

Photometric Test Report

Relevant Standards

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

Prepared For

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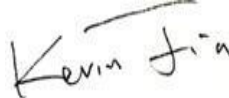
2019/1/9

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v4.4

Indoor - Troffer/2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces			
Luminaire Description:		EZPANFA2x4 / 50W / 3500K	
Input Control Signal Applied:		0%	
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 3000	5365
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	75.97%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	111.3
Allowable CCTs* (K)	IES LM-79-2008	5000	3372
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	79
Power Factor	ANSI C82.77:2014	0.873	0.954
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	10.13%
Power (Input Wattage)	IES LM-79-2008	Wrost Case	48.2
Input Voltage	IES LM-79-2008	Wrost Case	277
Input Current	IES LM-79-2008	Wrost Case	0.183
Luminaire Description:		EZPANFA2x4 / 50W / 4000K	
Input Control Signal Applied:		50%	
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 3000	5630
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	75.30%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	122.0
Allowable CCTs* (K)	IES LM-79-2008	5000	4033
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	81
Power Factor	ANSI C82.77:2014	0.873	0.956
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	9.85%
Power (Input Wattage)	IES LM-79-2008	Wrost Case	46.1
Input Voltage	IES LM-79-2008	Wrost Case	277
Input Current	IES LM-79-2008	Wrost Case	0.175

Luminaire Description: EZPANFA2x4 / 50W / 5000K			
Input Control Signal Applied: 100%			
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 3000	5311
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	75.29%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	110.4
Allowable CCTs* (K)	IES LM-79-2008	5000	4812
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	81
Power Factor	ANSI C82.77:2014	0.873	0.957
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	10.00%
Power (Input Wattage)	IES LM-79-2008	Worst Case	48.1
Input Voltage	IES LM-79-2008	Worst Case	277
Input Current	IES LM-79-2008	Worst Case	0.182

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2019/1/8	EZPANFA2x4 / 50W / 3500K	C1
2	Goniophotometer Test	2019/1/8	EZPANFA2x4 / 50W / 3500K	C1
3	THD and PF Test	2019/1/8	EZPANFA2x4 / 50W / 3500K	C1
4	Integrating Sphere Test	2019/1/8	EZPANFA2x4 / 50W / 4000K	C1
5	Goniophotometer Test	2019/1/8	EZPANFA2x4 / 50W / 4000K	C1
6	THD and PF Test	2019/1/8	EZPANFA2x4 / 50W / 4000K	C1
7	Integrating Sphere Test	2019/1/8	EZPANFA2x4 / 50W / 5000K	C1
8	Goniophotometer Test	2019/1/8	EZPANFA2x4 / 50W / 5000K	C1
9	THD and PF Test	2019/1/8	EZPANFA2x4 / 50W / 5000K	C1

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: EZPANFA2x4 / 50W / 3500K
EZPANFA2x4 / 50W / 4000K
EZPANFA2x4 / 50W / 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.	EZPANFA2x4 / 50W / 3500K	Sample ID.	C1
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
24.5	277.03	60	0.184	48.7	0.954

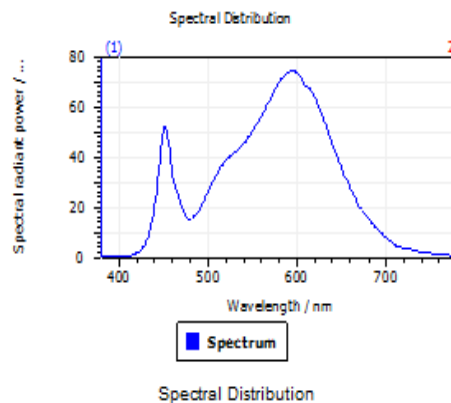
Test Result

CCT (K)	CRI (Ra)	Duv
3372	79	2.0E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

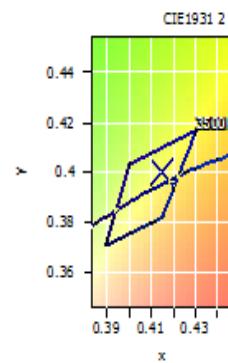


Spectral values

DominantWavelength	580.59 nm
Purity	0.446
PeakWavelength	593.84 nm
Width50%	131.38 nm

Color Coordinates

Correlated Color Temperatu		3372 K	
x: 0.4150	u: 0.2381	u': 0.2381	
y: 0.4000	v: 0.3443	v': 0.5165	
CRI01	76.0	CRI09	-11.8
CRI02	87.8	CRI10	72.2
CRI03	95.8	CRI11	73.9
CRI04	75.7	CRI12	61.2
CRI05	75.9	CRI13	78.8
CRI06	83.7	CRI14	98.1
CRI07	81.6	CRI15	67.4
CRI08	53.5	CRI16	65.2
ResultsCRI	78.7		



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4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA2x4 / 50W / 3500K	Sample ID.	C1
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
24.5	277.01	60	0.183	48.2	0.954	Light Down

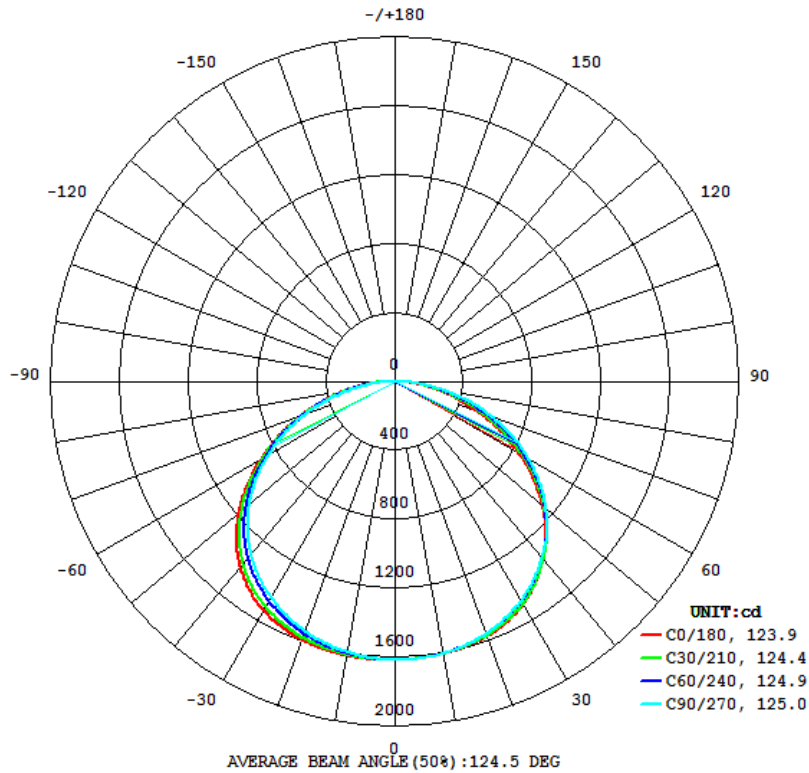
Test Result

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	
5365	75.97%	166.7	167.0	123.9	125.0	111.3

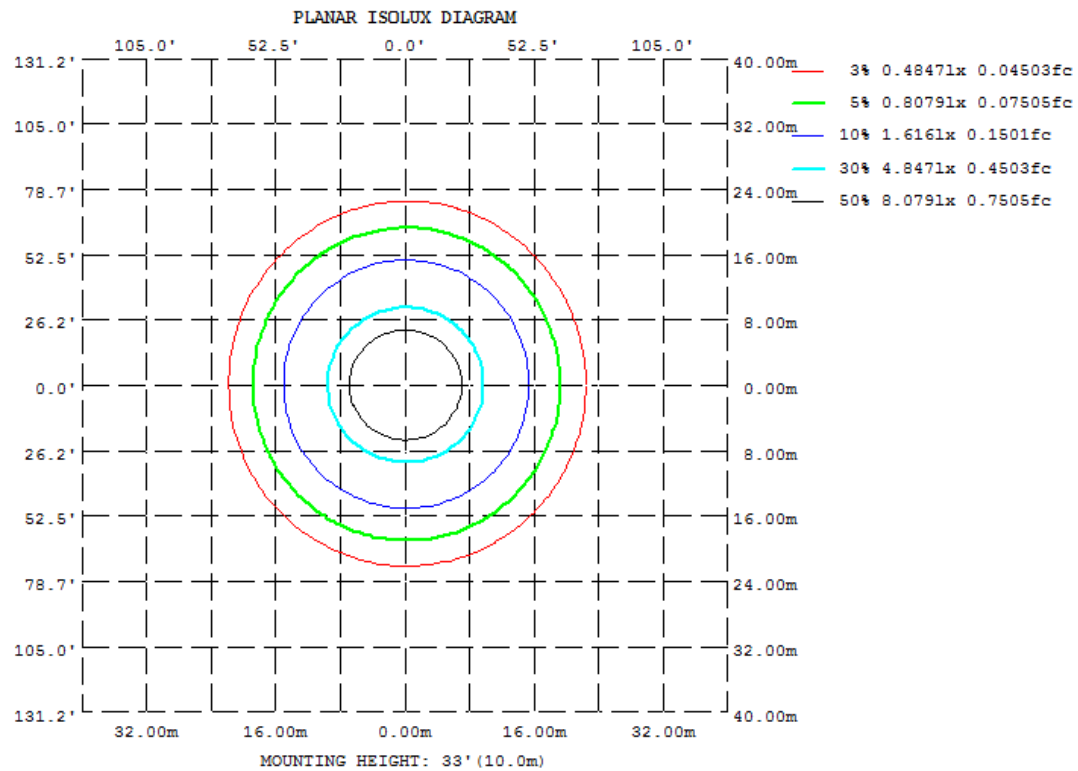
SC: 0° - 180°	SC: 90° - 270°
1.34	1.38

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

°	C0	C45	C90	C135	C180	C225	C270	C315
10	1614	1605	1595	1597	1603	1601	1602	1611
20	1594	1567	1541	1553	1569	1559	1555	1580
30	1532	1489	1446	1468	1492	1478	1467	1510
40	1401	1355	1304	1325	1344	1341	1333	1382
50	1186	1152	1106	1112	1124	1143	1150	1188
60	903.2	884.5	854.8	838.2	836.1	872.2	901.0	915.9
70	588.6	580.1	562.3	534.2	521.0	562.9	602.8	602.3
80	281.4	270.5	249.2	233.0	223.8	253.4	282.4	286.3
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	153.61	0 - 10	153.61	2.86%
10-20	449.14	0 - 20	602.75	11.24%
20-30	706.45	0 - 30	1309.20	24.40%
30-40	891.28	0 - 40	2200.48	41.02%
40-50	967.58	0 - 50	3168.06	59.05%
50-60	907.57	0 - 60	4075.63	75.97%
60-70	716.61	0 - 70	4792.24	89.33%
70-80	436.36	0 - 80	5228.60	97.46%
80-90	136.28	0 - 90	5364.88	100.00%
90-100	0.00	0 - 100	5364.88	100.00%
100-110	0.00	0 - 110	5364.88	100.00%
110-120	0.00	0 - 120	5364.88	100.00%
120-130	0.00	0 - 130	5364.88	100.00%
130-140	0.00	0 - 140	5364.88	100.00%
140-150	0.00	0 - 150	5364.88	100.00%
150-160	0.00	0 - 160	5364.88	100.00%
160-170	0.00	0 - 170	5364.88	100.00%
170-180	0.00	0 - 180	5364.88	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	98	94	105	101	97	93	96	93	90		92	90	87		89	87	84		82
2	98	89	82	76	95	87	81	75	84	78	73		80	76	71		77	73	70		68
3	89	78	69	62	86	76	68	62	73	66	61		70	64	60		68	63	58		56
4	81	68	59	52	79	67	59	52	65	57	51		62	56	50		60	54	50		48
5	74	61	52	45	72	60	51	44	58	50	44		56	49	43		54	48	43		41
6	68	55	45	39	66	54	45	39	52	44	38		50	43	38		48	42	37		35
7	63	49	40	34	62	49	40	34	47	39	34		45	38	33		44	38	33		31
8	59	45	36	30	57	44	36	30	43	35	30		42	35	30		40	34	29		27
9	55	41	33	27	53	40	32	27	39	32	27		38	31	27		37	31	26		25
10	51	38	30	24	50	37	30	24	36	29	24		35	29	24		34	28	24		22

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	EZPANFA2x4 / 50W / 3500K	Sample ID.	C1
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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
24.5	277.03	60	0.184	48.7	0.954	4.43%
24.5	119.98	60	0.405	48.2	0.992	10.13%

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	EZPANFA2x4 / 50W / 4000K	Sample ID.	C1
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
24.5	277.06	60.00	0.175	46.5	0.956

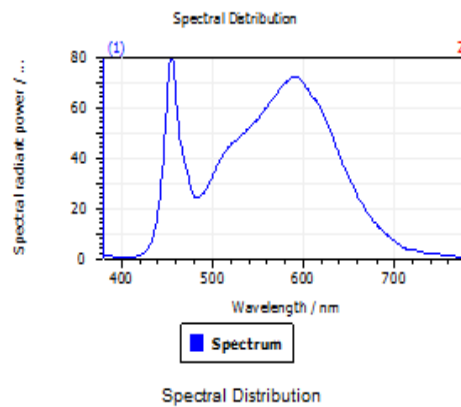
Test Result

CCT (K)	CRI (Ra)	Duv
4033	81	2.4E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

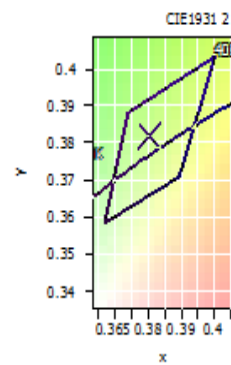


Spectral values

DominantWavelength	577.71 nm
Purity	0.289
PeakWavelength	454.59 nm
Width50%	23.11 nm

Color Coordinates

Correlated Color Temperatu		4033 K
x: 0.3806	u: 0.2232	u': 0.2232
y: 0.3820	v: 0.3359	v': 0.5039
CRI01	78.6	CRI09
CRI02	90.1	CRI10
CRI03	95.0	CRI11
CRI04	76.6	CRI12
CRI05	78.5	CRI13
CRI06	86.0	CRI14
CRI07	82.8	CRI15
CRI08	58.1	CRI16
ResultsCRI	80.7	



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4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA2x4 / 50W / 4000K	Sample ID.	C1
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
24.5	276.95	60	0.175	46.1	0.953	Light Down

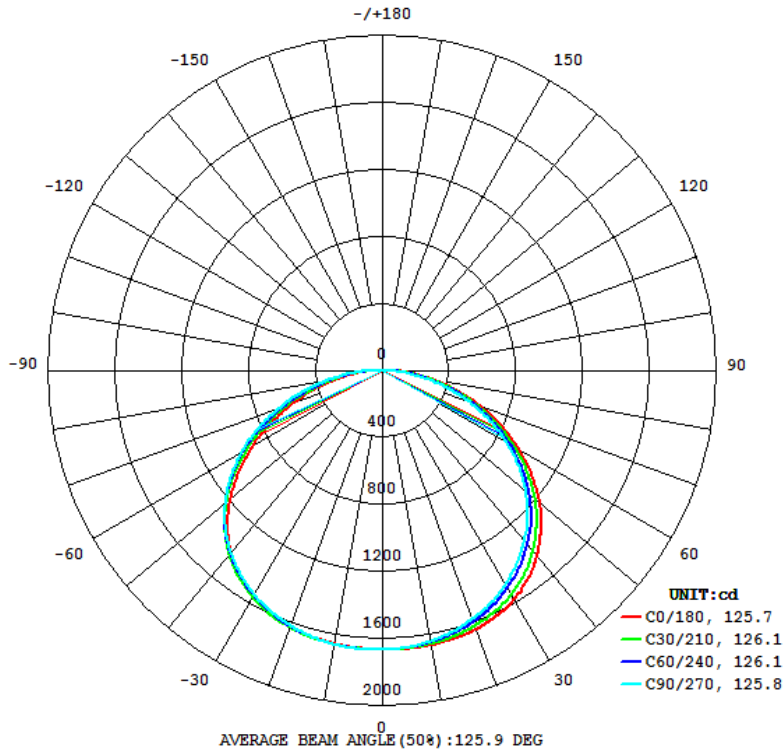
Test Result

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	
5630	75.30%	168.4	167.9	125.7	125.8	122.0

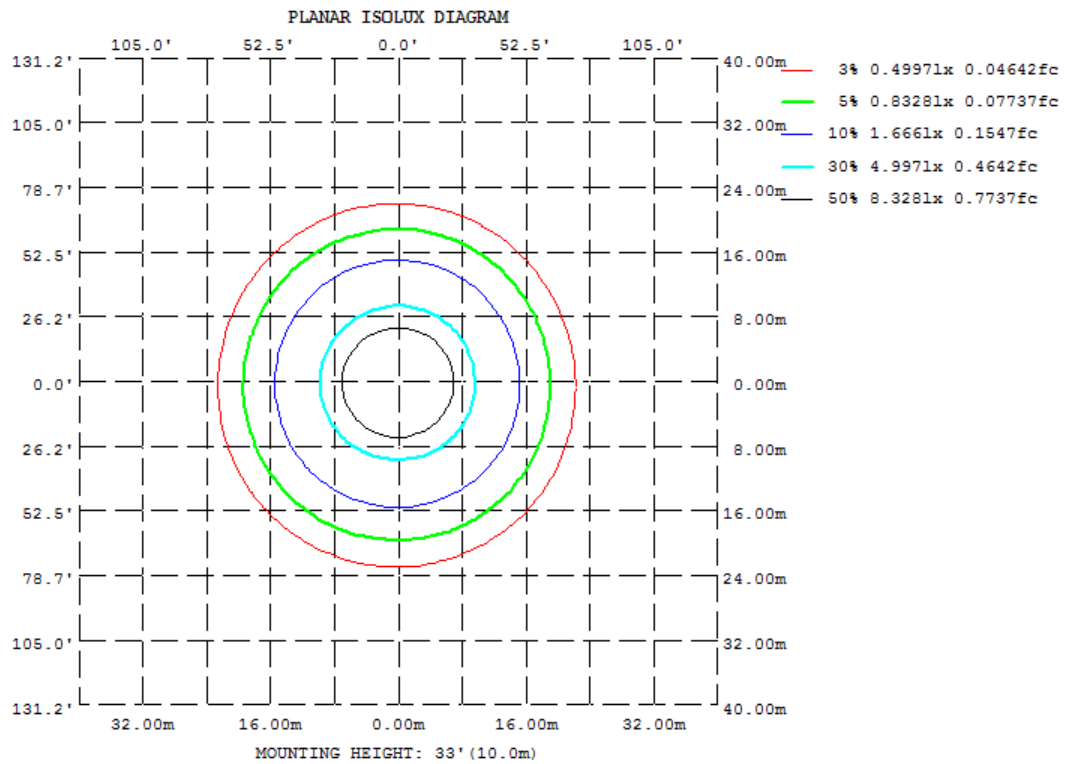
SC:0-180°	SC:90°-270°
1.38	1.42

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	1656	1659	1660	1664	1663	1650	1639	1646
20	1627	1626	1620	1637	1641	1605	1577	1597
30	1556	1555	1541	1573	1576	1521	1475	1508
40	1416	1427	1414	1450	1443	1379	1324	1359
50	1189	1227	1228	1257	1234	1175	1125	1148
60	900.5	957.2	975.5	989.5	946.7	901.2	863.8	867.2
70	577.5	633.7	666.3	671.9	623.3	587.5	559.9	549.0
80	266.5	305.8	333.6	341.8	305.6	272.9	246.3	236.7
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	158.48	0 - 10	158.48	2.82%
10-20	463.73	0 - 20	622.21	11.05%
20-30	730.56	0 - 30	1352.77	24.03%
30-40	924.45	0 - 40	2277.22	40.45%
40-50	1008.57	0 - 50	3285.79	58.37%
50-60	953.64	0 - 60	4239.43	75.30%
60-70	761.16	0 - 70	5000.59	88.83%
70-80	472.98	0 - 80	5473.57	97.23%
80-90	156.14	0 - 90	5629.71	100.00%
90-100	0.00	0 - 100	5629.71	100.00%
100-110	0.00	0 - 110	5629.71	100.00%
110-120	0.00	0 - 120	5629.71	100.00%
120-130	0.00	0 - 130	5629.71	100.00%
130-140	0.00	0 - 140	5629.71	100.00%
140-150	0.00	0 - 150	5629.71	100.00%
150-160	0.00	0 - 160	5629.71	100.00%
160-170	0.00	0 - 170	5629.71	100.00%
170-180	0.00	0 - 180	5629.71	100.00%

4.3 Goniophotometer Test

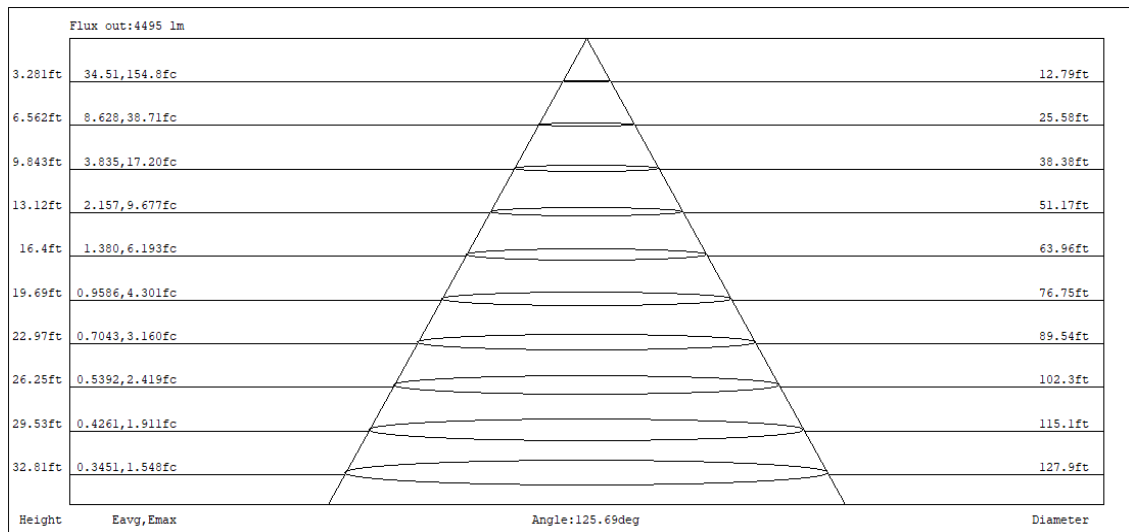
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	98	94	105	100	96	92	96	93	89	92	89	87	89	86	84	82
2	98	89	81	75	95	87	80	74	83	78	73	80	75	71	77	73	69	67
3	88	77	69	62	86	76	68	61	73	66	60	70	64	59	67	62	58	56
4	81	68	59	52	78	67	58	51	64	57	51	62	55	50	60	54	49	47
5	74	61	51	44	72	59	51	44	57	49	43	55	48	43	53	47	42	40
6	68	54	45	38	66	53	45	38	51	44	38	50	43	37	48	42	37	35
7	63	49	40	34	61	48	40	33	47	39	33	45	38	33	44	37	33	31
8	59	45	36	30	57	44	36	30	43	35	29	41	34	29	40	34	29	27
9	55	41	32	27	53	40	32	27	39	32	26	38	31	26	37	31	26	24
10	51	38	29	24	50	37	29	24	36	29	24	35	28	24	34	28	24	22

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	EZPANFA2x4 / 50W / 4000K	Sample ID.	C1
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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
24.5	277.06	60.00	0.175	46.5	0.956	4.92%
24.5	120.04	60.00	0.387	46.1	0.993	9.85%

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	EZPANFA2x4 / 50W / 5000K	Sample ID.	C1
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
24.6	277.02	60	0.182	48.3	0.957

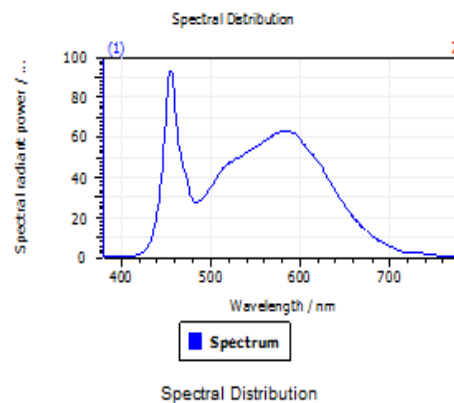
Test Result

CCT (K)	CRI (Ra)	Duv
4812	81	5.1E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

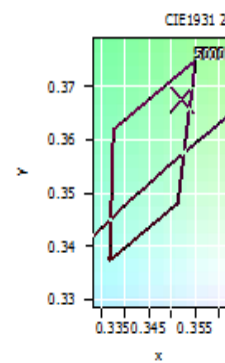


Spectral values

DominantWavelength	570.97 nm
Purity	0.159
PeakWavelength	454.90 nm
Width50%:	23.04 nm

Color Coordinates

Correlated Color Temperatu			4812 K
x: 0.3520	u: 0.2100	u': 0.2100	
y: 0.3675	v: 0.3288	v': 0.4932	
CRI01	77.7	CRI09	
CRI02	89.4	CRI10	
CRI03	94.9	CRI11	
CRI04	75.5	CRI12	
CRI05	77.6	CRI13	
CRI06	84.4	CRI14	
CRI07	84.1	CRI15	
CRI08	60.1	CRI16	
ResultsCRI	80.5		



PlanckDistance 5.1E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA2x4 / 50W / 5000K	Sample ID.	C1
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
24.6	276.96	60	0.182	48.1	0.954	Light Down

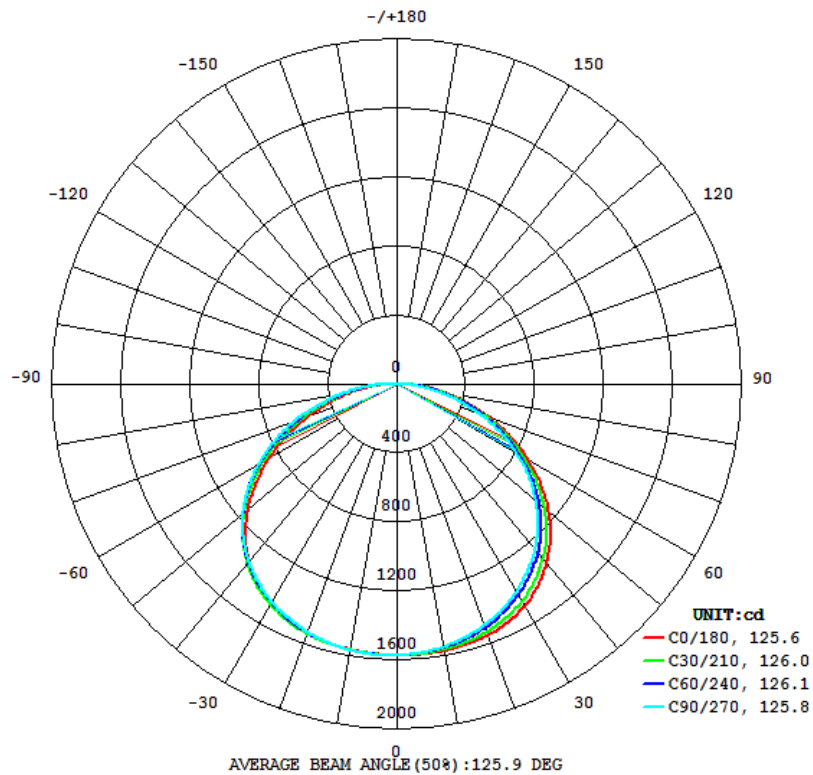
Test Result

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	
5311	75.29%	168.4	167.9	125.6	125.8	110.4

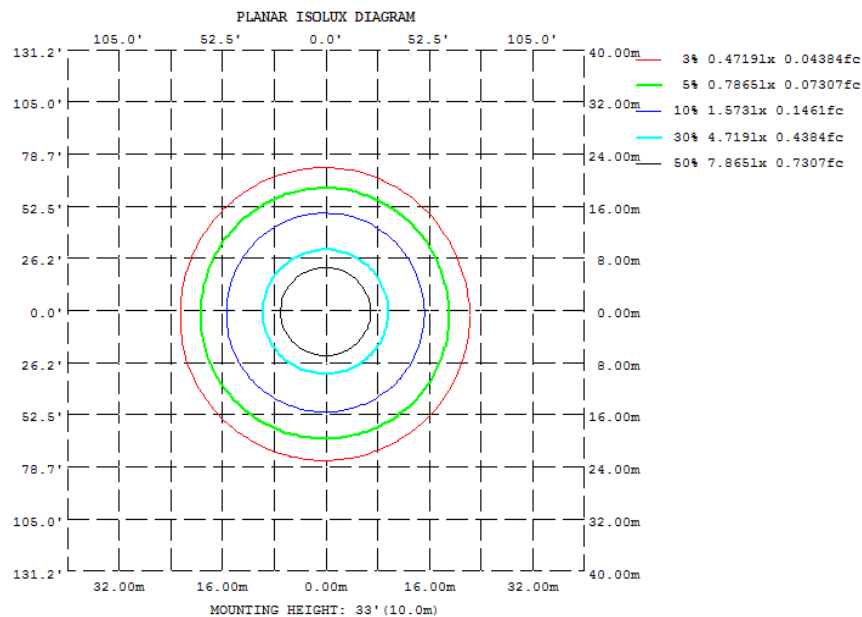
SC: 0° - 180°	SC: 90° - 270°
1.38	1.40

4.3 Goniophotometer Test

Light Distribution Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1563	1566	1567	1571	1569	1555	1545	1551
20	1535	1535	1530	1545	1546	1513	1486	1505
30	1469	1468	1456	1485	1484	1431	1388	1420
40	1338	1350	1338	1372	1356	1299	1252	1283
50	1130	1164	1166	1190	1153	1101	1056	1075
60	857.5	910.8	929.4	941.2	881.5	841.5	807.8	808.4
70	556.4	610.3	638.9	643.2	577.8	544.7	519.9	507.7
80	259.5	298.4	324.8	333.3	278.0	248.5	223.7	215.0
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	149.5	0 - 10	149.50	2.81%
10-20	437.37	0 - 20	586.87	11.05%
20-30	688.91	0 - 30	1275.78	24.02%
30-40	872.01	0 - 40	2147.79	40.44%
40-50	951.67	0 - 50	3099.46	58.36%
50-60	899.08	0 - 60	3998.54	75.29%
60-70	718.05	0 - 70	4716.59	88.81%
70-80	446.69	0 - 80	5163.28	97.22%
80-90	147.56	0 - 90	5310.84	100.00%
90-100	0	0 - 100	5310.84	100.00%
100-110	0	0 - 110	5310.84	100.00%
110-120	0	0 - 120	5310.84	100.00%
120-130	0	0 - 130	5310.84	100.00%
130-140	0	0 - 140	5310.84	100.00%
140-150	0	0 - 150	5310.84	100.00%
150-160	0	0 - 160	5310.84	100.00%
160-170	0	0 - 170	5310.84	100.00%
170-180	0	0 - 180	5310.84	100.00%

4.3 Goniophotometer Test

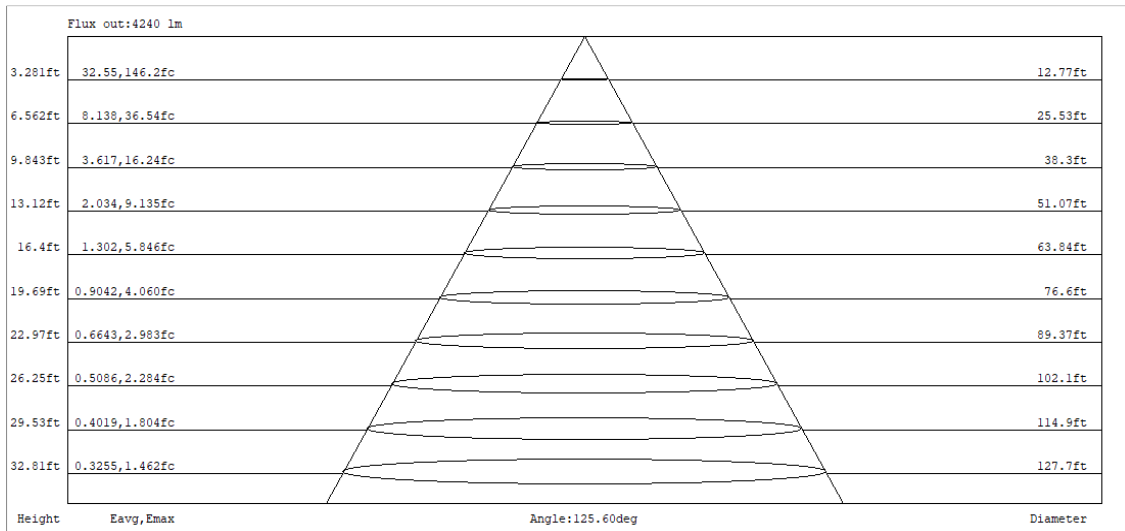
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	98	94	105	100	96	92	96	93	89	92	89	87	89	86	84	82
2	98	89	81	75	95	87	80	74	83	78	73	80	75	71	77	73	69	67
3	88	77	69	62	86	76	68	61	73	66	60	70	64	59	67	62	58	56
4	81	68	59	52	78	67	58	51	64	57	51	62	55	50	60	54	49	47
5	74	61	51	44	72	59	51	44	57	49	43	55	48	43	53	47	42	40
6	68	54	45	38	66	53	45	38	51	44	38	50	43	37	48	42	37	35
7	63	49	40	34	61	48	40	33	47	39	33	45	38	33	44	37	33	31
8	59	45	36	30	57	44	36	30	43	35	29	41	34	29	40	34	29	27
9	55	41	32	27	53	40	32	27	39	32	26	38	31	26	37	31	26	24
10	51	38	29	24	50	37	29	24	36	29	24	35	28	24	34	28	24	22

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	EZPANFA2x4 / 50W / 5000K	Sample ID.	C1
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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
24.5	277.02	60	0.182	48.3	0.957	4.32%
24.5	120.04	60	0.403	48.1	0.993	10.00%

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*****