

Photometric Test Report

Relevant Standards

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

Prepared For

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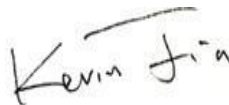
2019/1/9

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 / 30W / 3500K	
Input Control Signal Applied:		0%	
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 3000	3642
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	75.97%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	119.0
Allowable CCTs* (K)	IES LM-79-2008	5000	3368
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	79
Power Factor	ANSI C82.77:2014	0.873	0.933
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	10.55%
Power (Input Wattage)	IES LM-79-2008	Wrost Case	30.6
Input Voltage	IES LM-79-2008	Wrost Case	277
Input Current	IES LM-79-2008	Wrost Case	0.119
Luminaire Description:		EZPANFA2x4 / 30W / 4000K	
Input Control Signal Applied:		50%	
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 3000	3745
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	75.98%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	126.5
Allowable CCTs* (K)	IES LM-79-2008	5000	4051
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	82
Power Factor	ANSI C82.77:2014	0.873	0.929
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	11.00%
Power (Input Wattage)	IES LM-79-2008	Wrost Case	29.6
Input Voltage	IES LM-79-2008	Wrost Case	277
Input Current	IES LM-79-2008	Wrost Case	0.116

Luminaire Description: EZPANFA2x4 / 30W / 5000K			
Input Control Signal Applied: 100%			
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 3000	3600
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	77.11%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	118.0
Allowable CCTs* (K)	IES LM-79-2008	5000	4804
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	81
Power Factor	ANSI C82.77:2014	0.873	0.933
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	10.39%
Power (Input Wattage)	IES LM-79-2008	Worst Case	30.5
Input Voltage	IES LM-79-2008	Worst Case	277
Input Current	IES LM-79-2008	Worst Case	0.119

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2019/1/8	EZPANFA2x4 / 30W / 3500K	C1
2	Goniophotometer Test	2019/1/8	EZPANFA2x4 / 30W / 3500K	C1
3	THD and PF Test	2019/1/8	EZPANFA2x4 / 30W / 3500K	C1
4	Integrating Sphere Test	2019/1/8	EZPANFA2x4 / 30W / 4000K	C1
5	Goniophotometer Test	2019/1/8	EZPANFA2x4 / 30W / 4000K	C1
6	THD and PF Test	2019/1/8	EZPANFA2x4 / 30W / 4000K	C1
7	Integrating Sphere Test	2019/1/8	EZPANFA2x4 / 30W / 5000K	C1
8	Goniophotometer Test	2019/1/8	EZPANFA2x4 / 30W / 5000K	C1
9	THD and PF Test	2019/1/8	EZPANFA2x4 / 30W / 5000K	C1

Remark(If any)

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3.0 Production Description

Luminaire Description: EZPANFA2x4 / 30W / 3500K
EZPANFA2x4 / 30W / 4000K
EZPANFA2x4 / 30W / 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 / 30W / 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
24.4	277.03	60	0.119	30.7	0.933

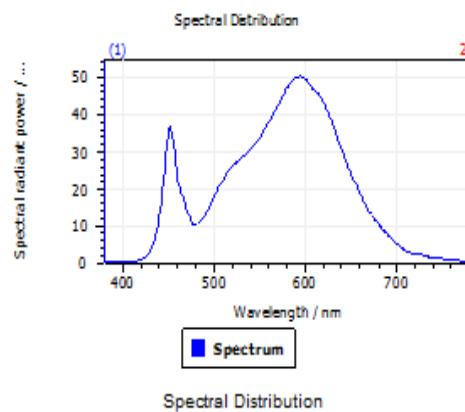
Test Result

CCT (K)	CRI (Ra)	Duv
3368	79	1.9E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

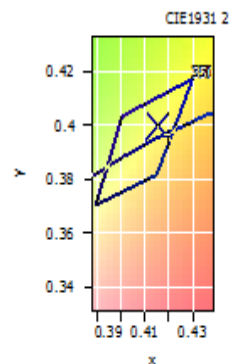


Spectral values

DominantWavelength	580.62 nm
Purity	0.447
PeakWavelength	594.13 nm
Width50%	131.54 nm

Color Coordinates

Correlated Color Temperature		3368 K
x: 0.4152	u: 0.2383	u': 0.2383
y: 0.4000	v: 0.3443	v': 0.5165
CRI01	76.4	CRI09
CRI02	88.2	CRI10
CRI03	95.8	CRI11
CRI04	76.0	CRI12
CRI05	76.3	CRI13
CRI06	84.2	CRI14
CRI07	81.6	CRI15
CRI08	53.9	CRI16
ResultsCRI	79.1	



PlanckDistance 1.9E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA2x4 / 30W / 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
24.4	276.95	60	0.119	30.6	0.928	Light Down

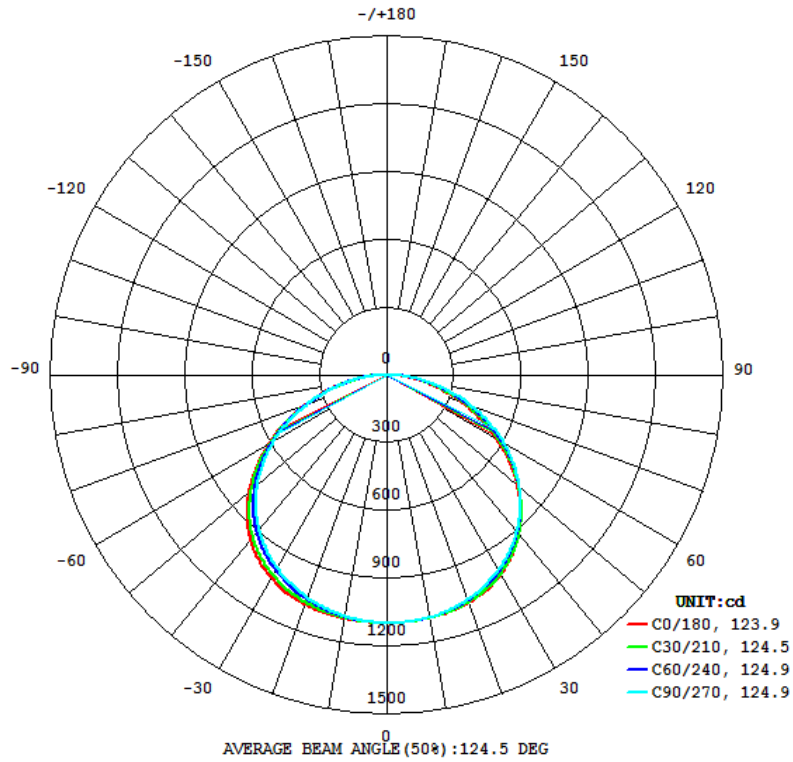
Test Result

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	
3642	75.97%	166.8	167.1	123.9	124.9	119.0

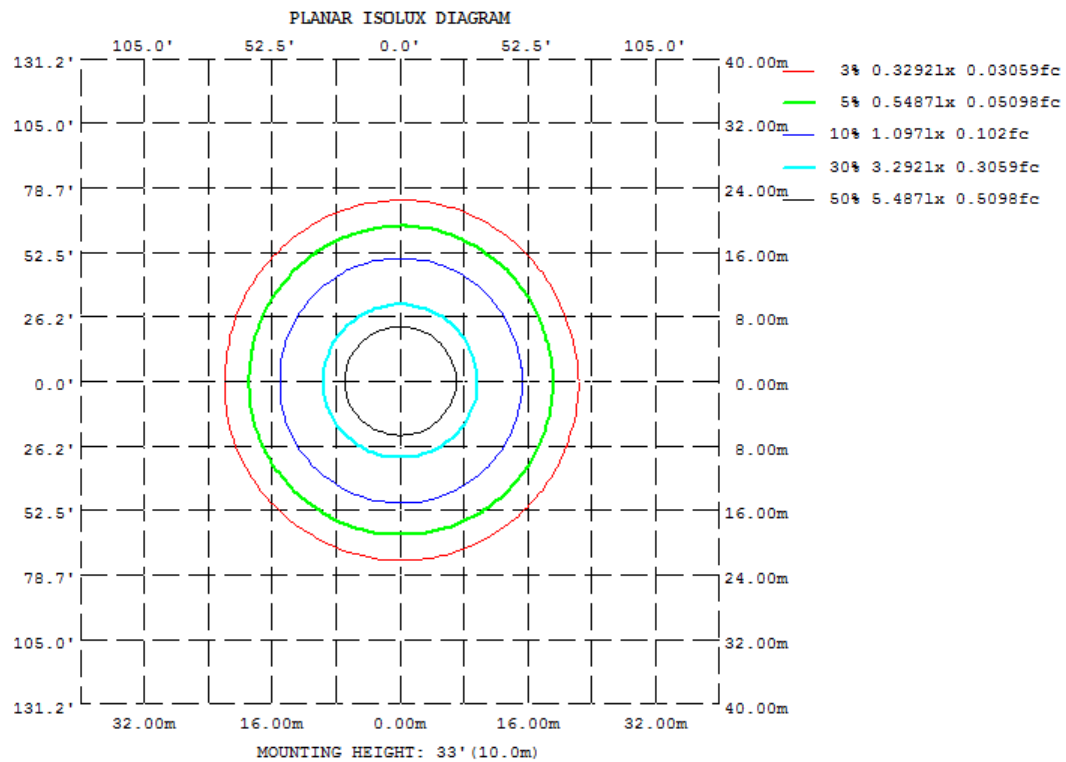
SC: 0° - 180°	SC: 90° - 270°
1.34	1.38

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd									
γ	C0	C45	C90	C135	C180	C225	C270	C315		
10	1094	1089	1084	1087	1091	1090	1088	1092		
20	1079	1062	1048	1059	1070	1063	1056	1069		
30	1037	1010	984.2	1004	1018	1008	996.0	1020		
40	948.7	919.4	888.5	907.4	916.6	914.2	903.9	930.3		
50	803.7	782.5	755.2	764.4	762.6	773.8	774.1	791.6		
60	610.6	601.4	584.8	580.4	569.0	592.0	605.6	607.4		
70	395.1	391.5	384.0	372.9	357.9	384.8	404.5	395.1		
80	184.8	180.3	172.7	168.8	158.9	177.2	190.7	182.3		
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		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	104.37	0 - 10	104.37	2.87%
10-20	305.19	0 - 20	409.56	11.24%
20-30	480.09	0 - 30	889.65	24.42%
30-40	605.74	0 - 40	1495.39	41.05%
40-50	656.39	0 - 50	2151.78	59.08%
50-60	615.26	0 - 60	2767.04	75.97%
60-70	486.05	0 - 70	3253.09	89.31%
70-80	296.12	0 - 80	3549.21	97.44%
80-90	93.22	0 - 90	3642.43	100.00%
90-100	0.00	0 - 100	3642.43	100.00%
100-110	0.00	0 - 110	3642.43	100.00%
110-120	0.00	0 - 120	3642.43	100.00%
120-130	0.00	0 - 130	3642.43	100.00%
130-140	0.00	0 - 140	3642.43	100.00%
140-150	0.00	0 - 150	3642.43	100.00%
150-160	0.00	0 - 160	3642.43	100.00%
160-170	0.00	0 - 170	3642.43	100.00%
170-180	0.00	0 - 180	3642.43	100.00%

4.3 Goniophotometer Test

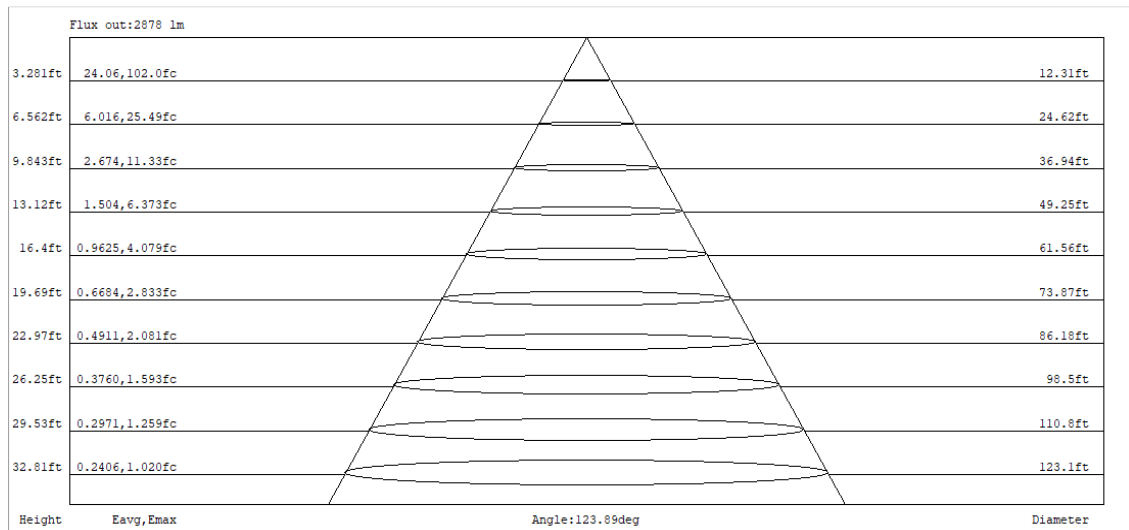
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	59	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	39	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	41	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 / 30W / 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
24.4	277.03	60	0.119	30.7	0.933	10.55%
24.4	120.01	60	0.255	30.4	0.995	5.77%

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	EZPANFA2x4 / 30W / 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
24.9	277.03	60	0.115	29.7	0.929

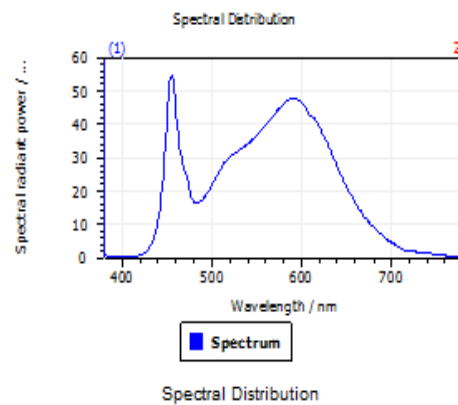
Test Result

CCT (K)	CRI (Ra)	Duv
4051	82	2.4E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

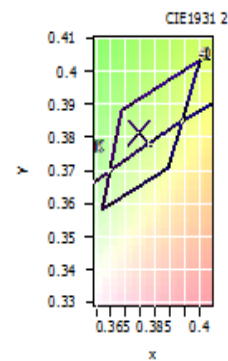


Spectral values

DominantWavelength	577.61 nm
Purity	0.285
PeakWavelength	454.92 nm
Width50%	22.33 nm

Color Coordinates

Correlated Color Temperatu		4051 K
x: 0.3799	u: 0.2228	u': 0.2228
y: 0.3816	v: 0.3357	v': 0.5036
CRI01	79.6	CRI09
CRI02	90.2	CRI10
CRI03	96.1	CRI11
CRI04	78.2	CRI12
CRI05	79.4	CRI13
CRI06	85.8	CRI14
CRI07	84.0	CRI15
CRI08	60.5	CRI16
ResultsCRI	81.7	



PlanckDistance 2.4E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA2x4 / 30W / 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
24.9	276.95	60	0.116	29.6	0.923	Light Down

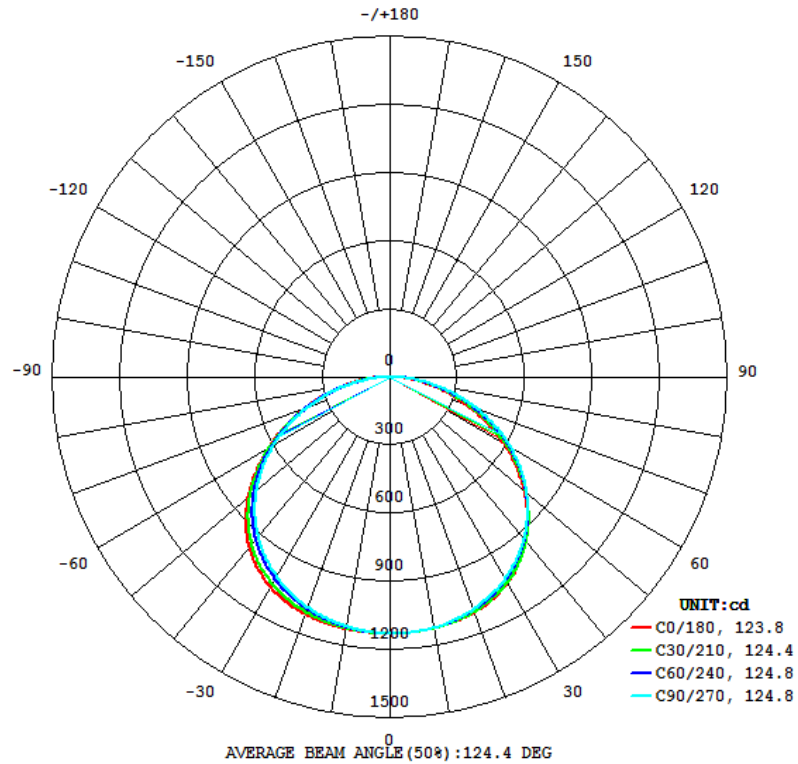
Test Result

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	
3745	75.98%	166.7	167.1	123.8	124.8	126.5

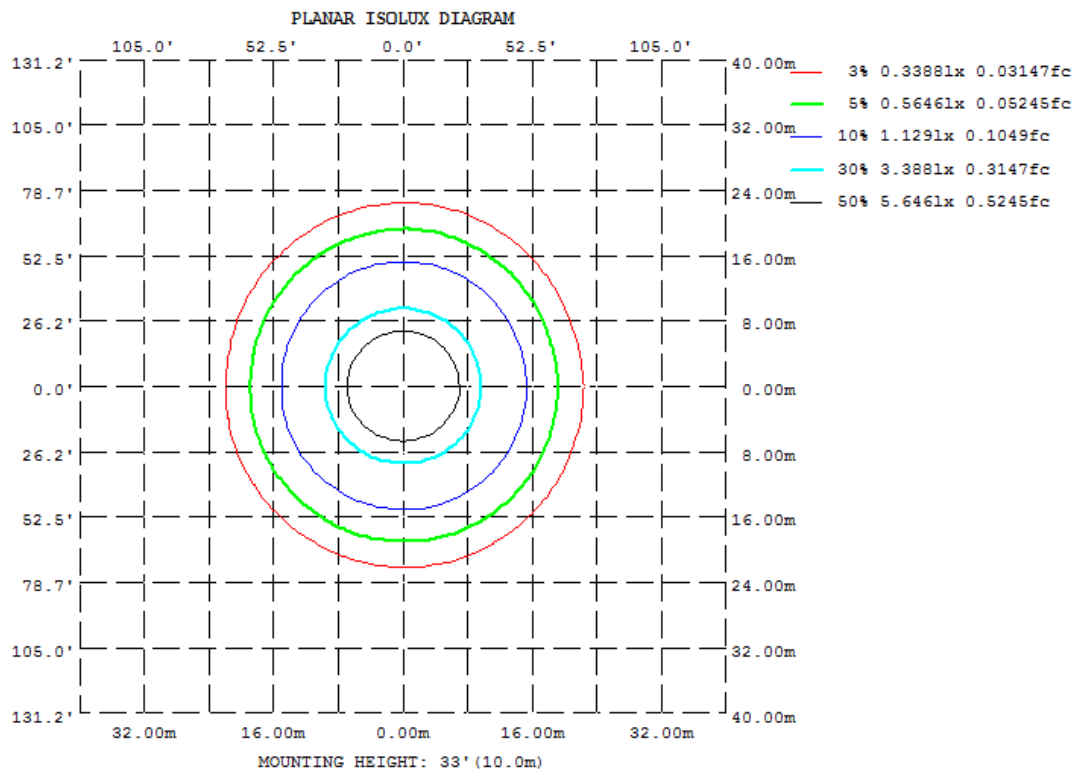
SC: 0° - 180°	SC: 90° - 270°
1.34	1.38

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd									
γ	C0	C45	C90	C135	C180	C225	C270	C315		
10	1126	1120	1116	1119	1123	1121	1120	1124		
20	1110	1092	1078	1089	1101	1094	1086	1100		
30	1066	1038	1012	1032	1047	1038	1025	1049		
40	974.6	944.8	913.3	932.5	942.8	940.6	930.1	956.4		
50	825.5	803.7	776.0	785.0	784.7	796.0	796.4	813.9		
60	626.5	617.6	600.5	595.8	585.4	609.1	623.2	624.8		
70	405.2	401.4	394.3	382.6	368.7	396.3	416.3	406.8		
80	189.5	185.0	176.9	173.2	164.3	182.9	196.6	187.8		
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		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	107.41	0 - 10	107.41	2.87%
10-20	314.02	0 - 20	421.43	11.25%
20-30	493.83	0 - 30	915.26	24.44%
30-40	622.85	0 - 40	1538.11	41.07%
40-50	674.70	0 - 50	2212.81	59.09%
50-60	632.34	0 - 60	2845.15	75.98%
60-70	499.49	0 - 70	3344.64	89.31%
70-80	304.33	0 - 80	3648.97	97.44%
80-90	95.85	0 - 90	3744.82	100.00%
90-100	0.00	0 - 100	3744.82	100.00%
100-110	0.00	0 - 110	3744.82	100.00%
110-120	0.00	0 - 120	3744.82	100.00%
120-130	0.00	0 - 130	3744.82	100.00%
130-140	0.00	0 - 140	3744.82	100.00%
140-150	0.00	0 - 150	3744.82	100.00%
150-160	0.00	0 - 160	3744.82	100.00%
160-170	0.00	0 - 170	3744.82	100.00%
170-180	0.00	0 - 180	3744.82	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	59	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	39	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	41	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 / 30W / 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
24.9	277.03	60	0.115	29.7	0.929	11.00%
24.9	119.99	60	0.246	29.4	0.995	5.45%

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	EZPANFA2x4 / 30W / 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	60.00	0.118	30.6	0.933

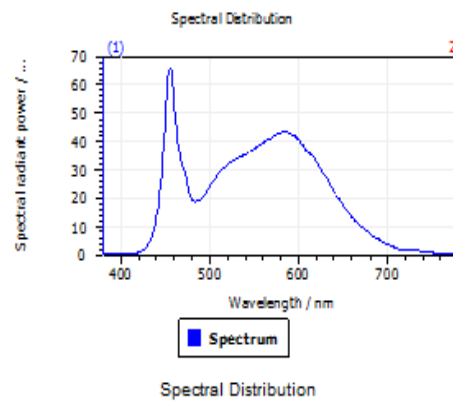
Test Result

CCT (K)	CRI (Ra)	Duv
4804	81	5.2E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

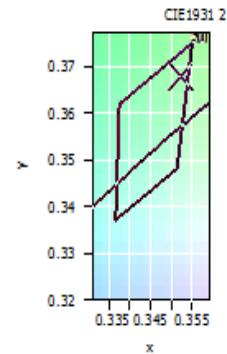


Spectral values

DominantWavelength	570.98 nm
Purity	0.162
PeakWavelength	455.12 nm
Width50%	21.68 nm

Color Coordinates

Correlated Color Temperature			4804 K
x: 0.3523	u: 0.2100	u': 0.2100	
y: 0.3680	v: 0.3290	v': 0.4935	
CRI01	78.1	CRI09	
CRI02	89.8	CRI10	
CRI03	94.9	CRI11	
CRI04	75.5	CRI12	
CRI05	77.7	CRI13	
CRI06	84.9	CRI14	
CRI07	84.0	CRI15	
CRI08	60.2	CRI16	
ResultsCRI	80.6		



PlanckDistance 5.2E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA2x4 / 30W / 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	0.119	30.5	0.927	Light Down

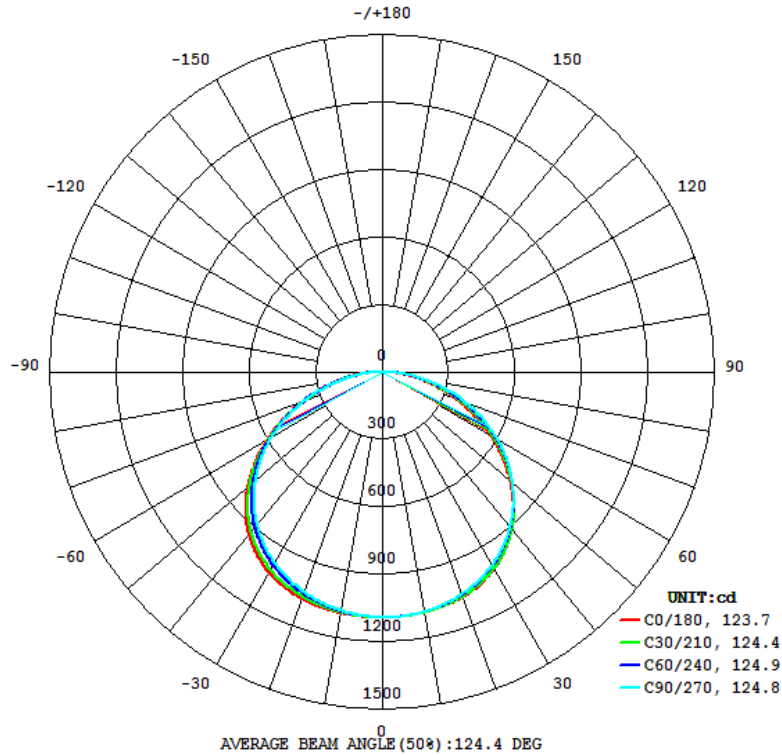
Test Result

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	
3600	77.11%	166.7	167.1	123.7	124.8	118.0

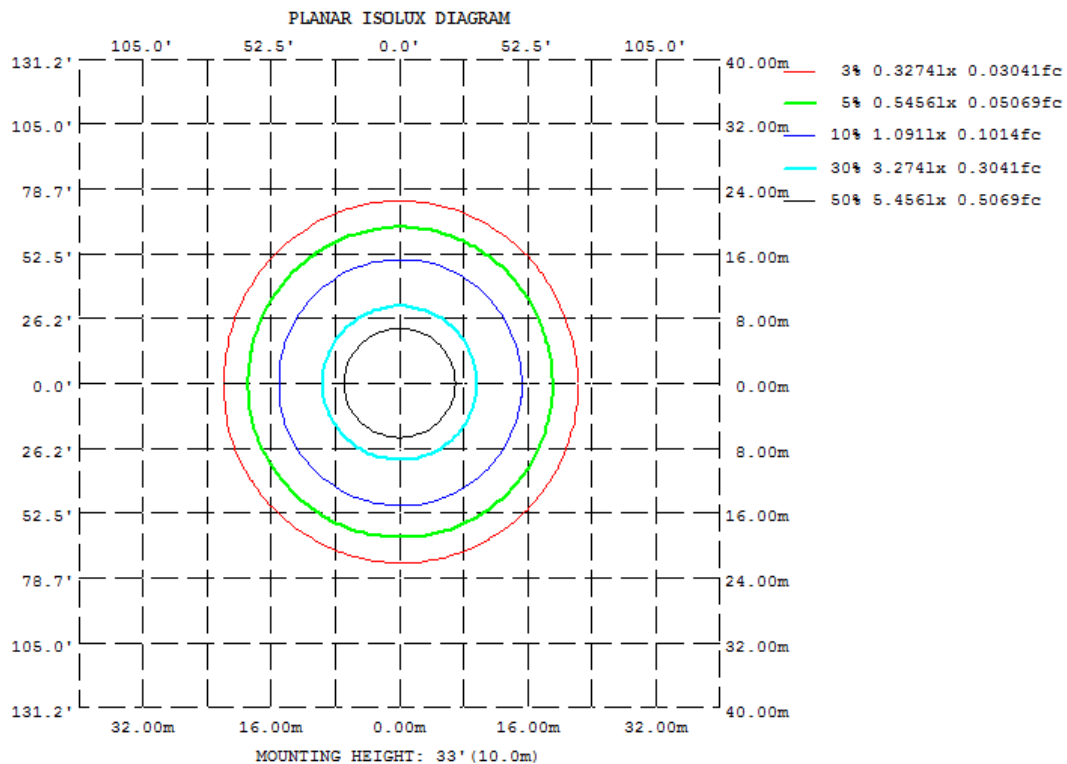
SC: 0° - 180°	SC: 90° - 270°
1.24	1.40

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		
10	1088	1082	1078	1081	1085	1084	1082	1086		
20	1072	1055	1041	1052	1063	1057	1050	1063		
30	1029	1002	977.7	995.8	1011	1003	990.7	1013		
40	940.0	912.2	882.2	899.5	910.6	909.2	899.5	924.2		
50	795.0	775.9	749.4	757.0	757.5	769.5	770.8	786.8		
60	604.0	595.5	579.7	573.9	566.1	589.4	603.7	604.5		
70	389.8	387.2	380.3	368.4	356.8	383.6	404.3	394.2		
80	181.7	177.5	169.9	166.4	159.0	177.8	191.1	182.8		
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		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	110.14	0 - 10	110.14	3.06%
10-20	319.43	0 - 20	429.57	11.93%
20-30	494.73	0 - 30	924.30	25.67%
30-40	611.24	0 - 40	1535.54	42.65%
40-50	647.07	0 - 50	2182.61	60.63%
50-60	593.41	0 - 60	2776.02	77.11%
60-70	460.32	0 - 70	3236.34	89.90%
70-80	276.66	0 - 80	3513.00	97.58%
80-90	87.01	0 - 90	3600.01	100.00%
90-100	0.00	0 - 100	3600.01	100.00%
100-110	0.00	0 - 110	3600.01	100.00%
110-120	0.00	0 - 120	3600.01	100.00%
120-130	0.00	0 - 130	3600.01	100.00%
130-140	0.00	0 - 140	3600.01	100.00%
140-150	0.00	0 - 150	3600.01	100.00%
150-160	0.00	0 - 160	3600.01	100.00%
160-170	0.00	0 - 170	3600.01	100.00%
170-180	0.00	0 - 180	3600.01	100.00%

4.3 Goniophotometer Test

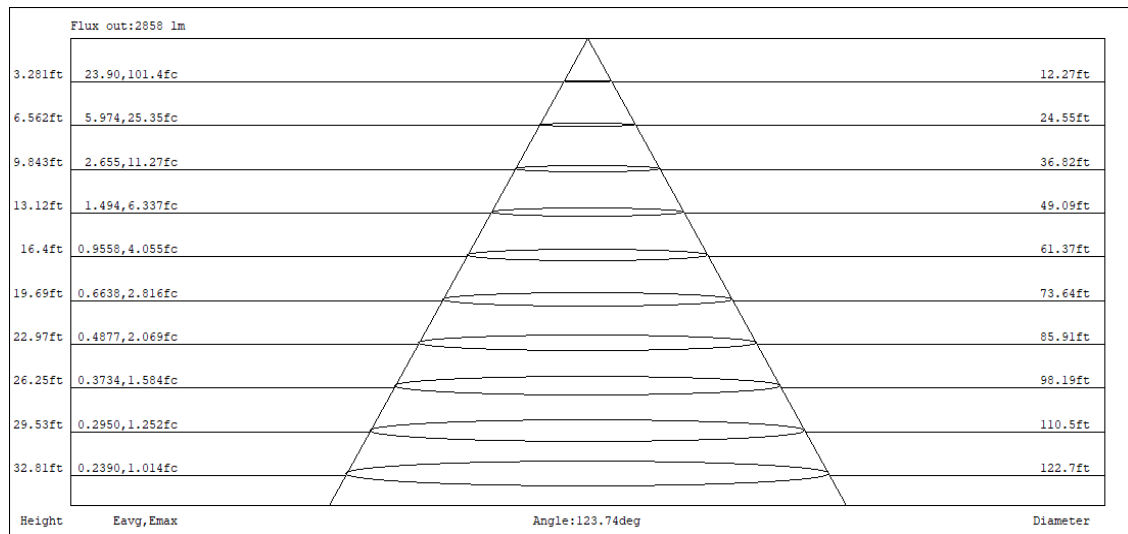
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
R/W	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	59	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	39	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	41	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 / 30W / 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
24.6	277.02	60	0.118	30.6	0.933	10.39%
24.6	120.02	60	0.254	30.3	0.995	5.73%

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*****