

# 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

**DLF1812112**

## Data Number

**DLF1812112-13aMOD50**

## Test Date

**2018/12/14**

## Issue Date

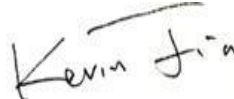
**2018/12/15**

## 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

Outdoor - Mid Output Parking Garage Luminaire			
Requirement Category	Test Method	Requirements	Test value
Lamp Output (lm)	IES LM-79-2008	5000	8175
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	112.0
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	40.10%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	16.58%
Power (Input Wattage)	IES LM-79-2008	Worst Case	73.0
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.153
Allowable CCTs* (K)	IES LM-79-2008	≤5700	4780
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	76
Power Factor	ANSI C82.77:2014	0.873	0.995
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	9.12%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/14	IVGT5U-70L750W4	M1
2	Goniophotometer Test	2018/12/14	IVGT5U-70L750W4	M1
3	THD and PF Test	2018/12/14	IVGT5U-70L750W4	M1

### Remark(If any)

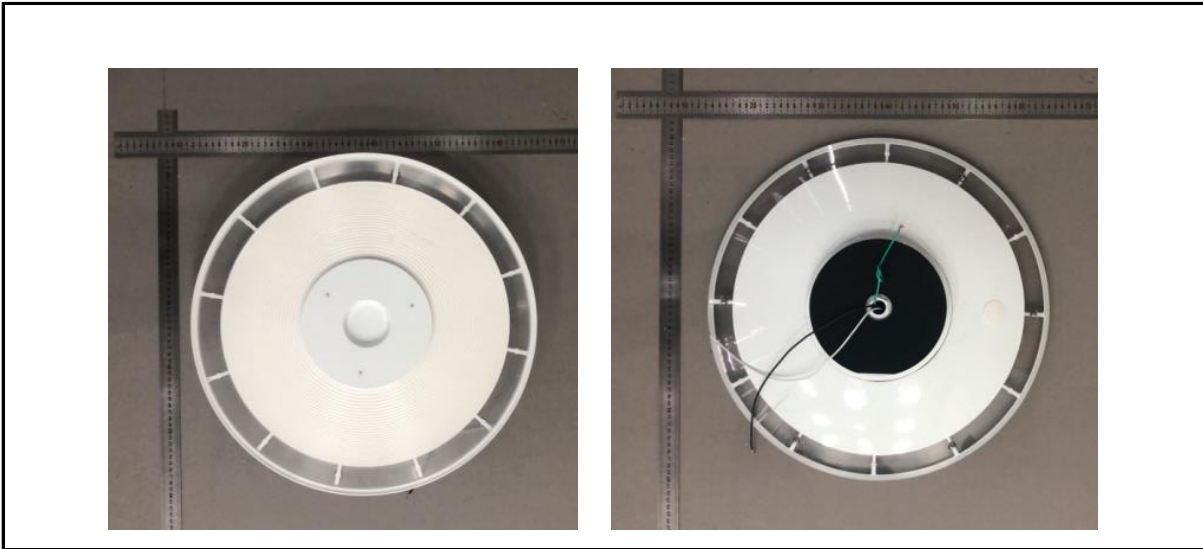
- 1、 This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.
- 2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without 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:** IVGT5U-70L750W4

**Electrical Specification:** 480V,50/60HZ, 70W

#### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	IVGT5U-70L750W4	Sample ID.	M1
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  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  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
25.3	480.02	60	0.153	73.0	0.995

#### Test Result

CCT (K)	CRI (Ra)	Duv
4780	76	6.2E-04

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVGT5U-70L750W4	Sample ID.	M1
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  $\pm 0.2$  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  $0.5^{\circ}$  vertical intervals and  $10^{\circ}$  horizontal intervals.

#### Test Conditions

Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.01	60	0.153	73.0	0.994	Light Down

#### Test Result

Flux (lm)	Zonal Lumen Requirement ( $60^{\circ}$ - $80^{\circ}$ )	Zonal Lumen Requirement ( $70^{\circ}$ - $80^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
8175	40.10%	16.58%	284.8	285.6	170.3	169.3	112.0

### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	60.79	0 - 10	60.79	0.74%
10-20	195.09	0 - 20	255.88	3.13%
20-30	363.01	0 - 30	618.89	7.57%
30-40	624.96	0 - 40	1243.85	15.22%
40-50	1086.94	0 - 50	2330.79	28.51%
50-60	1674.13	0 - 60	4004.92	48.99%
60-70	1923.26	0 - 70	5928.18	72.52%
70-80	1355.17	0 - 80	7283.35	89.09%
80-90	396.45	0 - 90	7679.80	93.94%
90-100	29.98	0 - 100	7709.78	94.31%
100-110	113.50	0 - 110	7823.28	95.70%
110-120	143.91	0 - 120	7967.19	97.46%
120-130	83.25	0 - 130	8050.44	98.48%
130-140	58.39	0 - 140	8108.83	99.19%
140-150	35.37	0 - 150	8144.20	99.62%
150-160	19.36	0 - 160	8163.56	99.86%
160-170	9.43	0 - 170	8172.99	99.97%
170-180	2.11	0 - 180	8175.10	100.00%

### 3.2 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	118	118	118	118	114	114	114	114	108	108	108	102	102	102	96	96	96	94
1	103	96	90	85	99	93	88	83	88	83	79	82	79	75	78	75	72	69
2	90	79	70	62	86	76	68	61	71	64	58	67	61	56	63	58	54	51
3	79	66	55	47	76	63	54	46	59	51	44	55	48	42	52	46	41	38
4	71	56	45	36	68	54	43	35	50	41	34	47	39	33	44	37	32	29
5	64	48	37	29	61	46	36	28	43	34	27	41	33	26	38	31	25	23
6	58	42	31	23	55	41	30	23	38	29	22	36	28	22	33	26	21	18
7	53	37	27	20	51	36	26	19	34	25	19	32	24	18	30	23	17	15
8	49	33	23	17	47	32	23	16	30	22	16	28	21	15	27	20	15	12
9	45	30	21	14	43	29	20	14	27	19	14	26	18	13	24	18	13	11
10	42	27	18	12	41	27	18	12	25	17	12	24	17	11	22	16	11	9

## 5.0 THD and PF Test

Model No.	IVGT5U-70L750W4	Sample ID.	M1
-----------	-----------------	------------	----

### 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	480.02	60	0.153	73.0	0.995	9.12%



## 6.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration	Calibration Due Date
DLF107	Integrating Sphere System	2017/12/28	2018/12/27
DLF108	Auxiliary Lamp	2017/12/28	2018/12/27
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-directional	2017/12/28	2018/12/27
DLF116	AC Power Source	2017/12/28	2018/12/27
DLF113	Power Meter	2017/12/28	2018/12/27
DLF112	Temperature Recorder	2017/12/28	2018/12/27
DLF114	Temperature & Humidity Datalogger	2017/12/28	2018/12/27
DLF101	Goniophotometer	2017/12/28	2018/12/27
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-directional	2017/12/28	2018/12/27
DLF104	AC Power Source	2017/12/28	2018/12/27
DLF507	DC Power Source	2017/12/28	2018/12/27
DLF102	Power Meter	2017/12/28	2018/12/27
DLF111	Temperature & Humidity Datalogger	2017/12/28	2018/12/27
DLF119	Power Meter	2017/12/28	2018/12/27
DLF031	Temperature data logger	2017/12/28	2018/12/27
DLF022	Digital power meter	2017/12/28	2018/12/27
DLF003	Temperature & Humidity Datalogger	2017/12/28	2018/12/27

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