

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

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2018/12/14

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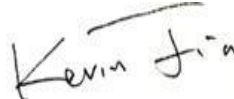
2018/12/15

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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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	7693
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	103.9
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	74.0
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.155
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3067
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	71
Power Factor	ANSI C82.77:2014	0.873	0.995
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	9.52%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/14	IVGT5U-70L730W4	M1
2	Goniophotometer Test	2018/12/14	IVGT5U-70L730W4	M1
3	THD and PF Test	2018/12/14	IVGT5U-70L730W4	M1

Remark(If any)

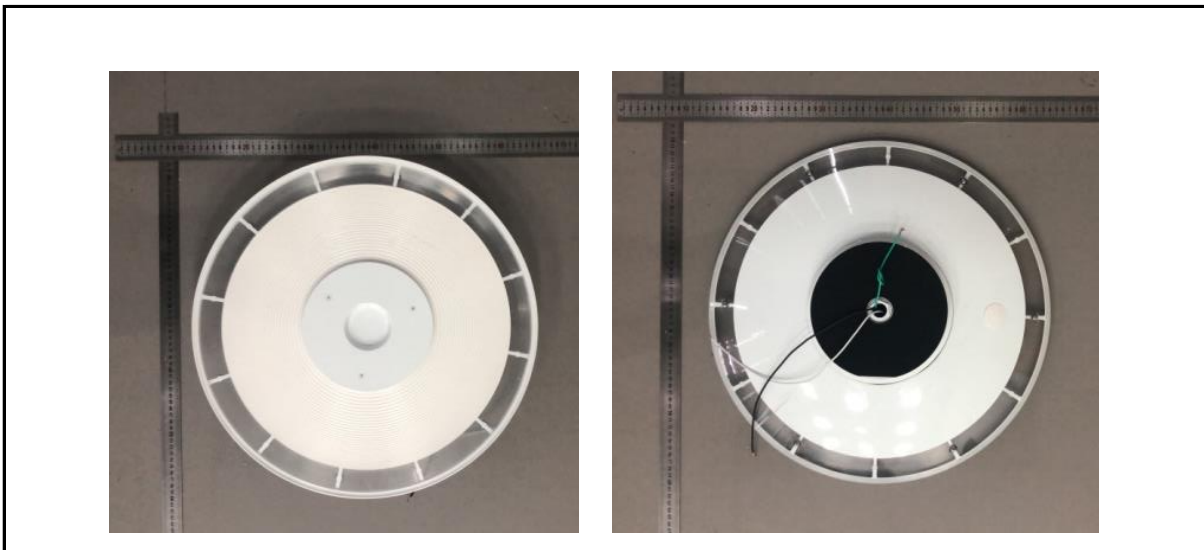
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3.0 Production Description

Luminaire Description: IVGT5U-70L730W4

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-70L730W4	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 ± 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
25.3	480.02	60	0.154	73.7	0.995

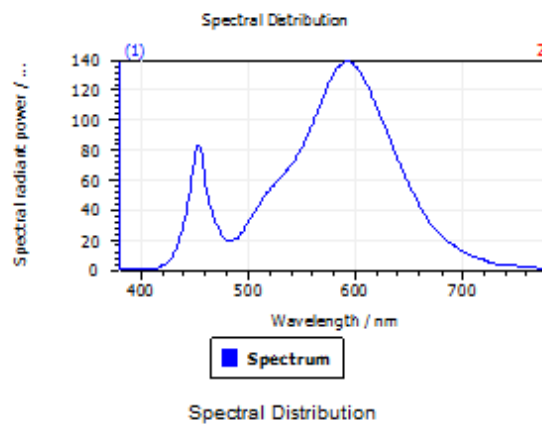
Test Result

CCT (K)	CRI (Ra)	Duv
3067	71.1	6.2E-04

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

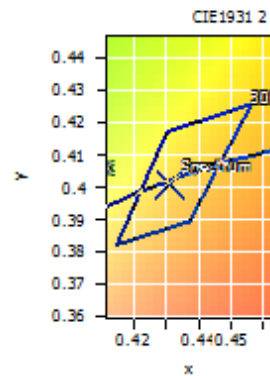


Spectral values

DominantWavelength	582.77 nm
Purity	0.497
PeakWavelength	592.56 nm
Width50%	103.00 nm

Color Coordinates

Correlated Color Temperature		3067 K	
x: 0.4314	u: 0.2485	u': 0.2485	
y: 0.4006	v: 0.3461	v': 0.5192	
CRI01	67.2	CRI09	-41.3
CRI02	84.2	CRI10	64.7
CRI03	93.3	CRI11	59.9
CRI04	64.8	CRI12	53.8
CRI05	67.0	CRI13	70.9
CRI06	78.6	CRI14	96.7
CRI07	74.8	CRI15	58.3
CRI08	38.8	CRI16	55.9
ResultsCRI	71.1		



PlanckDistance 6.2E-004

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5U-70L730W4	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 ± 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

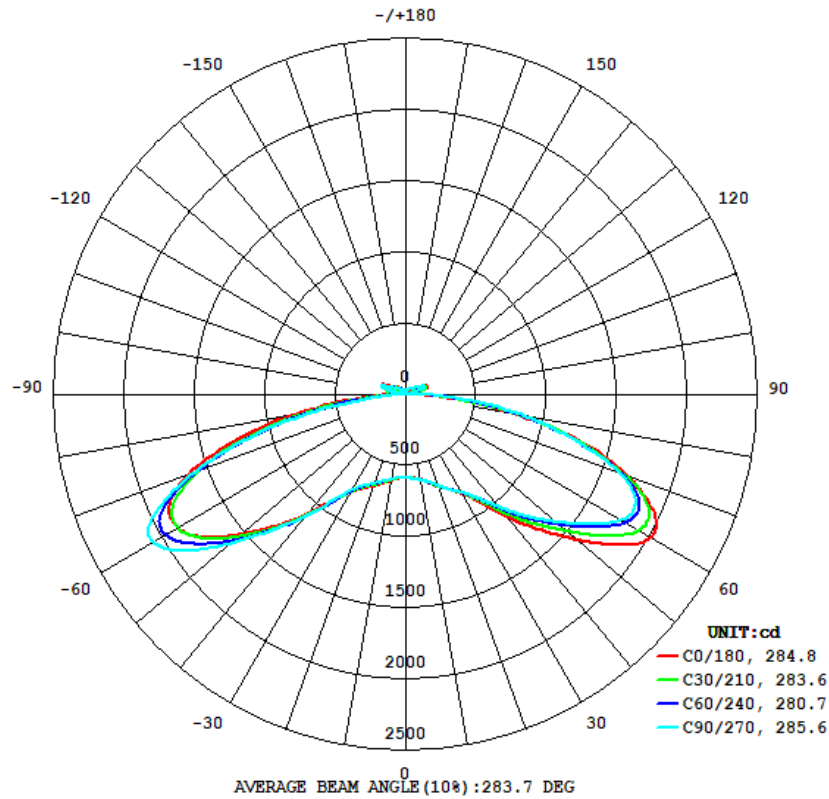
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.01	60	0.155	74.0	0.994	Light Down

Test Result

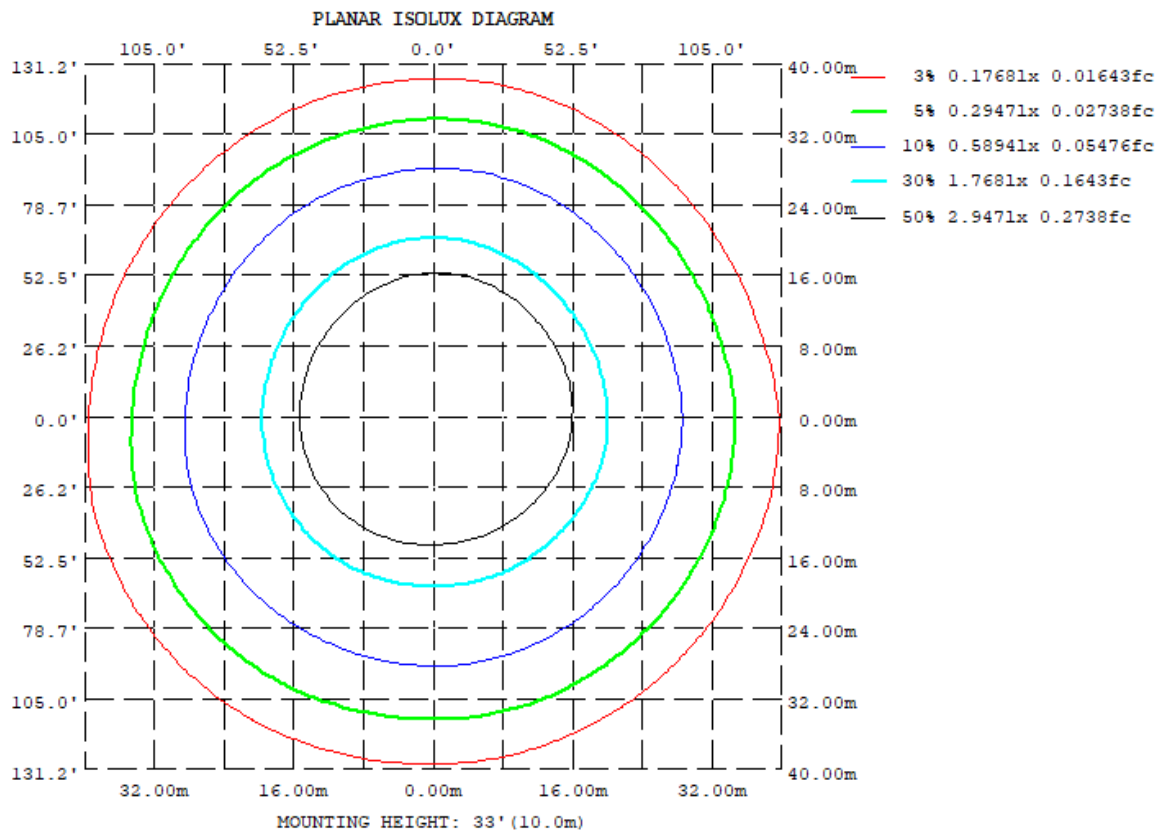
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7693	40.10%	16.58%	284.8	285.6	170.3	169.3	103.9

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd									
γ	C0	C45	C90	C135	C180	C225	C270	C315		
10	610.0	612.2	613.2	612.6	615.4	608.6	605.6	611.0		
20	692.1	690.0	684.5	693.9	689.2	672.8	666.6	680.1		
30	807.6	800.0	799.6	803.0	796.3	791.0	774.2	808.7		
40	1123	1057	1032	1059	1093	1122	1119	1179		
50	1591	1451	1395	1473	1530	1576	1625	1689		
60	2007	1848	1767	1863	1874	1905	2077	1993		
70	1678	1639	1619	1685	1648	1561	1593	1587		
80	779.4	817.9	836.7	926.4	786.2	664.9	593.5	598.7		
90	19.12	37.55	57.95	77.19	31.75	6.419	3.237	1.466		
100	22.41	29.50	26.38	30.65	46.53	78.93	77.75	72.61		
110	170.7	115.6	85.09	124.5	183.2	110.2	189.6	138.8		
120	112.7	97.21	119.1	114.6	127.4	117.0	110.0	88.20		
130	46.26	83.70	80.79	94.25	55.34	85.19	73.11	79.57		
140	67.01	61.18	56.96	68.79	74.61	62.49	60.42	59.38		
150	42.03	45.19	48.62	47.40	42.60	42.85	43.05	43.14		
160	29.21	33.74	37.91	33.71	32.49	31.59	37.94	30.95		
170	24.05	26.78	26.42	23.33	22.36	21.90	26.06	25.71		
180	21.98	19.24	16.46	20.74	20.78	19.56	17.86	19.50		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	57.21	0 - 10	57.21	0.74%
10-20	183.59	0 - 20	240.80	3.13%
20-30	341.61	0 - 30	582.41	7.57%
30-40	588.13	0 - 40	1170.54	15.22%
40-50	1022.88	0 - 50	2193.42	28.51%
50-60	1575.46	0 - 60	3768.88	48.99%
60-70	1809.91	0 - 70	5578.79	72.52%
70-80	1275.30	0 - 80	6854.09	89.09%
80-90	373.08	0 - 90	7227.17	93.94%
90-100	28.21	0 - 100	7255.38	94.31%
100-110	106.81	0 - 110	7362.19	95.70%
110-120	135.43	0 - 120	7497.62	97.46%
120-130	78.34	0 - 130	7575.96	98.48%
130-140	54.95	0 - 140	7630.91	99.19%
140-150	33.28	0 - 150	7664.19	99.62%
150-160	18.22	0 - 160	7682.41	99.86%
160-170	8.87	0 - 170	7691.28	99.97%
170-180	1.98	0 - 180	7693.26	100.00%

3.2 Goniophotometer Test

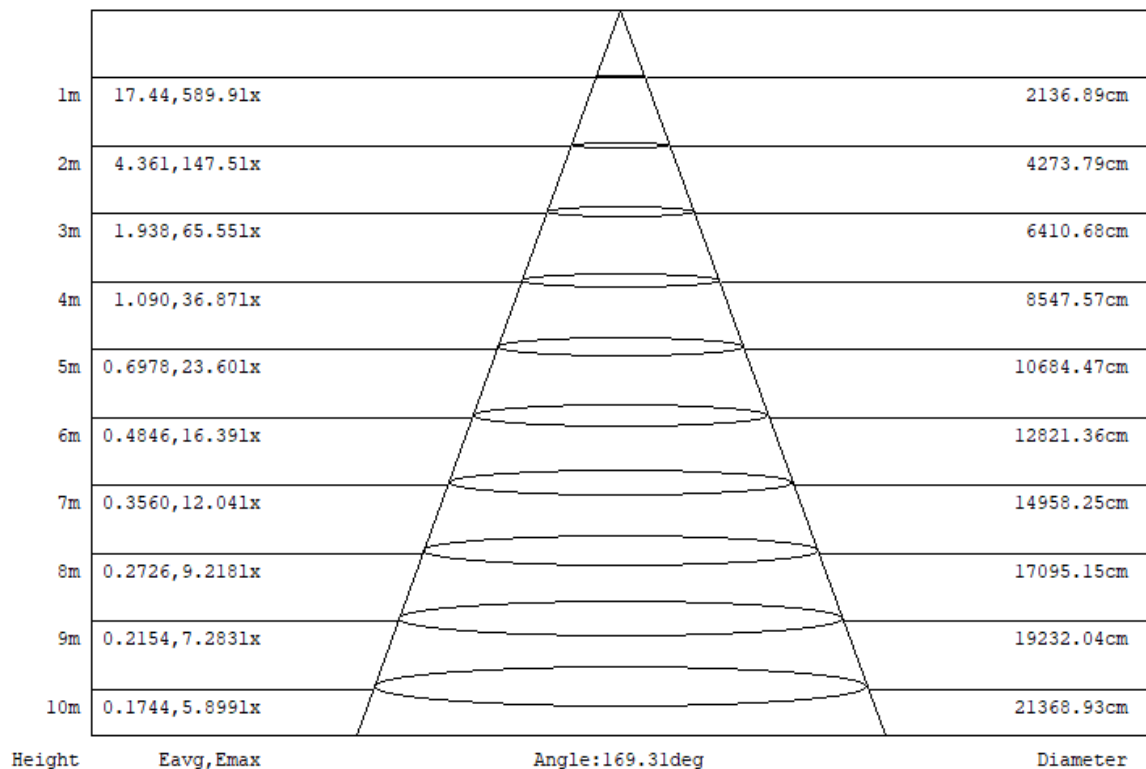
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	56	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

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	IVGT5U-70L730W4	Sample ID.	M1
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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	0.154	73.7	0.995	9.52%

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*****