

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2019
- ☒ ANSI C82.77-10:2014

Prepared For

RAB Lighting Inc.

408 W 14th St, New York, NY 10014 United States

Xiao Xiang, 15921313292, Gary.Xiao@rablighting.com

Prepared By

Deliver Co., Ltd.

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

0512-66801950, kevin.jia@szdeliver.com

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Test By

Hengshan Li

Hengshan Li

Prepared By

Wangzun Zhu

Wangzun Zhu

Approved By

Kevin Jia

Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Indoor - Linear Ambient - Direct Linear Ambient Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2019	1500		3351
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2019	≥375		838
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2019	Standard 115	Premium 130	140.2
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2019	Wrosted Case		23.9
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77-10: 2014	20.00%	120V	3.71%
		20.00%	277V	12.74%
Power Factor (THD & PF - section 4.3)	ANSI C82.77-10: 2014	0.9	120V	0.993
		0.9	277V	0.876
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2019	7 step	3985±275	3860
		4 step	3985±154	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2019 CIE 13.3-1995	≥80		94
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2019 CIE 13.3-1995	≥0		73
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		91
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		100
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-12%≤IES Rcs,h1≤+23%		-4%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2019	≥40%		82.06%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		29.8
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2019	Worst Case		277
(Goniophotometer - Section 4.2)		Non-Worst Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2019	Worst Case		0.098
(Goniophotometer - Section 4.2)		Non-Worst Case		0.200
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2019	Worst Case		23.9
(Goniophotometer - Section 4.2)		Non-Worst Case		23.8

2.0 Test List

Test Item	Test	Test Date	Model Number	Build Level	Sample No.
1	Integrating Sphere Test	2025/9/23	BOAE4P @ 24W/4000K	N/A	DLF2509110-U1
2	Goniophotometer Test	2025/9/23	BOAE4P @ 24W/4000K	N/A	DLF2509110-U1
3	THD and PF Test	2025/9/23	BOAE4P @ 24W/4000K	N/A	DLF2509110-U1

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 DUT Description

Model Number: BOAE4P @ 24W/4000K

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

Received Date: 2025/9/22

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	BOAE4P @ 24W/4000K	Sample ID.	DLF2509110-U1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.2	Humidity (%RH)	55.2

Test Method

The samples were tested according to the IES LM-79-2019.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature and relative humidity condition inside the sphere was maintained at 25° C ± 1.2° C and 10% - 65% RH.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.00	60	0.200	23.8	0.993
277.00	60	0.098	23.9	0.876

Test Result

CCT (K)	CRI	R9	Duv
3860	94	73	0.001

Rf	Rg	IES Rcs,h1
91	100	-4%

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	BOAE4P @ 24W/4000K	Sample ID.	DLF2509110-U1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.1	Humidity (%RH)	55.0

Test Method

The samples were tested according to the IES LM-79-2019.

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

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ and 10% - 65% RH, 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.

Airflow for the instantaneous tangential velocity of any point on the DUT shall be less than an upper tolerance limit of 0.20 m/s.

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

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	277.00	60	0.098	23.9	0.876
NON-WORST CASE	120.00	60	0.200	23.8	0.993

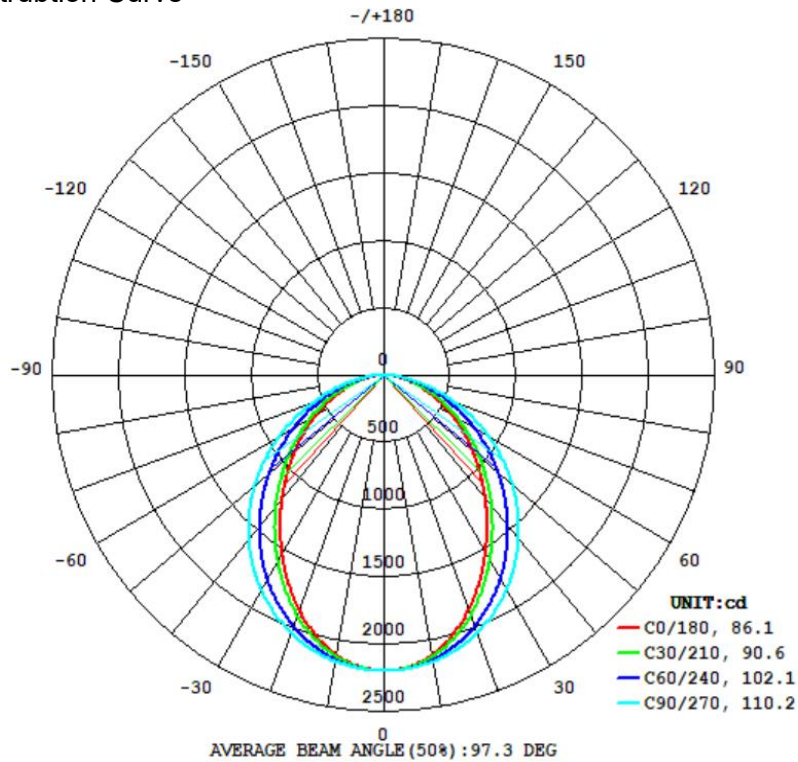
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
3351	150.7	158.7	86.1	110.2	140.2

Zonal Lumen Requirement (0° - 60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
82.06%	29.8	4	838

4.2 Goniophotometer Test

Light Distrubtion Curve



UGR Table - Corrected

UGR Table - Corrected										
Reflectances										
Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20
Room Size										
X=2H	UGR Viewed Crosswise					UGR Viewed Endwise				
Y=2H	26.1	27.7	26.4	28.0	28.3	23.8	25.4	24.2	25.7	26.1
3H	27.8	29.3	28.2	29.6	30.0	25.4	26.8	25.7	27.1	27.5
4H	28.5	29.8	28.9	30.2	30.5	25.9	27.2	26.3	27.6	28.0
6H	28.9	30.1	29.3	30.5	30.9	26.2	27.5	26.6	27.8	28.2
8H	29.0	30.2	29.4	30.5	30.9	26.3	27.5	26.7	27.9	28.3
12H	29.0	30.1	29.4	30.5	31.0	26.3	27.5	26.8	27.9	28.3
4H	2H	26.4	27.8	26.8	28.1	28.5	24.6	26.0	25.0	26.3
	3H	28.4	29.5	28.8	29.9	30.3	26.3	27.5	26.8	27.9
	4H	29.2	30.2	29.6	30.6	31.0	27.0	28.0	27.4	28.4
	6H	29.7	30.6	30.1	31.0	31.5	27.4	28.3	27.8	28.7
	8H	29.8	30.7	30.3	31.1	31.6	27.5	28.3	27.9	28.8
	12H	29.9	30.6	30.4	31.1	31.6	27.5	28.3	28.0	28.8
8H	4H	29.3	30.1	29.8	30.6	31.0	27.3	28.2	27.8	28.6
	6H	29.9	30.6	30.4	31.1	31.6	27.8	28.5	28.3	29.0
	8H	30.1	30.7	30.6	31.2	31.7	28.0	28.6	28.5	29.1
	12H	30.2	30.7	30.7	31.2	31.8	28.1	28.6	28.6	29.1
12H	4H	29.3	30.1	29.8	30.5	31.0	27.4	28.1	27.8	28.6
	6H	29.9	30.5	30.4	31.0	31.5	27.9	28.5	28.4	29.0
	8H	30.1	30.7	30.6	31.2	31.7	28.1	28.6	28.6	29.1
Maximum UGR = 31.8										

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	131.5	0 - 10	131.50	3.92%
10-20	368.19	0 - 20	499.69	14.91%
20-30	534.88	0 - 30	1034.57	30.87%
30-40	610.22	0 - 40	1644.79	49.08%
40-50	596.75	0 - 50	2241.54	66.89%
50-60	508.47	0 - 60	2750.01	82.06%
60-70	367.02	0 - 70	3117.03	93.01%
70-80	193.98	0 - 80	3311.01	98.80%
80-90	40.26	0 - 90	3351.27	100.00%
90-100	0	0 - 100	3351.27	100.00%
100-110	0	0 - 110	3351.27	100.00%
110-120	0	0 - 120	3351.27	100.00%
120-130	0	0 - 130	3351.27	100.00%
130-140	0	0 - 140	3351.27	100.00%
140-150	0	0 - 150	3351.27	100.00%
150-160	0	0 - 160	3351.27	100.00%
160-170	0	0 - 170	3351.27	100.00%
170-180	0	0 - 180	3351.27	100.00%

4.2 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	109	105	101	97	107	103	99	96	98	95	93	95	92	90	91	89	87	85
2	100	92	86	80	97	90	84	79	87	82	77	83	79	76	80	77	74	72
3	91	81	74	67	89	80	73	67	77	71	65	74	69	64	72	67	63	61
4	84	72	64	57	82	71	63	57	69	62	56	66	60	56	64	59	55	53
5	77	65	56	50	75	64	56	50	62	55	49	60	53	49	58	52	48	46
6	72	59	50	44	70	58	50	44	56	49	43	54	48	43	53	47	42	40
7	67	53	45	39	65	53	45	39	51	44	38	50	43	38	48	42	38	36
8	62	49	41	35	61	48	40	35	47	40	35	46	39	34	45	39	34	32
9	58	45	37	32	57	44	37	31	43	36	31	42	36	31	41	35	31	29
10	55	42	34	29	53	41	34	29	40	33	29	39	33	28	38	32	28	27

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	BOAE4P @ 24W/4000K	Sample ID.	DLF2509110-U1
Temperature (°C)	25.2	Humidity (%RH)	55.2

Test Method

The samples were tested according to the ANSI C82.77-10:2014.

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1.0^{\circ}\text{C}$ and 10% - 65% RH. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.00	60	0.200	23.8	0.993	3.71%
277.00	60	0.098	23.9	0.876	12.74%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2024/12/23	2025/12/22
DLF108	Auxiliary Lamp	2024/12/23	2025/12/22
DLF122	Measurement Standard Lamp Standard Lamp Type: Tungsten, Omni-directional	2024/12/23	2025/12/22
DLF116	AC Power Source	2024/12/13	2025/12/12
DLF516	Power Meter	2024/12/13	2025/12/12
DLF112	Temperature Recorder	2024/12/19	2025/12/18
DLF114	Temperature & Humidity Datalogger	2024/12/19	2025/12/18
DLF521	Measurement Standard Lamp Standard Lamp Type: Tungsten, Omni-directional	2024/12/23	2025/12/22
DLF101	Goniophotometer	2024/12/23	2025/12/22
DLF511	AC Power Source	2024/12/13	2025/12/12
DLF512	AC Power Source	2024/12/13	2025/12/12
DLF513	AC Power Source	2024/12/13	2025/12/12
DLF507	DC Power Source	2024/12/13	2025/12/12
DLF111	Temperature & Humidity Datalogger	2024/12/19	2025/12/18
DLF119	Power Meter	2024/12/13	2025/12/12
DLF530	Hot-wire anemometer	2025/1/23	2026/1/22
DLF129	Clock	2025/9/4	2026/9/3

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