Photometric Test Report

Relevant Standards

☑IES LM-79-2008
☑ANSI C82.77:2017

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

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Prepared By	**Approved By**
Wangzun Zhu	Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Indoor - High Bay Luminaires (Commercial and Industrial)				
Requirement Category	**Test Method**	**Requirements**		**Test value**
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	10000		17907
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 120	Premium 135	133.9
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		133.7
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	7.12%
		20.00%	277V	10.05%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.998
		0.9	277V	0.945
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3465±245	4982
		4 step	3465±124	
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		11.8
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		96
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%⩽IES Rcs,h1⩽+23%		-12%
Zonal Lumen Requirement (20°-50°) (Goniophotometer - Section 4.2)	IES LM-79-2008	⩾30%		52.39%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	＜28		27.7
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		120
(Goniophotometer - Section 4.2)		Non-Wrost Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		1.116
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.507
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		133.7
(Goniophotometer - Section 4.2)		Non-Wrost Case		132.8

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2020/2/26	RAIL[bank, P]150W/D10	G1
2	Goniophotometer Test	2020/2/26	RAIL[bank, P]150W/D10	G1
3	THD and PF Test	2020/2/26	RAIL[bank, P]150W/D10	G1

Remark(If any)
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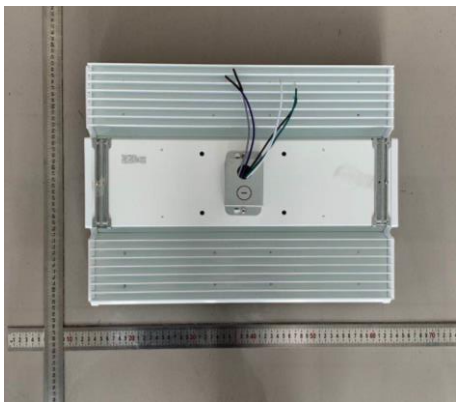
2、The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing 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: RAIL[bank, P]150W/D10

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.	RAIL[bank, P]150W/D10	Sample ID.	G1
Opreate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	24.9	Humidity (%RH)	56.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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	1.117	133.7	0.998
277.07	60	0.507	132.8	0.945

Test Result

CCT (K)	CRI	R9	Duv
4982	84	11.8	0.0031

Rf	Rg	IES Rcs,h1
84	96	-12%

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	RAIL[bank, P]150W/D10	Sample ID.	G1
Opreate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.1	Humidity (%RH)	54.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters 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^{o} vertical intervals and 10^{o} horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	120.05	60	1.116	133.7	0.998
NON-WROST CASE	277.03	60	0.507	132.8	0.945

Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
17907	155.0	154.8	94.3	99.5	133.9

Zonal Lumen Requirement (20°-50°)	Corrected UGR (X=4H, Y=8H, 70/50/20%)
52.39%	27.7

4.2 Goniophotometer Test

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		UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H	Y=2H	23.5	25.1	23.8	25.4	25.7	23.4	25.0	23.8	25.3	25.6
	3H	25.1	26.6	25.5	26.9	27.3	24.9	26.4	25.3	26.7	27.0
	4H	25.8	27.1	26.2	27.5	27.9	25.5	26.8	25.9	27.1	27.5
	6H	26.3	27.6	26.8	27.9	28.3	25.8	27.0	26.2	27.4	27.8
	8H	26.6	27.7	27.0	28.1	28.5	25.9	27.1	26.3	27.5	27.9
	12H	26.8	27.9	27.2	28.3	28.7	25.9	27.1	26.4	27.4	27.9
4H	2H	24.0	25.4	24.4	25.7	26.1	23.9	25.3	24.3	25.6	26.0
	3H	25.9	27.0	26.3	27.4	27.8	25.7	26.8	26.1	27.2	27.6
	4H	26.7	27.7	27.1	28.1	28.6	26.3	27.3	26.7	27.7	28.2
	6H	27.4	28.3	27.8	28.7	29.2	26.8	27.6	27.2	28.1	28.5
	8H	27.7	28.5	28.1	28.9	29.4	26.9	27.7	27.3	28.2	28.6
	12H	28.0	28.7	28.4	29.2	29.7	26.9	27.7	27.4	28.2	28.6
8H	4H	27.0	27.8	27.4	28.3	28.7	26.6	27.4	27.0	27.8	28.3
	6H	27.8	28.5	28.3	29.0	29.4	27.1	27.8	27.6	28.3	28.8
	8H	28.2	28.8	28.7	29.3	29.8	27.3	27.9	27.8	28.4	28.9
	12H	28.6	29.2	29.1	29.6	30.2	27.4	28.0	28.0	28.5	29.0
12H	4H	27.0	27.8	27.5	28.2	28.7	26.6	27.3	27.1	27.8	28.3
	6H	27.9	28.5	28.4	28.9	29.5	27.2	27.8	27.7	28.3	28.8
	8H	28.3	28.8	28.8	29.3	29.9	27.4	28.0	27.9	28.5	29.0

Maximum UGR = 30.2

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	699.63	0 - 10	699.63	3.91%
10-20	1971.31	0 - 20	2670.94	14.92%
20-30	2890.45	0 - 30	5561.39	31.06%
30-40	3303.81	0 - 40	8865.20	49.51%
40-50	3186.89	0 - 50	12052.09	67.31%
50-60	2654.96	0 - 60	14707.05	82.13%
60-70	1868.55	0 - 70	16575.60	92.57%
70-80	1020.48	0 - 80	17596.08	98.27%
80-90	310.59	0 - 90	17906.67	100.00%
90-100	0.00	0 - 100	17906.67	100.00%
100-110	0.00	0 - 110	17906.67	100.00%
110-120	0.00	0 - 120	17906.67	100.00%
120-130	0.00	0 - 130	17906.67	100.00%
130-140	0.00	0 - 140	17906.67	100.00%
140-150	0.00	0 - 150	17906.67	100.00%
150-160	0.00	0 - 160	17906.67	100.00%
160-170	0.00	0 - 170	17906.67	100.00%
170-180	0.00	0 - 180	17906.67	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	102	99	95	98	95	92	94	92	90	91	89	87	85
2	100	92	85	80	97	90	84	79	87	82	77	83	79	75	80	77	74	72
3	91	81	73	67	89	80	73	67	77	71	65	74	69	64	72	67	63	61
4	84	72	64	58	82	71	63	57	69	62	56	66	60	56	64	59	55	53
5	78	65	56	50	75	64	56	50	62	55	49	60	54	49	58	53	48	46
6	72	59	50	44	70	58	50	44	56	49	43	54	48	43	53	47	43	41
7	67	54	45	39	65	53	45	39	51	44	39	50	43	38	48	43	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	45	37	32	43	36	31	42	36	31	41	35	31	29
10	55	42	34	29	53	41	34	29	40	33	29	39	33	29	38	33	28	27

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	RAIL[bank, P]150W/D10	Sample ID.	G1
Temperature (°C)	24.9	Humidity (%RH)	56.0

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 25º C ± 1º 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	1.117	133.7	0.998	7.12%
277.07	60	0.507	132.8	0.945	10.05%

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**********