82	2	0.0016	9.42%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
84	97	-12%	1847	161.13

4.1 Integrating Sphere Test

Results



Spectral Distribution

Spectral values

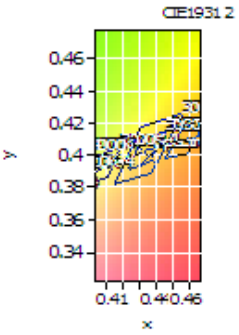
DominantWavelength	583.44 nm
Purity	0.505
PeakWavelength	602.74 nm
Radiant Power	7.395 W
Width50%:	

Color Coordinates

Correlated Color Temperat		2993 K			
x:	0.4351	u:	0.2514	u':	0.2514
y:	0.3995	v:	0.3462	v':	0.5193

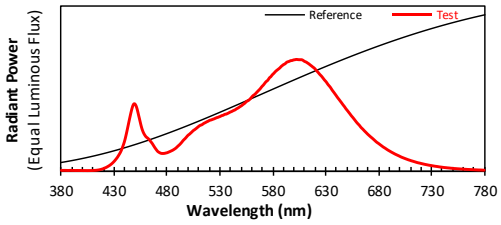
CRI01	80.3	CRI09	2.4
CRI02	90.5	CRI10	79.0
CRI03	96.0	CRI11	80.6
CRI04	80.6	CRI12	72.9
CRI05	81.2	CRI13	82.6
CRI06	89.0	CRI14	98.5
CRI07	81.5	CRI15	72.5
CRI08	56.8	CRI16	70.0

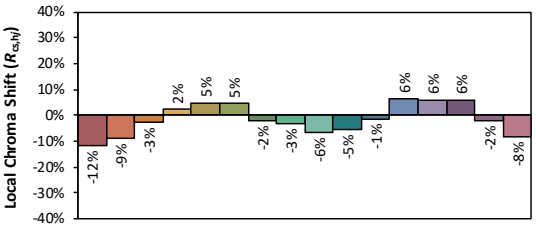
ResultsCRI 82.0

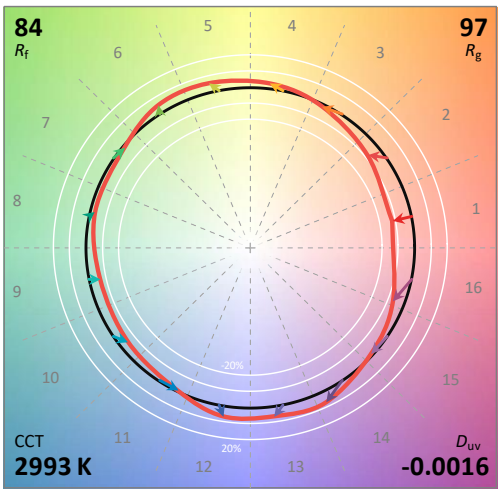


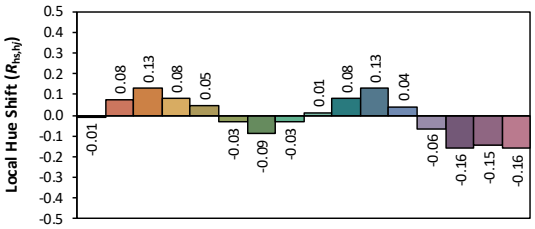
PlanckDistance 1.6E-003

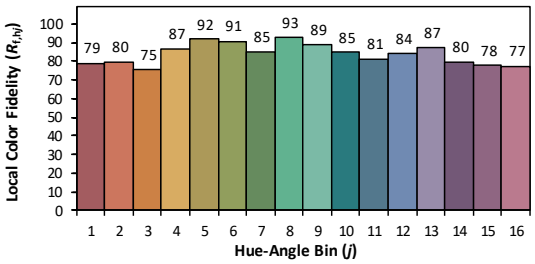
4.1 Integrating Sphere Test

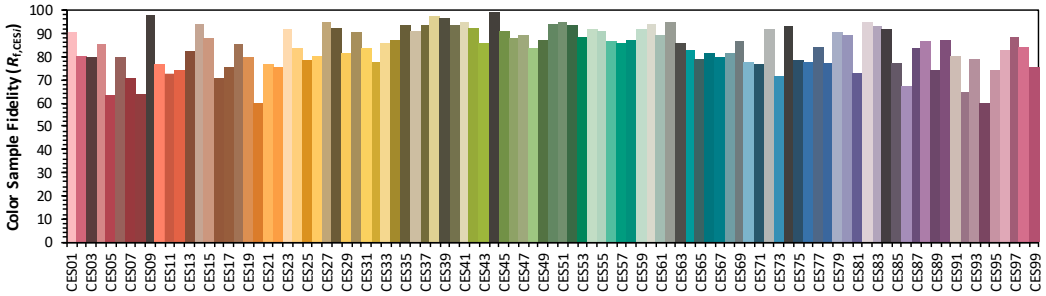












Notes: This is a recommended method for displaying IES TM-30-18 information.

x	0.4351
y	0.3995
u'	0.2514
v'	0.5193

CIE 13.3-1995 (CRI)

R_a	82
R_9	6

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 5000K

Model No.	L48T8/850/15P-XT (2L)	Sample ID.	B2
Opreate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C.
The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.
The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.
The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.00	60	0.096	11.4	0.993

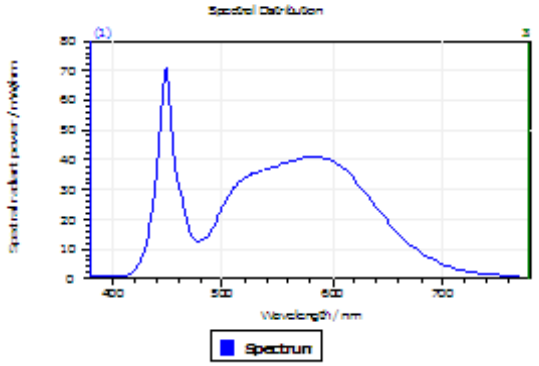
Test Result

CCT (K)	CRI	R9	Duv	THD
4859	82	7	0.0021	9.48%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
82	97	-12%	1934	169.06

4.1 Integrating Sphere Test

Results



Spectral Distribution

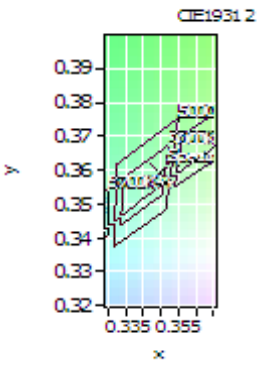
Spectral values

DominantWavelength	572.47 nm
Purity	0.128
PeakWavelength	448.77 nm
Radiant Power	7.968 W
Width50%:	

Color Coordinates

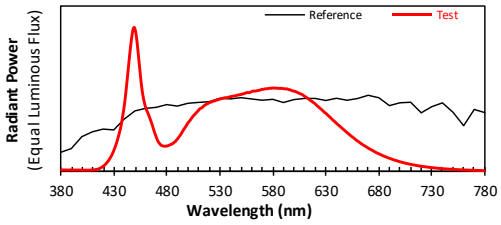
Correlated Color Temperat		4859 K			
x:	0.3497	u:	0.2115	u':	0.2115
y:	0.3595	v:	0.3261	v':	0.4892

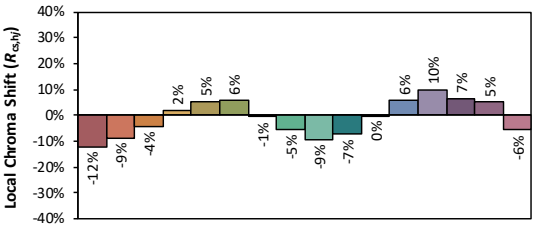
CRI01	80.0	CRI09	6.9
CRI02	85.4	CRI10	65.6
CRI03	89.6	CRI11	82.0
CRI04	82.9	CRI12	55.6
CRI05	80.6	CRI13	81.0
CRI06	80.2	CRI14	94.4
CRI07	87.7	CRI15	74.2
CRI08	68.1	CRI16	73.2
ResultsCRI	81.8		

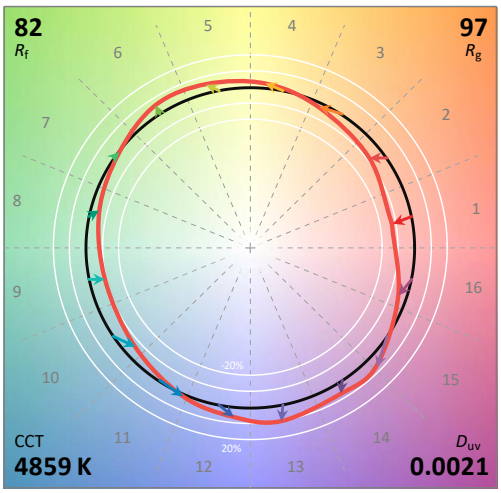


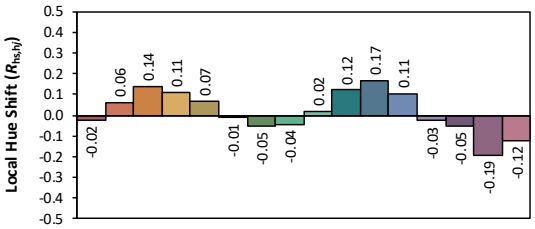
PlanckDistance 2.1E-003

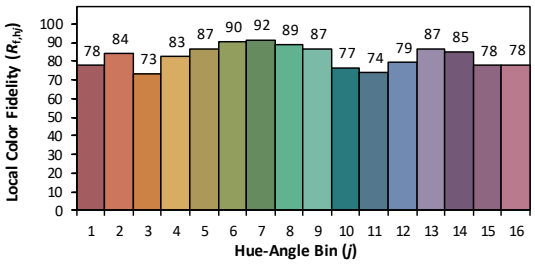
4.1 Integrating Sphere Test

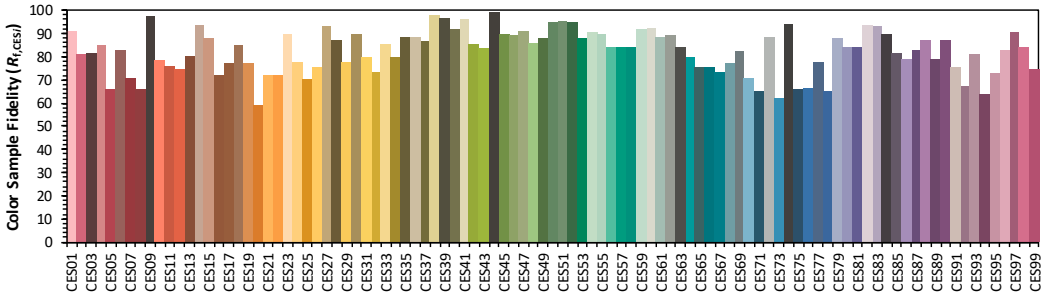












Notes: This is a recommended method for displaying IES TM-30-18 information.

x	0.3497
y	0.3595
u'	0.2115
v'	0.4892

CIE 13.3-1995 (CRI)

R_a	82
R_9	12

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test - 3000K

Model No.	L48T8/830/15P-XT (2L)	Sample ID.	B1
Opreate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using a type C goniophotometer and software.
The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample.
The voltage of an AC power supply (RMS voltage)or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.
The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5^{o} vertical intervals and 10^{o} horizontal intervals. Test with ballast: QHE 2x32T8/UNV ISN-SC

Test Conditions

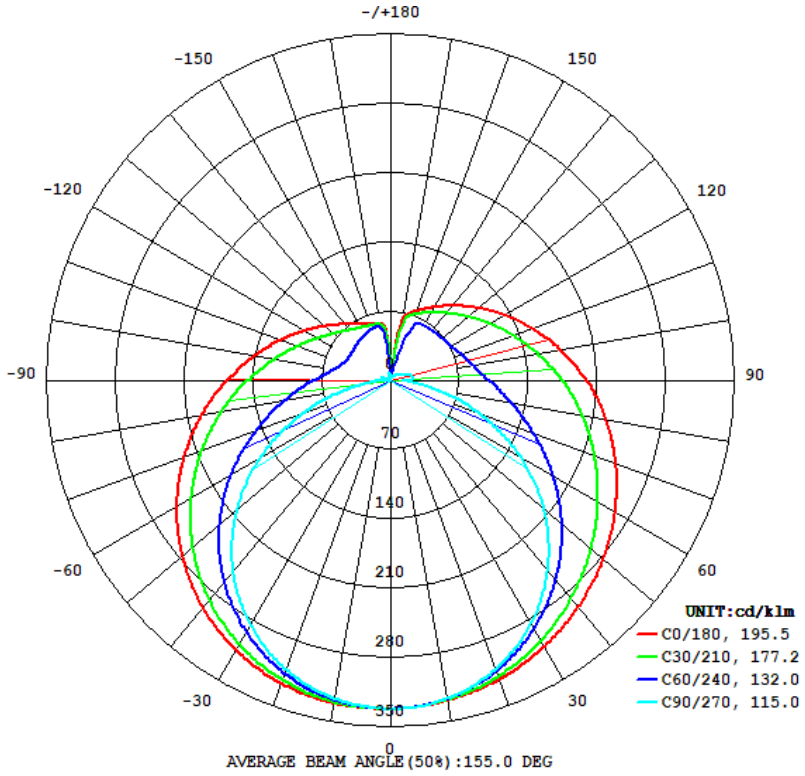
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	120.03	60	0.096	11.5	0.993

Test Result

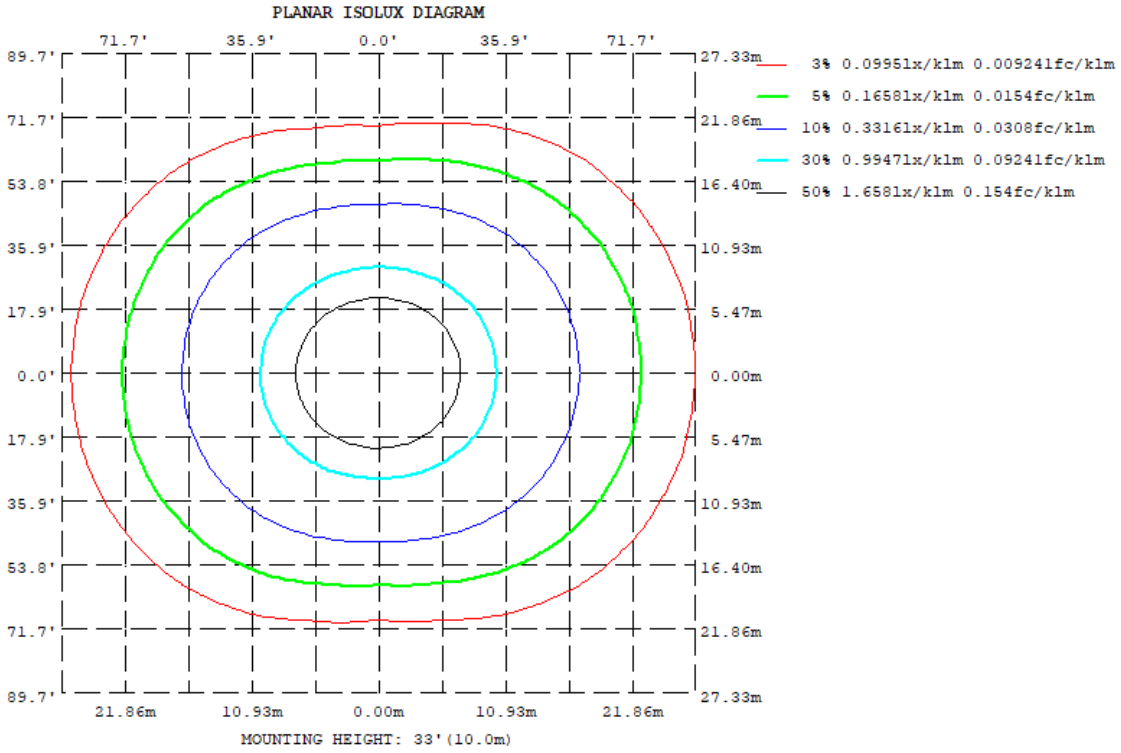
Flux (lm)	Luminous Efficacy (lm/W)	Beam Angle
1861	162.4	195.5

4.2 Goniophotometer Test

Zonal Lumen Summary



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	328.2	326.9	326.3	329.1	331.0	329.0	326.5	327.2
20	321.3	315.4	310.7	319.3	325.7	318.9	311.1	316.4
30	310.9	297.6	285.0	302.2	314.7	301.2	285.5	299.5
40	297.7	274.9	249.4	278.8	298.3	276.9	249.7	277.8
50	281.9	248.7	204.6	250.4	276.8	247.1	204.9	252.7
60	264.0	220.7	152.0	218.5	251.2	213.9	152.3	225.9
70	244.1	192.9	94.60	185.7	223.5	180.0	94.06	199.1
80	222.7	167.3	40.27	154.5	195.0	147.5	37.99	173.5
90	199.9	144.8	13.58	126.8	167.6	119.6	4.469	150.6
100	176.8	125.6	23.82	104.2	142.7	97.41	5.153	130.4
110	154.6	109.6	18.86	86.66	120.8	80.87	10.68	113.7
120	134.0	96.84	13.67	74.18	102.0	69.75	4.750	100.0
130	115.5	86.88	9.892	66.39	86.76	63.09	1.910	89.23
140	99.40	79.18	7.775	61.50	75.04	59.63	0.7326	80.87
150	86.00	73.24	6.327	59.24	66.60	58.40	0.4891	73.77
160	75.23	67.88	4.284	58.61	61.43	58.37	5.388	66.33
170	53.28	4.192	2.169	55.42	58.46	57.39	5.224	2.333
180	0.3161	0.4875	0.5734	0.1722	0.8864	0.8853	0.6219	0.5885
DEG	LUMINOUS INTENSITY:cd/klm							

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	L48T8/830/15P-XT (2L)	Sample ID.	B1
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the ANSI C82.77:2002. The total harmonic distortion shall be measured to the 40th order. The ambient temperature condition was maintained at 25º C ± 1º C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results					
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.01	60	0.096	11.5	0.993	9.42%
277.02	60	0.043	11.4	0.954	12.49%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2020/12/26	2021/12/25
DLF108	Auxiliary Lamp	2020/12/26	2021/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF116	AC Power Source	2020/12/26	2021/12/25
DLF113	Power Meter	2020/12/26	2021/12/25
DLF112	Temperature Recorder	2020/12/26	2021/12/25
DLF114	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF101	Goniophotometer	2020/12/26	2021/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF104	AC Power Source	2020/12/26	2021/12/25
DLF507	DC Power Source	2020/12/26	2021/12/25
DLF102	Power Meter	2020/12/26	2021/12/25
DLF111	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF119	Power Meter	2020/12/26	2021/12/25
DLF031	Temperature data logger	2020/12/26	2021/12/25
DLF022	Digital power meter	2020/12/26	2021/12/25
DLF003	Temperature & Humidity Datalogger	2020/12/26	2021/12/25

********** End of Test Report**********