

Photometric Test Report

Relevant Standards

- IES LM-79-2008
- ANSI C82.77:2017

Prepared For RAB Lighting Inc.

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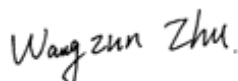
Test Date

2020/8/13

Issue Date

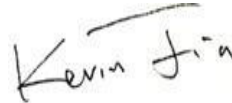
2020/8/19

Prepared By



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Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Outdoor - Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2) (0°-180° zones)	IES LM-79-2008	300		3604
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2) (0°-180° zones)	IES LM-79-2008	Standard 105	Premium 120	123.8
Luminaire Output (lm) (Goniophotometer - Section 4.2) (0°-90° zones)	IES LM-79-2008	300		3512
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard 105	Premium 120	120.7
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		29.1
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	3.46%
		20.00%	277V	4.25%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.996
		0.9	277V	0.926
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3045±175	5006
		4 step	3045±100	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		84
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		12
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		84
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		98
IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18% ≤ IES Rcs,h1 ≤ +23%		-12%
Zonal Lumen Requirement (80°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≤10%		2.24%
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		120
(Goniophotometer - Section 4.2)		Non-Worst Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		0.243
(Goniophotometer - Section 4.2)		Non-Worst Case		0.111
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		29.1
(Goniophotometer - Section 4.2)		Non-Worst Case		28.6

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2020/8/13	W34-30L	A1
2	Goniophotometer Test	2020/8/13	W34-30L	A1
3	THD and PF Test	2020/8/13	W34-30L	A1

Remark(If any)

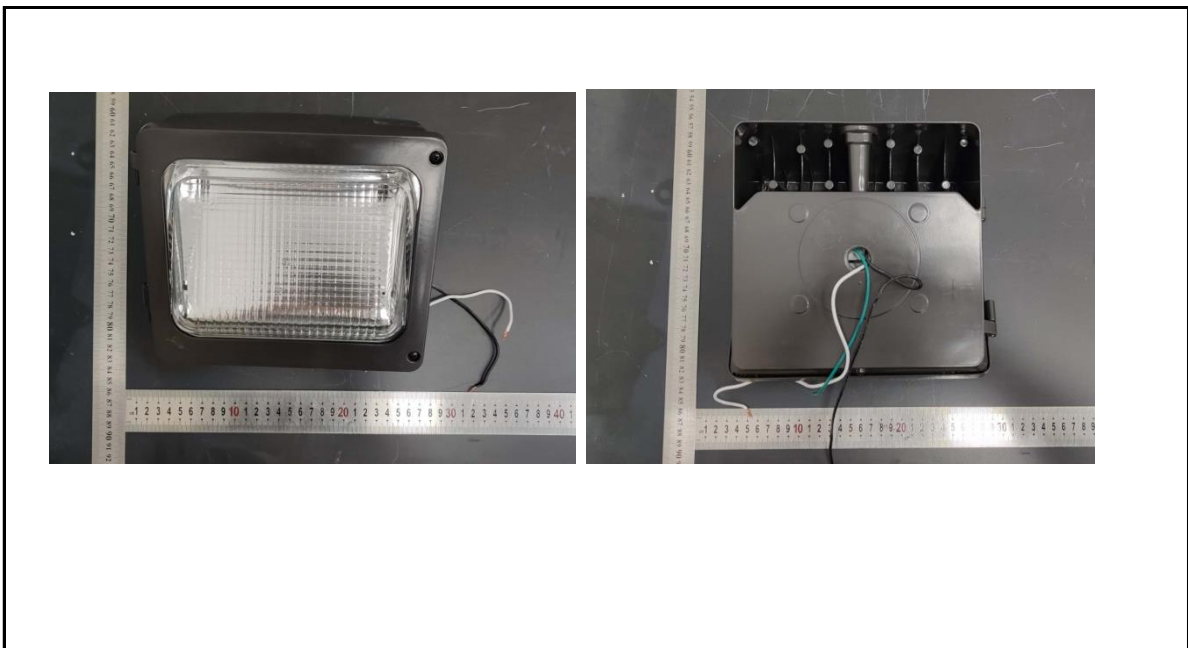
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3.0 Production Description

Luminaire Description: W34-30L

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.	W34-30L	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.1	Humidity (%RH)	57.0

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 Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.00	60	0.243	29.1	0.996
277.00	60	0.111	28.6	0.926

Test Result

CCT (K)	CRI	R9	Duv
5006	84	12	0.0001

Rf	Rg	IES Rcs,h1
84	98	-12%

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	W34-30L	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

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° C ± 1° 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

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.00	60	0.243	29.1	0.996
NON-WORST CASE	277.00	60	0.111	28.6	0.926

Test Result

Result type	Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		C0-180	C90-270	C0-180	C90-270	
0°-180° zones	3604	106.9	160.6	65.5	107.5	123.8
0°-90° zones	3512	106.9	160.6	65.5	107.5	120.7

Zonal Lumen Requirement (80°-90°)	BUG rating
2.24%	B1-U3-G1



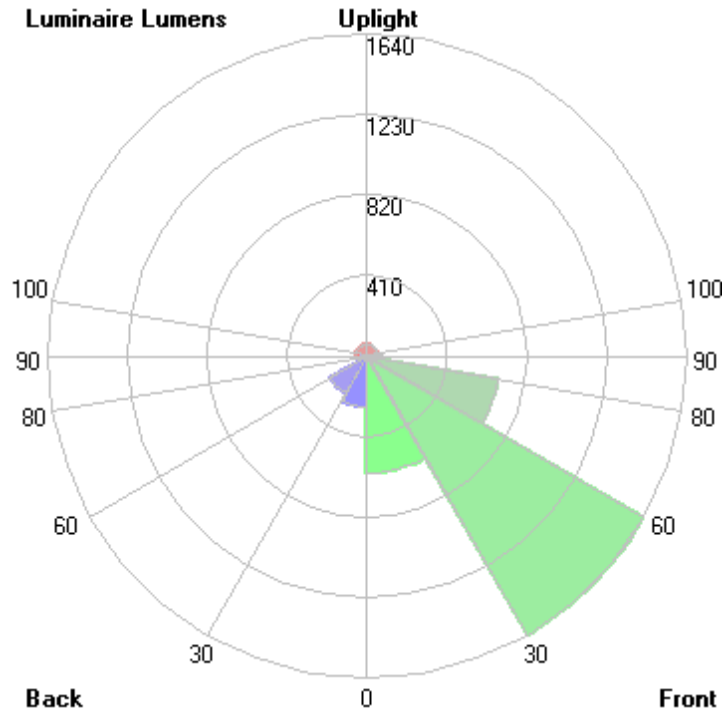
4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	99.27	0 - 10	99.27	2.75%
10-20	292.72	0 - 20	391.99	10.88%
20-30	466.70	0 - 30	858.69	23.83%
30-40	606.83	0 - 40	1465.52	40.67%
40-50	645.03	0 - 50	2110.55	58.56%
50-60	605.28	0 - 60	2715.83	75.36%
60-70	468.49	0 - 70	3184.32	88.36%
70-80	246.62	0 - 80	3430.94	95.20%
80-90	80.85	0 - 90	3511.79	97.45%
90-100	34.87	0 - 100	3546.66	98.41%
100-110	15.28	0 - 110	3561.94	98.84%
110-120	13.82	0 - 120	3575.76	99.22%
120-130	11.72	0 - 130	3587.48	99.55%
130-140	9.68	0 - 140	3597.16	99.82%
140-150	4.58	0 - 150	3601.74	99.94%
150-160	1.49	0 - 160	3603.23	99.98%
160-170	0.43	0 - 170	3603.66	100.00%
170-180	0.15	0 - 180	3603.81	100.00%

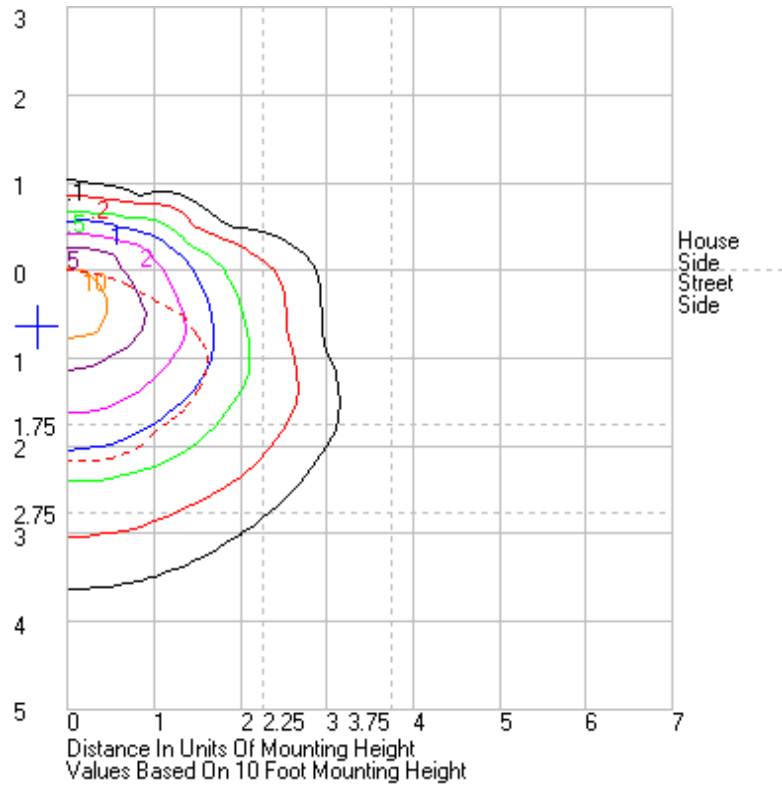
4.2 Goniophotometer Test

LCS/BUG



	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	597.3	N.A.	16.6
FM - Front-Medium (30-60)	1639.6	N.A.	45.5
FH - Front-High (60-80)	679.5	N.A.	18.9
FVH - Front-Very High (80-90)	77.2	N.A.	2.1
BL - Back-Low (0-30)	261.4	N.A.	7.3
BM - Back-Medium (30-60)	217.5	N.A.	6.0
BH - Back-High (60-80)	35.7	N.A.	1.0
BVH - Back-Very High (80-90)	3.6	N.A.	0.1
UL - Uplight-Low (90-100)	34.9	N.A.	1.0
UH - Uplight-High (100-180)	57.2	N.A.	1.6
Total	3603.9	N.A.	100.0
BUG Rating	B1-U3-G1		

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4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	W34-30L	Sample ID.	A1
Temperature (°C)	25.1	Humidity (%RH)	57.0

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° C ± 1° 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

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.00	60	0.243	29.1	0.996	3.46%
277.00	60	0.111	28.6	0.926	4.25%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2019/12/26	2020/12/25
DLF108	Auxiliary Lamp	2019/12/26	2020/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2019/12/26	2020/12/25
DLF116	AC Power Source	2019/12/26	2020/12/25
DLF113	Power Meter	2019/12/26	2020/12/25
DLF112	Temperature Recorder	2019/12/26	2020/12/25
DLF114	Temperature & Humidity Datalogger	2019/12/26	2020/12/25
DLF101	Goniophotometer	2019/12/26	2020/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2019/12/26	2020/12/25
DLF104	AC Power Source	2019/12/26	2020/12/25
DLF507	DC Power Source	2019/12/26	2020/12/25
DLF102	Power Meter	2019/12/26	2020/12/25
DLF111	Temperature & Humidity Datalogger	2019/12/26	2020/12/25
DLF119	Power Meter	2019/12/26	2020/12/25
DLF031	Temperature data logger	2019/12/26	2020/12/25
DLF022	Digital power meter	2019/12/26	2020/12/25
DLF003	Temperature & Humidity Datalogger	2019/12/26	2020/12/25

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