

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

Room 6A33, No.1388, Wuzhong road, Shanghai, China

Xiao Xiang, 15921313292, gary.Xiao@rabweb.com

Prepared By

Deliver Co., Ltd.

Block 11, 78 Keling Road, SSTP, Suzhou, China

0512-66801950, kevin.jia@szdeliver.com

Project Number

DLF1812114

Report Number

DLF1812114-12a

Test Date

2019/1/7

Issue Date

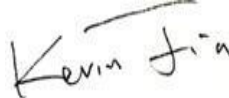
2019/1/8

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

The results contained in this report pertain only to the tested sample.

This report shall not be reproduced, except in full, without written approval of Deliver Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP.

1.0 Test Summary

DLC Technical Requirements v4.4

Indoor - Troffer/2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces			
Luminaire Description:		EZPANFA2x2 / 40W / 3500K	
Input Control Signal Applied:		0%	
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 2000	4425
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	77.36%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	106.6
Allowable CCTs* (K)	IES LM-79-2008	5000	3350
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	78	79
Power Factor	ANSI C82.77:2014	0.873	0.958
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	9.12%
Power (Input Wattage)	IES LM-79-2008	Wrost Case	41.5
Input Voltage	IES LM-79-2008	Wrost Case	277
Input Current	IES LM-79-2008	Wrost Case	0.157
Luminaire Description:		EZPANFA2x2 / 40W / 4000K	
Input Control Signal Applied:		50%	
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 2000	4802
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	76.66%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	122.5
Allowable CCTs* (K)	IES LM-79-2008	5000	4013
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%	9.29%
Power (Input Wattage)	IES LM-79-2008	Wrost Case	39.2
Input Voltage	IES LM-79-2008	Wrost Case	277
Input Current	IES LM-79-2008	Wrost Case	0.149

Luminaire Description: EZPANFA2x2 / 40W / 5000K			
Input Control Signal Applied: 100%			
Requirement Category	Test Method	Requirements	Test value
Luminaire Output (lm)	IES LM-79-2008	≥ 2000	4435
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	≥ 72	76.64%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	97	109.0
Allowable CCTs* (K)	IES LM-79-2008	5000	4798
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%	9.11%
Power (Input Wattage)	IES LM-79-2008	Wrost Case	40.7
Input Voltage	IES LM-79-2008	Wrost Case	277
Input Current	IES LM-79-2008	Wrost Case	0.154

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2019/1/7	EZPANFA2x2 / 40W / 3500K	B1
2	Goniophotometer Test	2019/1/7	EZPANFA2x2 / 40W / 3500K	B1
3	THD and PF Test	2019/1/7	EZPANFA2x2 / 40W / 3500K	B1
4	Integrating Sphere Test	2019/1/7	EZPANFA2x2 / 40W / 4000K	B1
5	Goniophotometer Test	2019/1/7	EZPANFA2x2 / 40W / 4000K	B1
6	THD and PF Test	2019/1/7	EZPANFA2x2 / 40W / 4000K	B1
7	Integrating Sphere Test	2019/1/7	EZPANFA2x2 / 40W / 5000K	B1
8	Goniophotometer Test	2019/1/7	EZPANFA2x2 / 40W / 5000K	B1
9	THD and PF Test	2019/1/7	EZPANFA2x2 / 40W / 5000K	B1

Remark(If any)

- 1、 This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.
- 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: EZPANFA2x2 / 40W / 3500K
EZPANFA2x2 / 40W / 4000K
EZPANFA2x2 / 40W / 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.	EZPANFA2x2 / 40W / 3500K	Sample ID.	B1
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	277.05	60	0.156	41.5	0.958

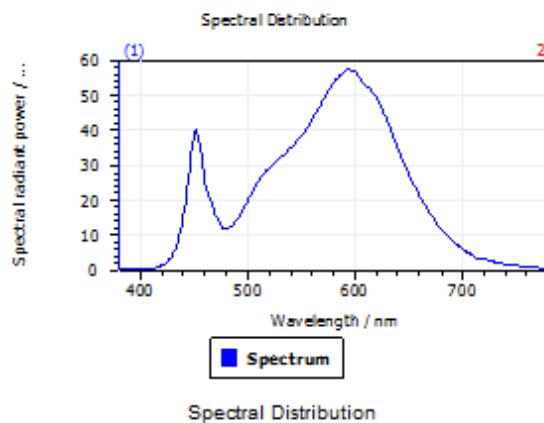
Test Result

CCT (K)	CRI (Ra)	Duv
3350	79	1.7E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

DominantWavelength	580.76 nm
Purity	0.449
PeakWavelength	594.08 nm
Width50%	130.60 nm

Color Coordinates

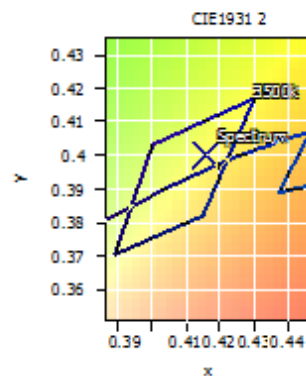
Correlated Color Temperature 3350 K

x: 0.4160 u: 0.2389 u': 0.2389

y: 0.3999 v: 0.3444 v': 0.5166

CRI01	76.3	CRI09	-10.2
CRI02	87.8	CRI10	72.2
CRI03	96.0	CRI11	74.4
CRI04	76.2	CRI12	61.0
CRI05	76.3	CRI13	79.0
CRI06	83.7	CRI14	98.2
CRI07	82.0	CRI15	68.1
CRI08	54.3	CRI16	65.9

ResultsCRI 79.1



PlanckDistance 1.7E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA2x2 / 40W / 3500K	Sample ID.	B1
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	276.98	60	0.157	41.5	0.953	Light Down

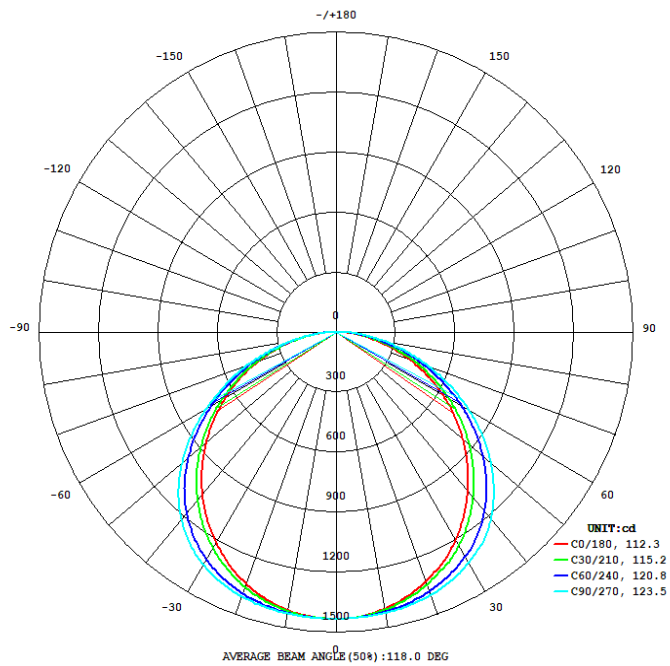
Test Result

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	
4425	77.36%	163.7	166.0	112.3	123.5	106.6

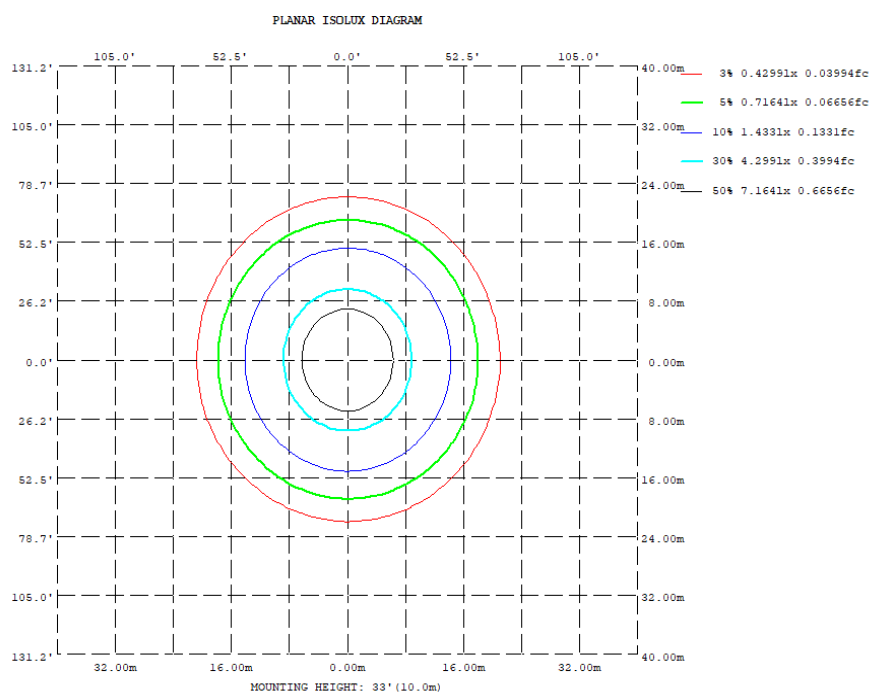
SC: 0° - 180°	SC: 90° - 270°
1.26	1.40

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd							
7	C0	C45	C90	C135	C180	C225	C270	C315
10	1411	1420	1428	1416	1403	1413	1424	1416
20	1337	1372	1405	1363	1323	1358	1397	1364
30	1215	1279	1343	1266	1203	1269	1333	1278
40	1053	1133	1218	1116	1036	1121	1217	1132
50	859.0	934.2	1018	914.8	838.2	923.4	1023	936.1
60	642.8	695.1	757.6	675.3	618.5	689.4	771.8	703.2
70	416.3	442.0	474.2	423.8	388.0	439.3	496.2	452.7
80	191.9	195.6	201.6	182.4	169.4	200.1	229.9	210.8
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	135.99	0 - 10	135.99	3.07%
10-20	394.27	0 - 20	530.26	11.98%
20-30	610.83	0 - 30	1141.09	25.79%
30-40	755.18	0 - 40	1896.27	42.85%
40-50	797.97	0 - 50	2694.24	60.88%
50-60	729.03	0 - 60	3423.27	77.36%
60-70	563.26	0 - 70	3986.53	90.08%
70-80	335.51	0 - 80	4322.04	97.67%
80-90	103.33	0 - 90	4425.37	100.00%
90-100	0.00	0 - 100	4425.37	100.00%
100-110	0.00	0 - 110	4425.37	100.00%
110-120	0.00	0 - 120	4425.37	100.00%
120-130	0.00	0 - 130	4425.37	100.00%
130-140	0.00	0 - 140	4425.37	100.00%
140-150	0.00	0 - 150	4425.37	100.00%
150-160	0.00	0 - 160	4425.37	100.00%
160-170	0.00	0 - 170	4425.37	100.00%
170-180	0.00	0 - 180	4425.37	100.00%

4.3 Goniophotometer Test

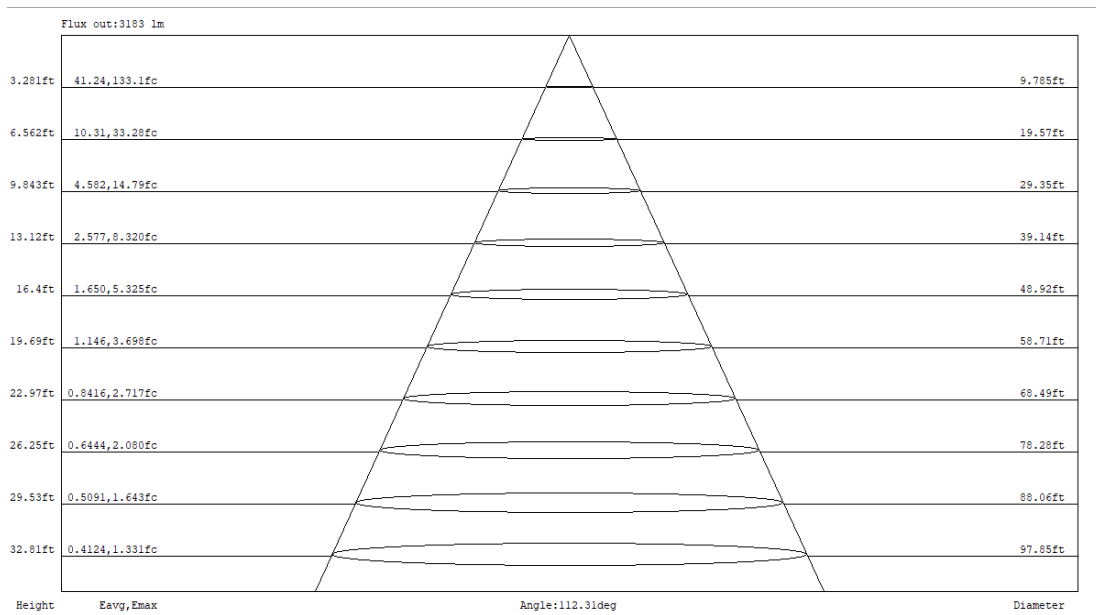
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	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	79	70	63	87	77	69	63	74	67	62	71	65	61	69	64	60	57
4	82	69	60	53	79	68	60	53	65	58	52	63	57	52	61	55	51	49
5	75	62	53	46	73	61	52	46	59	51	45	57	50	45	55	49	44	42
6	69	56	46	40	67	55	46	40	53	45	39	51	44	39	49	43	39	36
7	64	50	41	35	62	49	41	35	48	40	35	46	40	34	45	39	34	32
8	60	46	37	31	58	45	37	31	44	36	31	42	36	31	41	35	30	29
9	56	42	34	28	54	41	33	28	40	33	28	39	32	28	38	32	27	26
10	52	39	31	25	51	38	30	25	37	30	25	36	30	25	35	29	25	23

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	EZPANFA2x2 / 40W / 3500K	Sample ID.	B1
-----------	--------------------------	------------	----

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	277.05	60	0.156	41.5	0.958	8.54%
24.9	120.05	60	0.347	41.3	0.993	9.12%

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	EZPANFA2x2 / 40W / 4000K	Sample ID.	B1
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
25.1	277.01	60	0.148	39.3	0.956

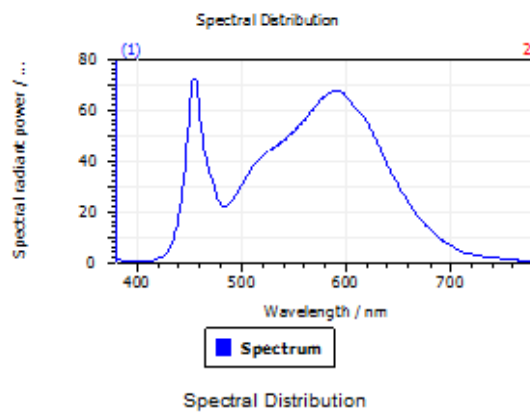
Test Result

CCT (K)	CRI (Ra)	Duv
4013	81	2.1E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

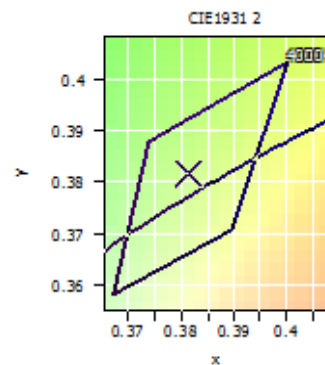


Spectral values

DominantWavelength	577.91 nm
Purity	0.291
PeakWavelength	454.53 nm
Width50%:	23.74 nm

Color Coordinates

Correlated Color Temperatu		4013 K
x: 0.3814	u: 0.2236	u': 0.2236
y: 0.3820	v: 0.3360	v': 0.5040
CRI01	78.6	CRI09
CRI02	89.9	CRI10
CRI03	95.3	CRI11
CRI04	76.9	CRI12
CRI05	78.5	CRI13
CRI06	85.7	CRI14
CRI07	83.1	CRI15
CRI08	58.5	CRI16
ResultsCRI	80.8	



PlanckDistance 2.1E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA2x2 / 40W / 4000K	Sample ID.	B1
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
25.0	276.94	60	0.149	39.2	0.952	Light Down

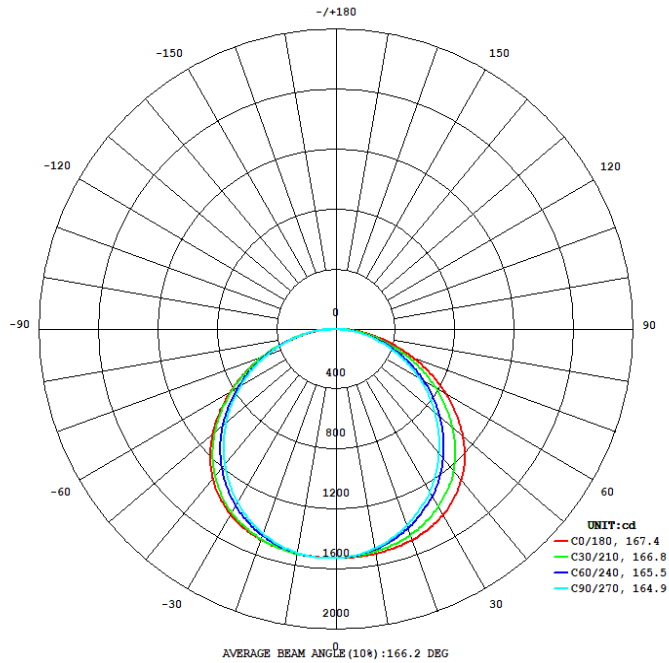
Test Result

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	
4802	76.66%	167.4	164.9	124.9	113.8	122.5

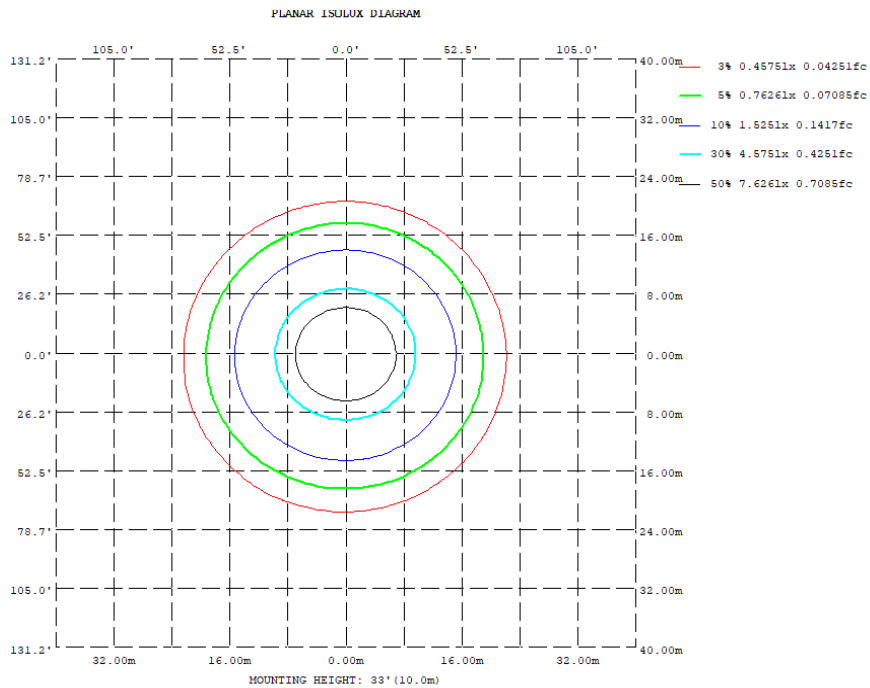
SC: 0° - 180°	SC: 90° - 270°
1.40	1.30

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	1520	1520	1515	1521	1519	1498	1484	1499
20	1493	1476	1450	1480	1494	1434	1392	1437
30	1427	1385	1333	1395	1433	1326	1260	1329
40	1296	1237	1169	1255	1312	1175	1081	1175
50	1089	1033	968.5	1056	1117	966.3	873.1	961.6
60	820.0	784.2	739.3	809.1	849.5	720.8	643.9	711.5
70	527.0	515.5	494.4	539.0	548.6	457.4	403.7	445.2
80	239.6	246.5	244.5	266.5	256.9	205.8	174.1	192.6
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	144.88	0 - 10	144.88	3.02%
10-20	420.52	0 - 20	565.40	11.77%
20-30	652.46	0 - 30	1217.86	25.36%
30-40	809.40	0 - 40	2027.26	42.21%
40-50	860.84	0 - 50	2888.10	60.14%
50-60	793.16	0 - 60	3681.26	76.66%
60-70	619.79	0 - 70	4301.05	89.56%
70-80	378.29	0 - 80	4679.34	97.44%
80-90	122.96	0 - 90	4802.30	100.00%
90-100	0.00	0 - 100	4802.30	100.00%
100-110	0.00	0 - 110	4802.30	100.00%
110-120	0.00	0 - 120	4802.30	100.00%
120-130	0.00	0 - 130	4802.30	100.00%
130-140	0.00	0 - 140	4802.30	100.00%
140-150	0.00	0 - 150	4802.30	100.00%
150-160	0.00	0 - 160	4802.30	100.00%
160-170	0.00	0 - 170	4802.30	100.00%
170-180	0.00	0 - 180	4802.30	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	87	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	50	45	56	49	44	54	48	44	41
6	69	55	46	39	67	54	46	39	52	45	39	51	44	38	49	43	38	36
7	64	50	41	35	62	49	41	35	48	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	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.	EZPANFA2x2 / 40W / 4000K	Sample ID.	B1
-----------	--------------------------	------------	----

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
25.1	277.01	60	0.148	39.3	0.956	9.29%
25.1	120.00	60	0.328	39.1	0.993	8.57%

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	EZPANFA2x2 / 40W / 5000K	Sample ID.	B1
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	276.95	60	0.154	40.7	0.957

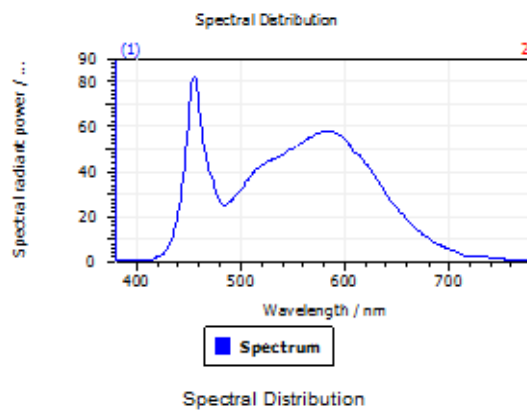
Test Result

CCT (K)	CRI (Ra)	Duv
4798	81	4.8E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

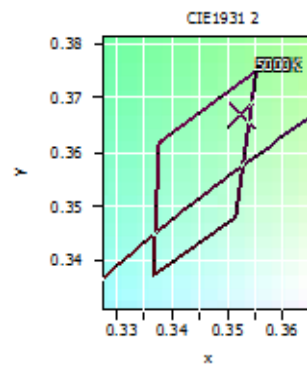


Spectral values

DominantWavelength	571.28 nm
Purity	0.159
PeakWavelength	455.07 nm
Width50%	24.38 nm

Color Coordinates

Correlated Color Temperature		4798 K	
x: 0.3524	u: 0.2103	u': 0.2103	
y: 0.3672	v: 0.3287	v': 0.4931	
CRI01	77.8	CRI09	-6.6
CRI02	89.4	CRI10	74.4
CRI03	95.0	CRI11	74.1
CRI04	75.7	CRI12	53.7
CRI05	77.7	CRI13	81.2
CRI06	84.3	CRI14	97.5
CRI07	84.3	CRI15	70.3
CRI08	60.4	CRI16	65.9
ResultsCRI	80.6		



PlanckDistance 4.8E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	EZPANFA2x2 / 40W / 5000K	Sample ID.	B1
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	276.94	60	0.154	40.7	0.954	Light Down

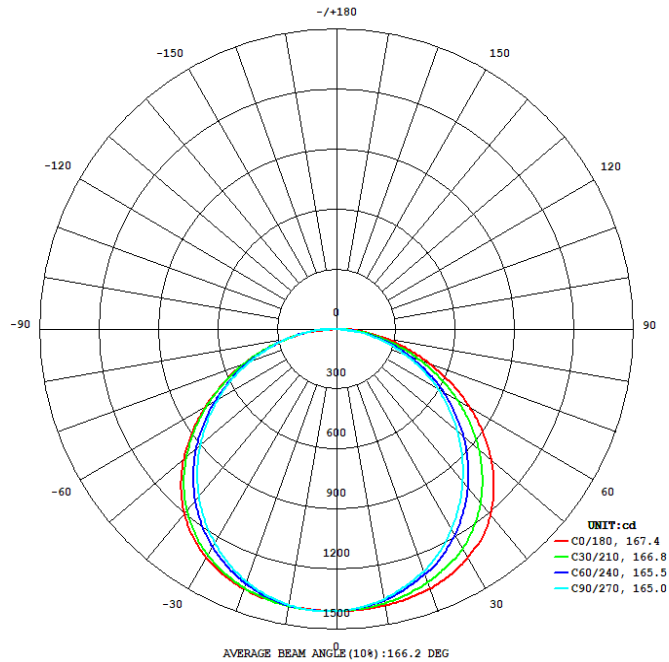
Test Result

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	
4435	76.64%	167.4	165.0	124.8	113.8	109.0

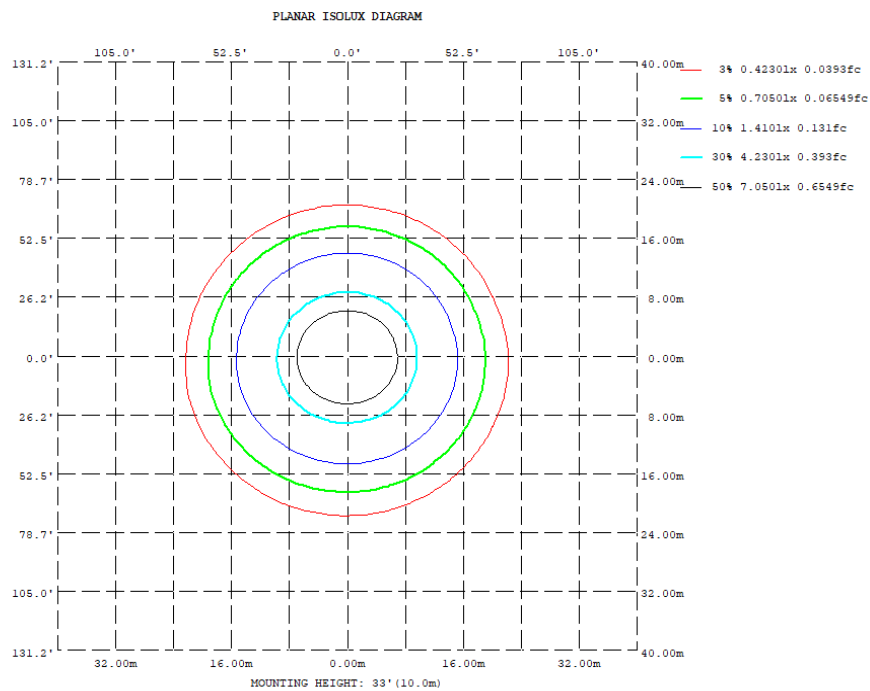
SC: 0° - 180°	SC: 90° - 270°
1.40	1.30

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd							
7	C0	C45	C90	C135	C180	C225	C270	C315
10	1404	1405	1400	1404	1402	1382	1369	1383
20	1379	1365	1342	1368	1378	1322	1289	1324
30	1320	1282	1235	1291	1320	1228	1159	1230
40	1200	1147	1085	1163	1211	1080	993.2	1078
50	1011	960.3	901.0	982.1	1022	885.3	799.8	879.6
60	765.2	731.9	690.6	755.2	773.5	657.2	587.6	648.1
70	495.4	484.6	465.4	506.7	496.3	414.4	365.5	402.5
80	229.6	235.9	233.9	254.4	228.3	182.8	154.8	170.3
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	133.79	0 - 10	133.79	3.02%
10-20	388.26	0 - 20	522.05	11.77%
20-30	603.02	0 - 30	1125.07	25.37%
30-40	747.69	0 - 40	1872.76	42.23%
40-50	794.33	0 - 50	2667.09	60.14%
50-60	731.82	0 - 60	3398.91	76.64%
60-70	572.70	0 - 70	3971.61	89.55%
70-80	349.59	0 - 80	4321.20	97.43%
80-90	113.84	0 - 90	4435.04	100.00%
90-100	0.00	0 - 100	4435.04	100.00%
100-110	0.00	0 - 110	4435.04	100.00%
110-120	0.00	0 - 120	4435.04	100.00%
120-130	0.00	0 - 130	4435.04	100.00%
130-140	0.00	0 - 140	4435.04	100.00%
140-150	0.00	0 - 150	4435.04	100.00%
150-160	0.00	0 - 160	4435.04	100.00%
160-170	0.00	0 - 170	4435.04	100.00%
170-180	0.00	0 - 180	4435.04	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	99	95	105	101	97	93	97	93	90	93	90	87	89	87	85	83
2	98	89	82	76	95	87	81	75	84	78	74	81	76	72	77	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	50	45	56	49	44	54	48	44	41
6	69	55	46	39	67	54	46	39	52	45	39	51	44	38	49	43	38	36
7	64	50	41	35	62	49	41	35	48	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	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.	EZPANFA2x2 / 40W / 5000K	Sample ID.	B1
-----------	--------------------------	------------	----

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	276.95	60	0.154	40.7	0.957	9.11%
24.9	119.94	60	0.341	40.6	0.993	8.86%

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*****