

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2014

Prepared For

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2019/1/8

Prepared By



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Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v4.4

Indoor - Troffer/1x4 Luminaires for Ambient Lighting of Interior Commercial Spaces			
Luminaire Description:		EZPANFA1x4 / 25W / 3500K	
Input Control Signal Applied:		0%	
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 1500	3032
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	76.77%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	115.3
Allowable CCTs* (K)	IES LM-79-2008	5000	3297
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	79
Power Factor	ANSI C82.77:2014	0.873	0.903
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	10.58%
Power (Input Wattage)	IES LM-79-2008	Wrost Case	26.3
Input Voltage	IES LM-79-2008	Wrost Case	277
Input Current	IES LM-79-2008	Wrost Case	0.106
Luminaire Description:		EZPANFA1x4 / 25W / 4000K	
Input Control Signal Applied:		50%	
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 1500	3059
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	76.40%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	119.5
Allowable CCTs* (K)	IES LM-79-2008	5000	3881
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	81
Power Factor	ANSI C82.77:2014	0.873	0.898
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	10.62%
Power (Input Wattage)	IES LM-79-2008	Wrost Case	25.6
Input Voltage	IES LM-79-2008	Wrost Case	277
Input Current	IES LM-79-2008	Wrost Case	0.104

Luminaire Description: EZPANFA1x4 / 25W / 5000K			
Input Control Signal Applied: 100%			
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 1500	2960
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	77.10%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	112.6
Allowable CCTs* (K)	IES LM-79-2008	5000	4751
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	81
Power Factor	ANSI C82.77:2014	0.873	0.905
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	10.71%
Power (Input Wattage)	IES LM-79-2008	Worst Case	26.3
Input Voltage	IES LM-79-2008	Worst Case	277
Input Current	IES LM-79-2008	Worst Case	0.106

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2019/1/7	EZPANFA1x4 / 25W / 3500K	A1
2	Goniophotometer Test	2019/1/7	EZPANFA1x4 / 25W / 3500K	A1
3	THD and PF Test	2019/1/7	EZPANFA1x4 / 25W / 3500K	A1
4	Integrating Sphere Test	2019/1/7	EZPANFA1x4 / 25W / 4000K	A1
5	Goniophotometer Test	2019/1/7	EZPANFA1x4 / 25W / 4000K	A1
6	THD and PF Test	2019/1/7	EZPANFA1x4 / 25W / 4000K	A1
7	Integrating Sphere Test	2019/1/7	EZPANFA1x4 / 25W / 5000K	A1
8	Goniophotometer Test	2019/1/7	EZPANFA1x4 / 25W / 5000K	A1
9	THD and PF Test	2019/1/7	EZPANFA1x4 / 25W / 5000K	A1

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: EZPANFA1x4 / 25W / 3500K
EZPANFA1x4 / 25W / 4000K
EZPANFA1x4 / 25W / 5000K

Electrical Specification: 120V-277V,50/60HZ

Photos of Luminaire Characteristics

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	EZPANFA1x4 / 25W / 3500K	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

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 Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
24.7	277.04	60	0.105	26.2	0.903

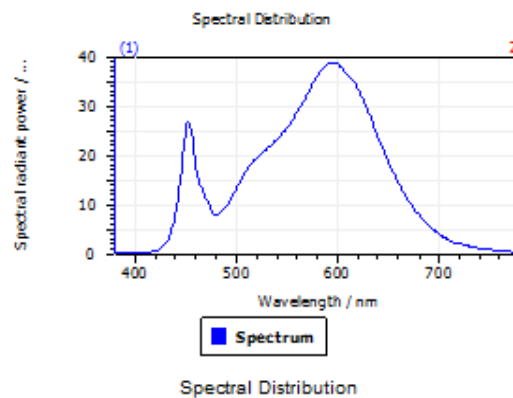
Test Result

CCT (K)	CRI (Ra)	Duv
3297	79	2.0E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

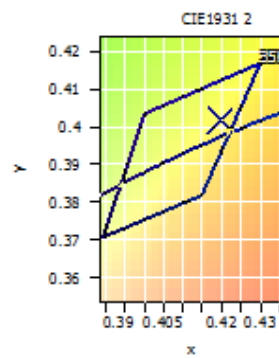


Spectral values

DominantWavelength	580.89 nm
Purity	0.467
PeakWavelength	595.22 nm
Width50%:	129.37 nm

Color Coordinates

Correlated Color Temperature		3297 K	
x: 0.4196	u: 0.2403	u': 0.2403	
y: 0.4021	v: 0.3454	v': 0.5180	
CRI01	76.7	CRI09	-10.1
CRI02	88.3	CRI10	73.5
CRI03	95.9	CRI11	74.6
CRI04	76.2	CRI12	61.0
CRI05	76.6	CRI13	79.4
CRI06	84.8	CRI14	98.2
CRI07	81.7	CRI15	68.3
CRI08	53.9	CRI16	65.6
ResultsCRI	79.3		



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4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA1x4 / 25W / 3500K	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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° vertical intervals and 10° horizontal intervals.

Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.7	276.96	60	0.106	26.3	0.897	Light Down

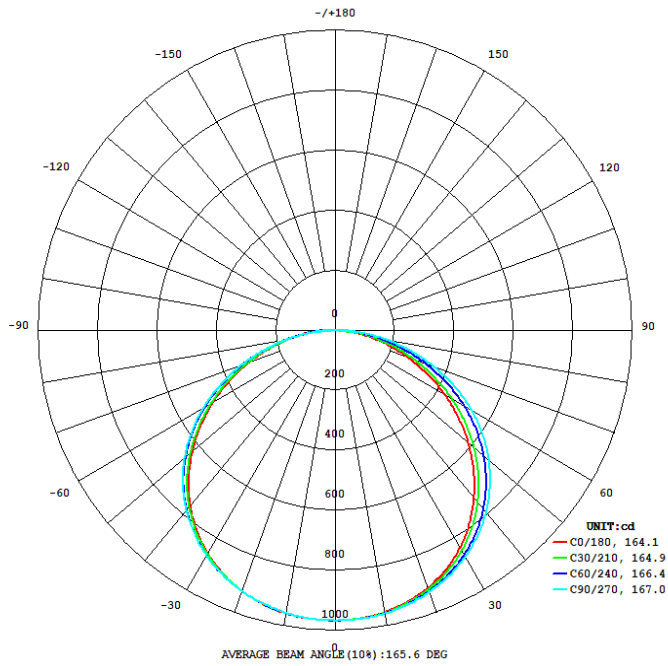
Test Result

Flux(lm)	Zonal Lumen Requirement (0° - 60°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
3032	76.77%	164.1	167.0	115.8	124.4	115.3

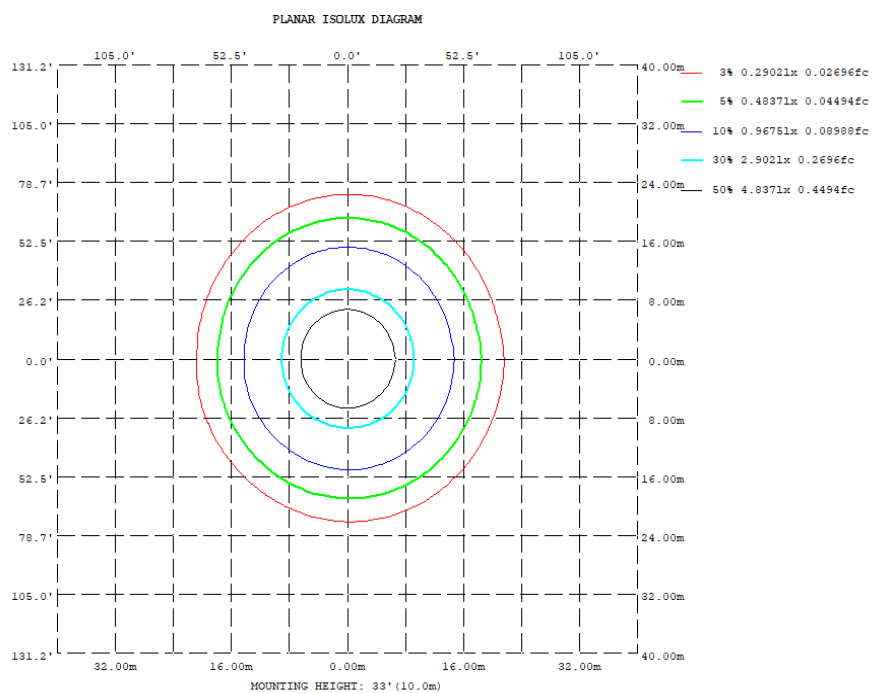
SC:0-180°	SC:90°-270°
1.32	1.34

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	957.9	957.0	956.3	955.6	953.6	956.2	958.3	957.0
20	923.5	923.9	924.0	919.6	913.1	921.6	927.7	923.5
30	859.2	864.3	867.0	854.1	838.9	858.6	873.6	862.3
40	760.4	773.1	781.5	755.3	728.2	762.5	791.1	769.4
50	628.7	648.6	663.5	623.1	585.8	632.7	676.4	643.4
60	473.3	494.8	512.5	463.9	423.6	474.7	528.5	490.0
70	307.9	322.2	334.7	291.2	256.1	300.5	351.7	319.3
80	148.9	150.7	150.0	124.8	102.8	130.4	165.3	150.8
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0
DEG	LUMINOUS INTENSITY:cd							

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	91.82	0 - 10	91.82	3.03%
10-20	266.31	0 - 20	358.13	11.81%
20-30	412.58	0 - 30	770.71	25.42%
30-40	510.79	0 - 40	1281.50	42.26%
40-50	543.67	0 - 50	1825.17	60.19%
50-60	502.82	0 - 60	2327.99	76.77%
60-70	393.33	0 - 70	2721.32	89.74%
70-80	237.05	0 - 80	2958.37	97.56%
80-90	73.95	0 - 90	3032.32	100.00%
90-100	0.00	0 - 100	3032.32	100.00%
100-110	0.00	0 - 110	3032.32	100.00%
110-120	0.00	0 - 120	3032.32	100.00%
120-130	0.00	0 - 130	3032.32	100.00%
130-140	0.00	0 - 140	3032.32	100.00%
140-150	0.00	0 - 150	3032.32	100.00%
150-160	0.00	0 - 160	3032.32	100.00%
160-170	0.00	0 - 170	3032.32	100.00%
170-180	0.00	0 - 180	3032.32	100.00%

4.3 Goniophotometer Test

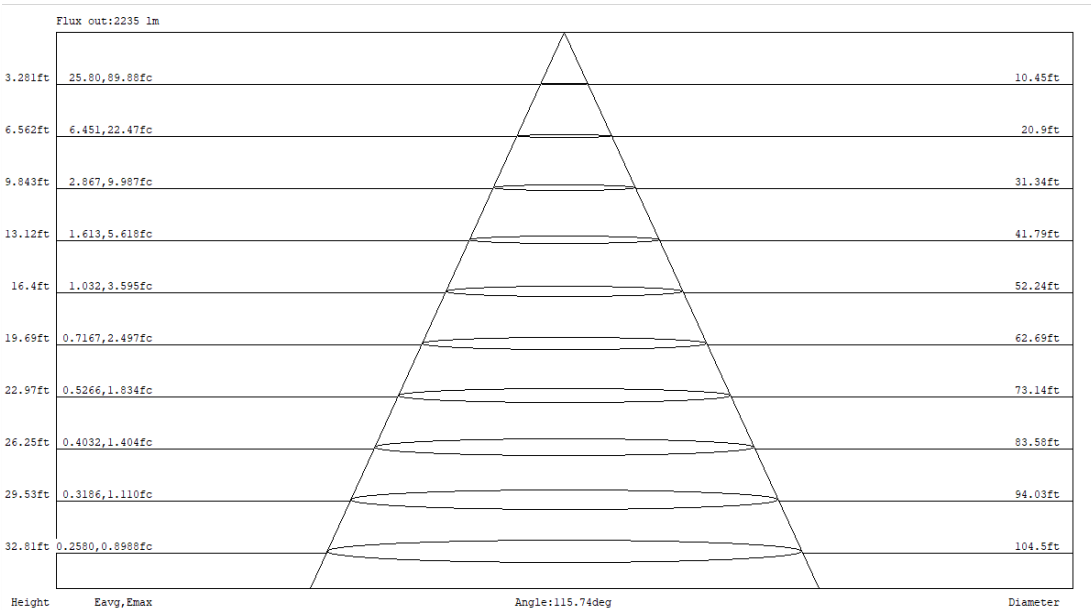
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	99	95	105	101	97	93	97	93	90	93	90	87	89	87	85	83
2	98	89	82	76	95	88	81	75	84	78	74	81	76	72	78	74	70	68
3	89	78	70	63	87	77	69	62	74	67	61	71	65	60	68	63	59	57
4	81	69	60	53	79	68	59	53	65	58	52	63	56	51	61	55	50	48
5	75	61	52	45	73	60	52	45	58	51	45	56	49	44	54	48	44	41
6	69	55	46	39	67	54	46	39	52	45	39	51	44	39	49	43	38	36
7	64	50	41	35	62	49	41	35	48	40	34	46	39	34	45	39	34	32
8	59	46	37	31	58	45	37	31	43	36	31	42	35	30	41	35	30	28
9	55	42	33	28	54	41	33	28	40	33	27	39	32	27	38	32	27	25
10	52	38	30	25	51	38	30	25	37	30	25	36	29	25	35	29	25	23

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	EZPANFA1x4 / 25W / 3500K	Sample ID.	A1
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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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
24.7	277.04	60	0.105	26.2	0.903	10.58%
24.7	120.00	60	0.218	26.0	0.994	4.67%

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	EZPANFA1x4 / 25W / 4000K	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

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 Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
24.4	276.96	60	0.103	25.6	0.898

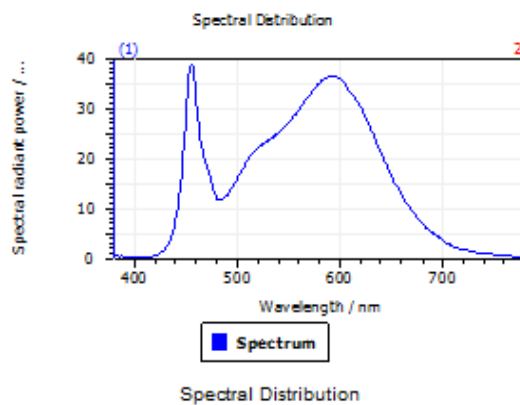
Test Result

CCT (K)	CRI (Ra)	Duv
3881	81	2.1E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

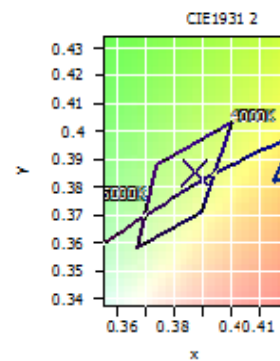


Spectral values

DominantWavelength	578.48 nm
Purity	0.321
PeakWavelength	455.21 nm
Width50%	22.53 nm

Color Coordinates

Correlated Color Temperatu		3881 K
x: 0.3875	u: 0.2262	u': 0.2262
y: 0.3857	v: 0.3377	v': 0.5065
CRI01	79.2	CRI09
CRI02	90.4	CRI10
CRI03	95.5	CRI11
CRI04	77.5	CRI12
CRI05	79.3	CRI13
CRI06	86.8	CRI14
CRI07	82.9	CRI15
CRI08	58.7	CRI16
ResultsCRI	81.3	



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4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA1x4 / 25W / 4000K	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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° vertical intervals and 10° horizontal intervals.

Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.4	277.03	60	0.104	25.6	0.891	Light Down

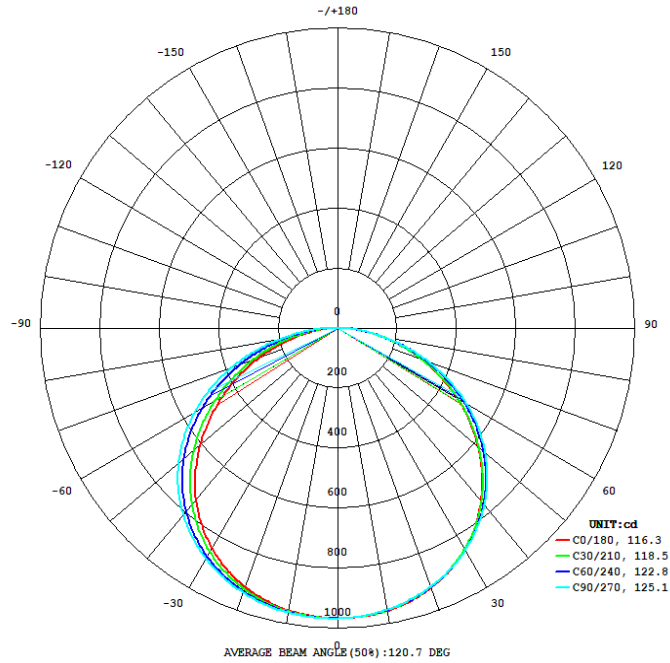
Test Result

Flux(lm)	Zonal Lumen Requirement (0° - 60°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
3059	76.40%	164.7	167.8	116.3	125.1	119.5

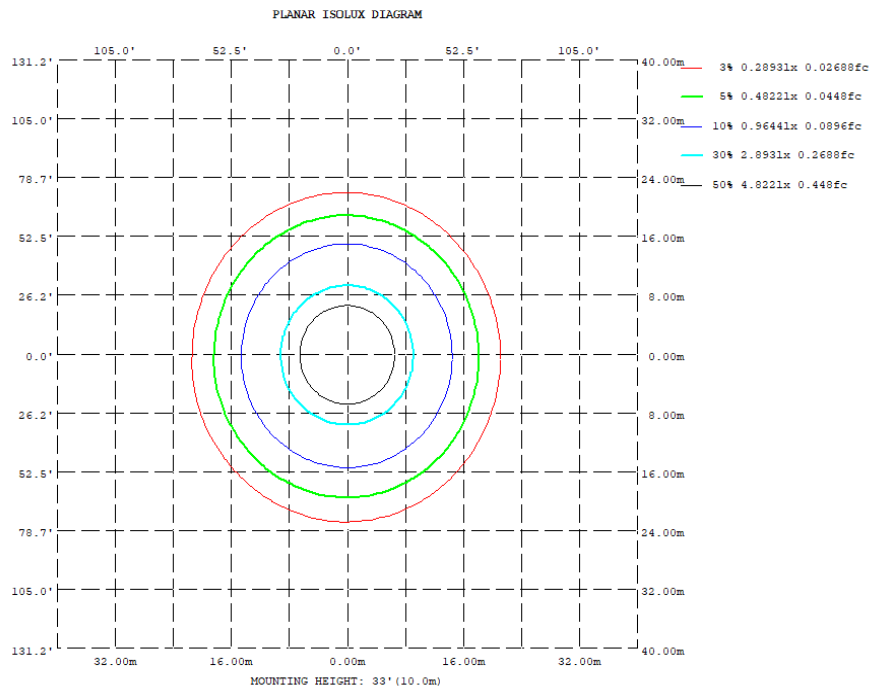
SC: 0° - 180°	SC: 90° - 270°
1.30	1.38

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd							
γ	C0	C45	C90	C135	C180	C225	C270	C315
10	954.6	959.4	962.1	960.5	956.2	953.3	951.9	952.3
20	917.1	928.8	936.4	930.8	919.5	917.0	915.9	913.6
30	847.0	870.7	886.9	874.1	853.0	853.7	856.0	846.8
40	742.9	780.1	809.6	785.4	752.4	758.6	768.3	747.8
50	604.9	654.9	699.7	663.2	618.3	631.2	649.2	616.6
60	445.9	500.1	555.1	511.7	462.4	476.7	498.8	458.8
70	276.4	325.6	380.0	341.7	297.1	306.1	323.1	287.0
80	120.1	151.4	189.9	169.2	139.9	139.0	141.6	119.9
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	91.77	0 - 10	91.77	3.00%
10-20	266.34	0 - 20	358.11	11.71%
20-30	412.98	0 - 30	771.09	25.20%
30-40	512.11	0 - 40	1283.20	41.94%
40-50	546.56	0 - 50	1829.76	59.81%
50-60	507.61	0 - 60	2337.37	76.40%
60-70	399.80	0 - 70	2737.17	89.47%
70-80	243.99	0 - 80	2981.16	97.44%
80-90	78.28	0 - 90	3059.44	100.00%
90-100	0.00	0 - 100	3059.44	100.00%
100-110	0.00	0 - 110	3059.44	100.00%
110-120	0.00	0 - 120	3059.44	100.00%
120-130	0.00	0 - 130	3059.44	100.00%
130-140	0.00	0 - 140	3059.44	100.00%
140-150	0.00	0 - 150	3059.44	100.00%
150-160	0.00	0 - 160	3059.44	100.00%
160-170	0.00	0 - 170	3059.44	100.00%
170-180	0.00	0 - 180	3059.44	100.00%

4.3 Goniophotometer Test

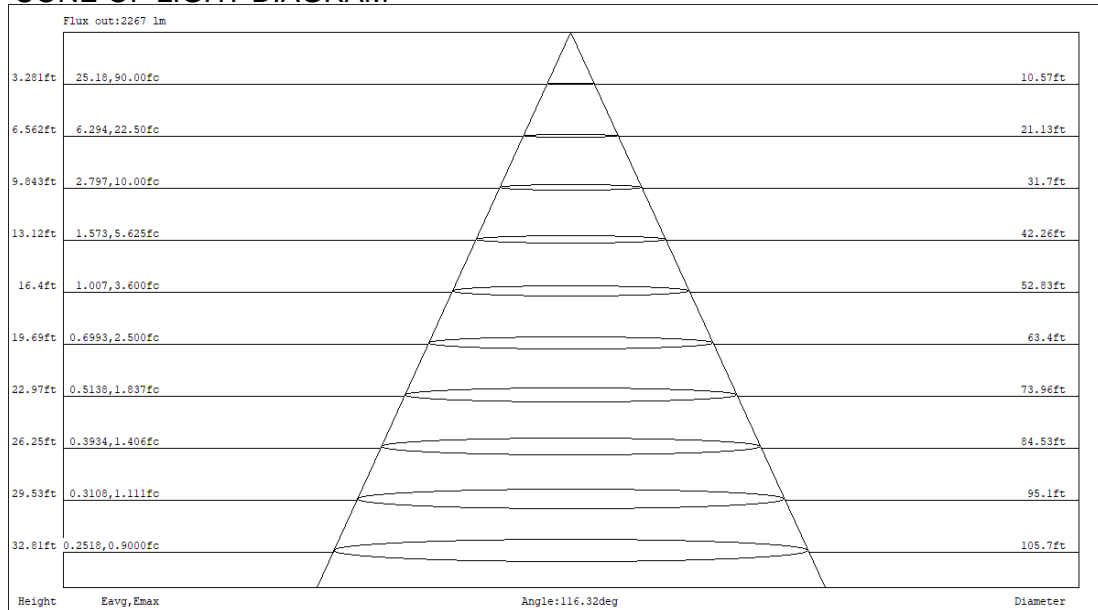
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
Rw	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	99	94	105	101	97	93	96	93	90	93	90	87	89	87	85	82
2	98	89	82	76	95	87	81	75	84	78	73	80	76	72	77	74	70	68
3	89	78	70	63	86	76	69	62	73	67	61	71	65	60	68	63	59	57
4	81	69	60	53	79	67	59	52	65	58	52	63	56	51	60	55	50	48
5	75	61	52	45	72	60	51	45	58	50	44	56	49	44	54	48	43	41
6	69	55	46	39	67	54	45	39	52	44	39	51	44	38	49	43	38	36
7	64	50	41	34	62	49	40	34	47	40	34	46	39	34	45	38	34	32
8	59	45	37	31	58	45	36	31	43	36	30	42	35	30	41	35	30	28
9	55	42	33	27	54	41	33	27	40	32	27	39	32	27	38	31	27	25
10	52	38	30	25	50	38	30	25	37	30	25	36	29	25	35	29	24	23

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	EZPANFA1x4 / 25W / 4000K	Sample ID.	A1
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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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
24.4	276.96	60	0.103	25.6	0.898	10.62%
24.4	120.01	60	0.212	25.3	0.994	4.70%

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	EZPANFA1x4 / 25W / 5000K	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

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 Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
24.3	277.05	60	0.105	26.4	0.905

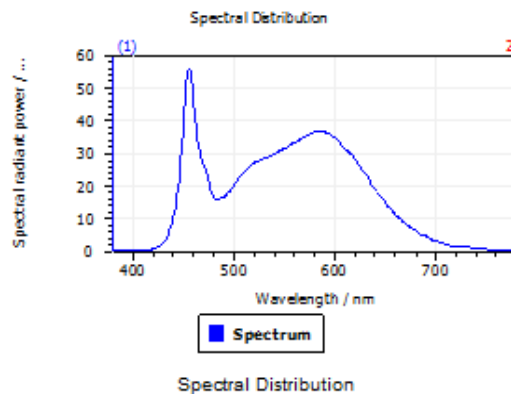
Test Result

CCT (K)	CRI (Ra)	Duv
4751	81	4.9E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

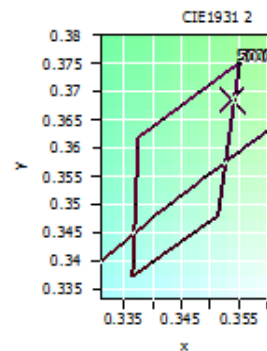


Spectral values

DominantWavelength	571.73 nm
Purity	0.168
PeakWavelength	455.49 nm
Width50%	21.53 nm

Color Coordinates

Correlated Color Temperatu		4751 K	
x: 0.3540	u: 0.2109	u': 0.2109	
y: 0.3685	v: 0.3293	v': 0.4940	
CRI01	78.8	CRI09	-4.2
CRI02	90.2	CRI10	76.0
CRI03	95.3	CRI11	75.0
CRI04	76.1	CRI12	52.3
CRI05	78.3	CRI13	82.3
CRI06	85.1	CRI14	97.8
CRI07	84.2	CRI15	71.3
CRI08	61.0	CRI16	66.2
ResultsCRI	81.1		



PlankDistance 4.9E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA1x4 / 25W / 5000K	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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° vertical intervals and 10° horizontal intervals.

Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.3	277.01	60	0.106	26.3	0.897	Light Down

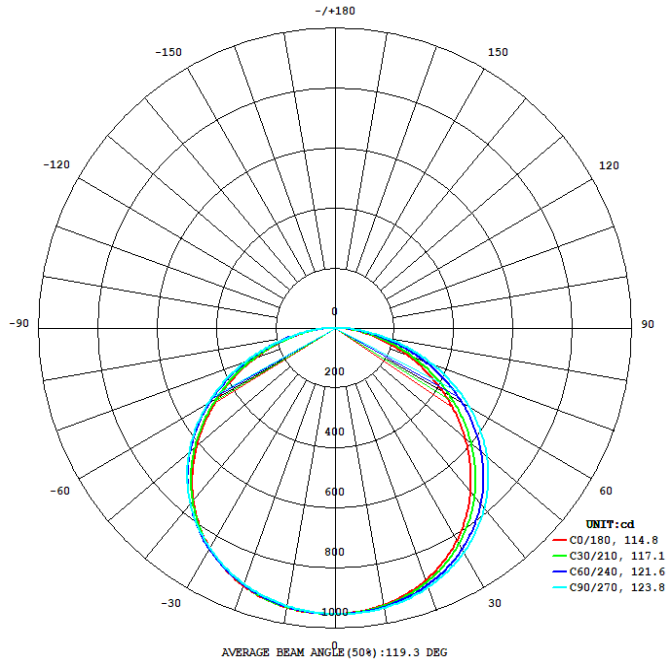
Test Result

Flux(lm)	Zonal Lumen Requirement (0° - 60°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
2960	77.10%	163.3	166.5	114.8	123.8	112.6

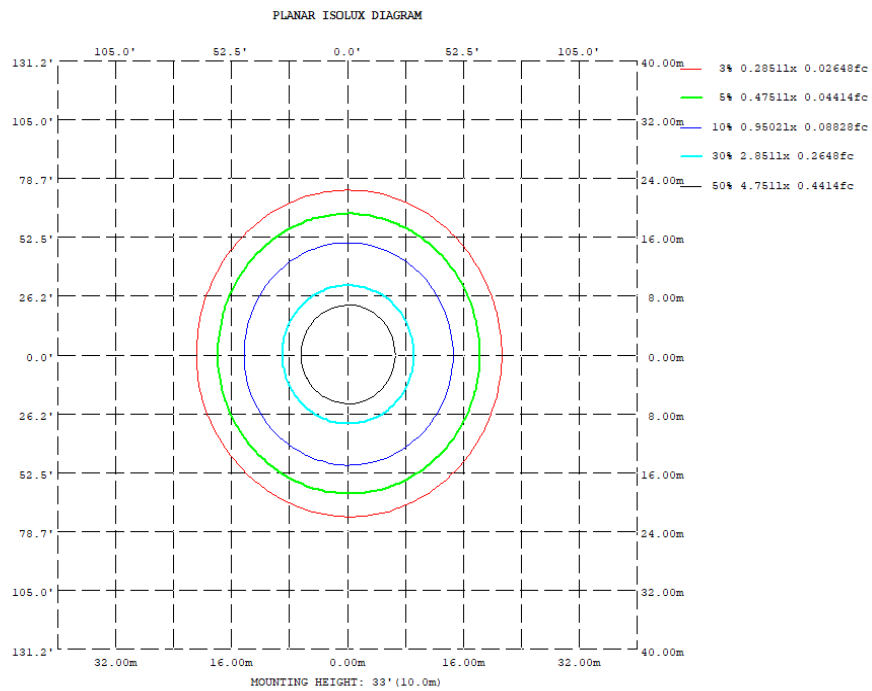
SC: 0° - 180°	SC: 90° - 270°
1.32	1.34

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd							
	C0	C45	C90	C135	C180	C225	C270	C315
7								
10	945.4	943.0	939.8	936.9	935.8	940.7	945.8	947.3
20	912.1	910.0	905.6	896.9	893.1	905.5	917.4	917.3
30	847.0	849.2	847.3	829.0	819.0	842.8	864.8	858.8
40	745.2	756.0	761.2	729.9	710.9	748.6	783.5	766.7
50	610.0	629.2	643.6	599.9	573.3	621.6	669.8	640.0
60	452.1	473.8	494.3	445.0	416.9	467.9	522.1	484.8
70	285.7	302.1	319.5	277.7	255.3	297.7	346.0	312.2
80	129.5	134.7	140.6	117.8	106.5	131.2	160.9	143.2
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	90.40	0 - 10	90.40	3.05%
10-20	262.14	0 - 20	352.54	11.91%
20-30	405.69	0 - 30	758.23	25.61%
30-40	501.38	0 - 40	1259.61	42.55%
40-50	532.37	0 - 50	1791.98	60.53%
50-60	490.60	0 - 60	2282.58	77.10%
60-70	381.47	0 - 70	2664.05	89.99%
70-80	227.22	0 - 80	2891.27	97.67%
80-90	69.09	0 - 90	2960.36	100.00%
90-100	0.00	0 - 100	2960.36	100.00%
100-110	0.00	0 - 110	2960.36	100.00%
110-120	0.00	0 - 120	2960.36	100.00%
120-130	0.00	0 - 130	2960.36	100.00%
130-140	0.00	0 - 140	2960.36	100.00%
140-150	0.00	0 - 150	2960.36	100.00%
150-160	0.00	0 - 160	2960.36	100.00%
160-170	0.00	0 - 170	2960.36	100.00%
170-180	0.00	0 - 180	2960.36	100.00%

4.3 Goniophotometer Test

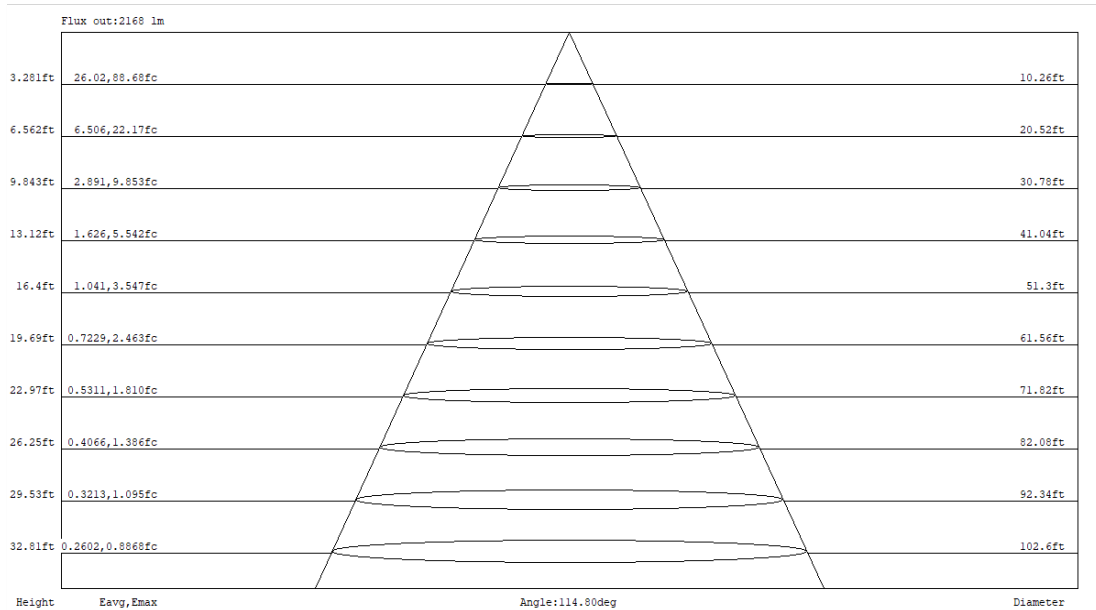
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	99	95	106	101	97	93	97	93	90	93	90	88	89	87	85	83
2	98	90	83	77	96	88	81	76	84	79	74	81	76	72	78	74	71	68
3	89	78	70	63	87	77	69	63	74	67	62	71	65	60	68	64	59	57
4	82	69	60	53	79	68	59	53	65	58	52	63	57	51	61	55	51	48
5	75	62	52	46	73	61	52	45	58	51	45	56	50	44	54	49	44	42
6	69	55	46	40	67	54	46	39	53	45	39	51	44	39	49	43	38	36
7	64	50	41	35	62	49	41	35	48	40	34	46	39	34	45	39	34	32
8	59	46	37	31	58	45	37	31	44	36	31	42	36	31	41	35	30	28
9	55	42	33	28	54	41	33	28	40	33	28	39	32	27	38	32	27	25
10	52	39	31	25	51	38	30	25	37	30	25	36	29	25	35	29	25	23

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	EZPANFA1x4 / 25W / 5000K	Sample ID.	A1
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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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
24.3	277.05	60	0.105	26.4	0.905	10.71%
24.3	119.99	60	0.219	26.1	0.994	4.72%

6.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2018/12/26	2019/12/25
DLF108	Auxiliary Lamp	2018/12/26	2019/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2018/12/26	2019/12/25
DLF116	AC Power Source	2018/12/26	2019/12/25
DLF113	Power Meter	2018/12/26	2019/12/25
DLF112	Temperature Recorder	2018/12/26	2019/12/25
DLF114	Temperature & Humidity Datalogger	2018/12/26	2019/12/25
DLF101	Goniophotometer	2018/12/26	2019/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2018/12/26	2019/12/25
DLF104	AC Power Source	2018/12/26	2019/12/25
DLF507	DC Power Source	2018/12/26	2019/12/25
DLF102	Power Meter	2018/12/26	2019/12/25
DLF111	Temperature & Humidity Datalogger	2018/12/26	2019/12/25
DLF119	Power Meter	2018/12/26	2019/12/25
DLF031	Temperature data logger	2018/12/26	2019/12/25
DLF022	Digital power meter	2018/12/26	2019/12/25
DLF003	Temperature & Humidity Datalogger	2018/12/26	2019/12/25

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