

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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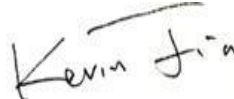
2018/11/13

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v4.3

Outdoor - Mid Output Parking Garage Luminaire			
Requirement Category	Test Method	Requirements	Test value
Lamp Output (lm)	IES LM-79-2008	5000	7657
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	95	109.4
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	34.15%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	13.88%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	2998
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	71
Power Factor	ANSI C82.77:2014	0.873	0.971
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	7.39%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/13	IVGT5CU-70L730WU	N1
2	Goniophotometer Test	2018/11/13	IVGT5CU-70L730WU	N1
3	THD and PF Test	2018/11/13	IVGT5CU-70L730WU	N1

Remark(If any)

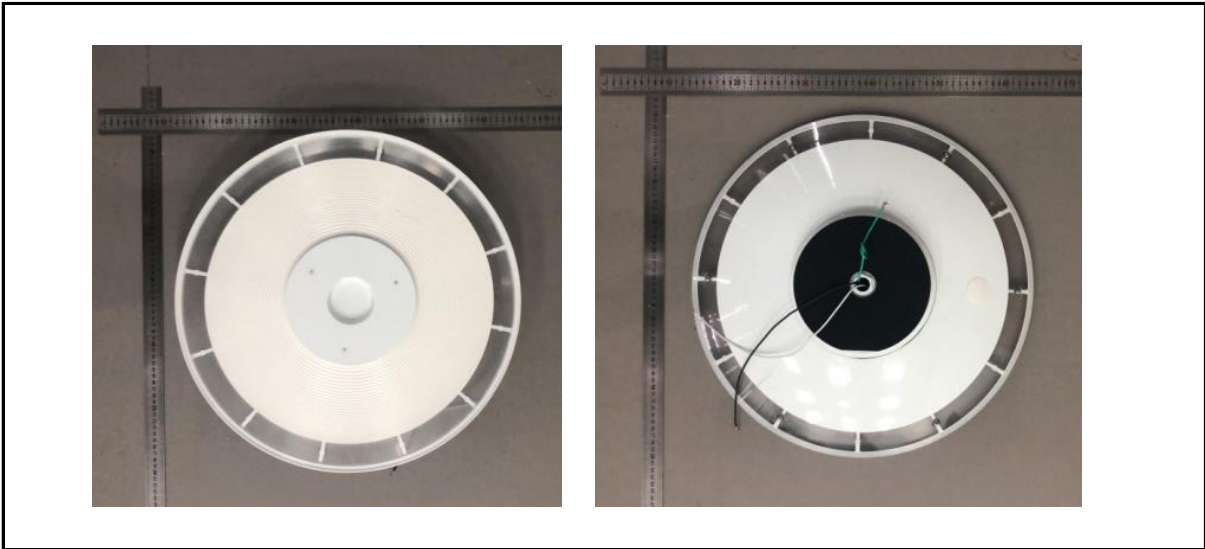
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3.0 Production Description

Luminaire Description: IVGT5CU-70L730WU

Electrical Specification: 120V-277V,50/60HZ, 70W

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	IVGT5CU-70L730WU	Sample ID.	N1
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	119.96	60	0.589	70.4	0.997

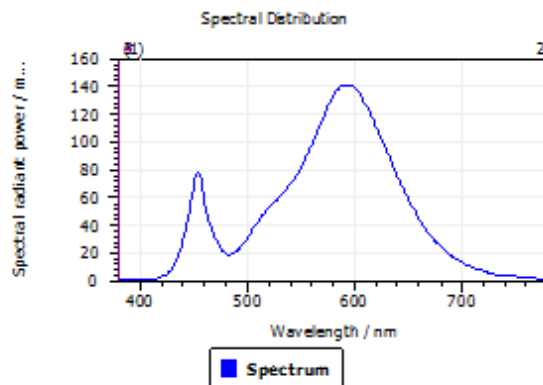
Test Result

CCT (K)	CRI (Ra)	Duv
2998	71	2.6E-04

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

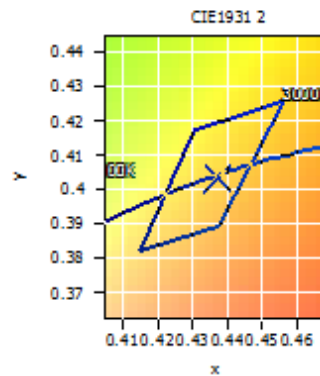
DominantWavelength	582.92 nm
Purity	0.522
PeakWavelength	593.03 nm
Radiant Power	18.51 W
Width50%	101.82 nm

Color Coordinates

Correlated Color Temperatu 2998 K

x: 0.4387 u: 0.2507 u': 0.2507
y: 0.4034 v: 0.3474 v': 0.5211

ResultsCRICRI01	66.8	ResultsCRICRI09	-40.9
ResultsCRICRI02	83.8	ResultsCRICRI10	64.0
ResultsCRICRI03	93.8	ResultsCRICRI11	59.7
ResultsCRICRI04	64.9	ResultsCRICRI12	53.2
ResultsCRICRI05	67.0	ResultsCRICRI13	70.3
ResultsCRICRI06	78.4	ResultsCRICRI14	97.0
ResultsCRICRI07	74.7	ResultsCRICRI15	58.0
ResultsCRICRI08	38.6	ResultsCRICRI16	55.7
ResultsCRI	71.0		



PlankDistance 2.6E-004

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5CU-70L730WU	Sample ID.	N1
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

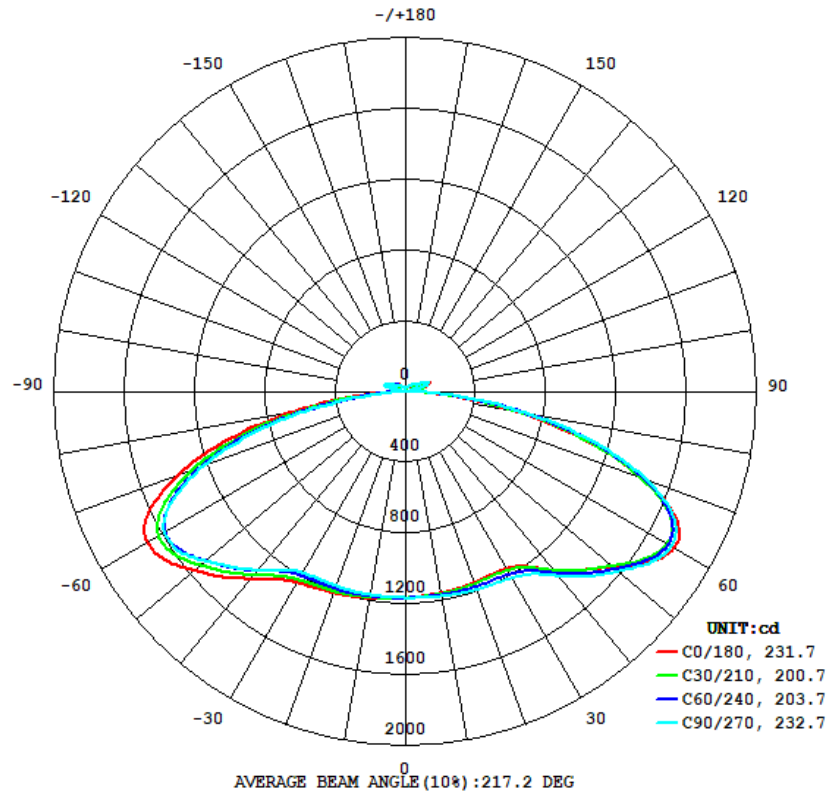
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	120.05	60	0.585	70.0	0.996	Light Down

Test Result

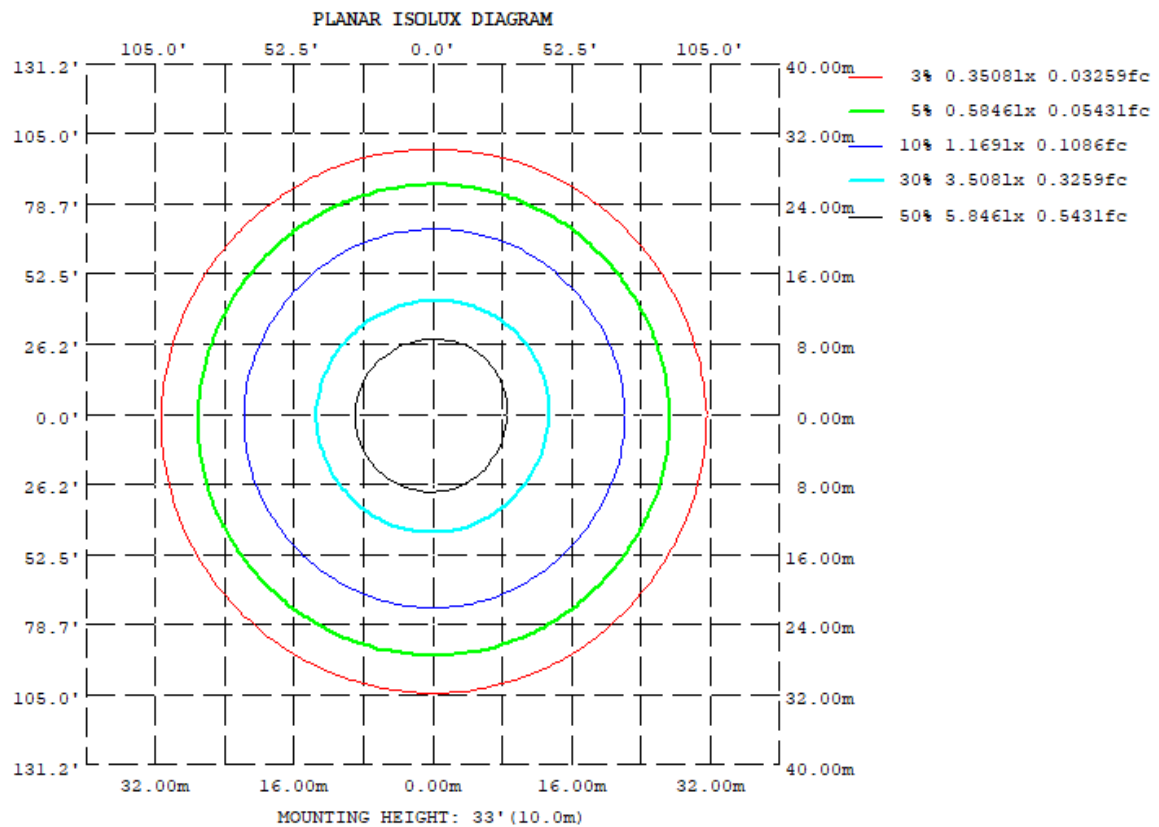
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7657	34.15%	13.88%	231.7	232.7	161.3	160.3	109.4

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1156	1163	1174	1184	1186	1178	1167	1159
20	1146	1163	1191	1211	1211	1193	1169	1154
30	1154	1177	1215	1245	1247	1214	1184	1174
40	1318	1331	1361	1381	1382	1336	1317	1346
50	1545	1543	1580	1586	1574	1505	1491	1556
60	1766	1709	1747	1721	1698	1596	1585	1679
70	1436	1425	1465	1434	1378	1265	1229	1297
80	635.4	665.8	701.0	693.4	639.9	551.7	504.3	531.6
90	8.108	17.23	18.47	20.30	21.24	3.569	2.721	2.220
100	26.47	37.57	37.99	30.81	18.91	30.47	38.99	50.47
110	151.9	93.53	135.8	89.89	119.0	107.2	131.6	84.13
120	86.18	99.01	99.87	74.00	97.18	66.45	90.77	96.73
130	61.09	70.82	66.38	73.12	62.41	68.63	61.61	71.03
140	52.72	53.71	47.67	57.39	62.08	55.90	48.87	49.21
150	33.14	36.91	40.85	44.73	43.99	43.26	37.22	37.19
160	25.29	29.69	31.44	32.18	27.00	31.44	34.36	30.95
170	18.05	22.05	22.79	22.06	20.95	17.83	22.39	22.35
180	21.56	20.39	17.55	13.76	21.06	20.32	17.99	17.47
DEG	LUMINOUS INTENSITY:cd							

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	111.57	0 - 10	111.57	1.46%
10-20	333.29	0 - 20	444.86	5.81%
20-30	549.88	0 - 30	994.74	12.99%
30-40	794.47	0 - 40	1789.21	23.37%
40-50	1123.11	0 - 50	2912.32	38.03%
50-60	1465.05	0 - 60	4377.37	57.17%
60-70	1552.51	0 - 70	5929.88	77.44%
70-80	1062.65	0 - 80	6992.53	91.32%
80-90	290.22	0 - 90	7282.75	95.11%
90-100	18.37	0 - 100	7301.12	95.35%
100-110	81.17	0 - 110	7382.29	96.41%
110-120	108.53	0 - 120	7490.82	97.82%
120-130	66.29	0 - 130	7557.11	98.69%
130-140	46.37	0 - 140	7603.48	99.30%
140-150	28.70	0 - 150	7632.18	99.67%
150-160	15.92	0 - 160	7648.10	99.88%
160-170	7.58	0 - 170	7655.68	99.98%
170-180	1.75	0 - 180	7657.43	100.00%

3.2 Goniophotometer Test

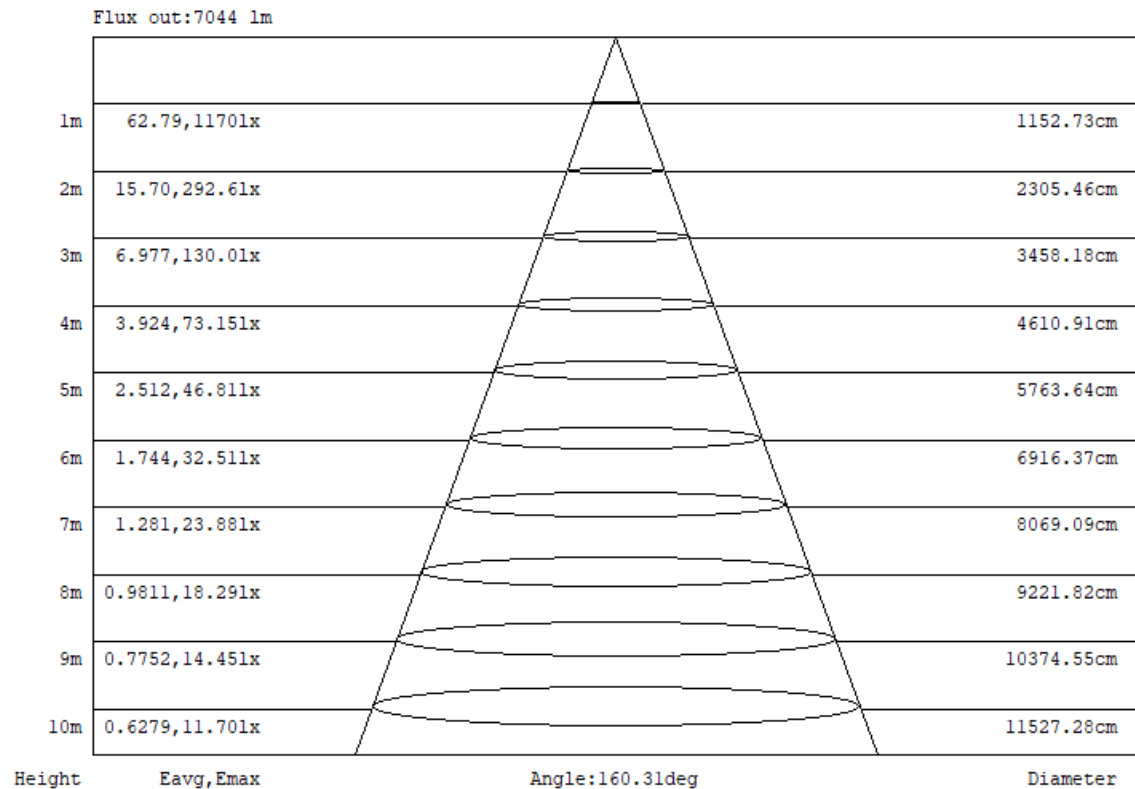
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
R/W	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	118	118	118	118	115	115	115	115	108	108	108	103	103	103	98	98	98	95
1	104	98	93	88	101	95	90	86	90	86	82	85	82	79	81	78	76	73
2	92	82	74	66	89	80	72	65	75	69	63	71	65	61	67	63	58	56
3	82	70	60	52	79	67	58	51	64	56	49	60	53	48	57	51	46	43
4	74	60	49	41	71	58	48	41	55	46	40	52	44	38	49	43	37	35
5	67	52	42	34	64	51	41	34	48	39	33	45	38	32	43	36	31	28
6	61	46	36	28	59	45	35	28	42	34	27	40	33	27	38	31	26	24
7	56	41	31	24	54	40	31	24	38	30	23	36	28	23	34	27	22	20
8	52	37	28	21	50	36	27	21	34	26	20	33	25	20	31	24	19	17
9	48	34	25	18	47	33	24	18	31	23	18	30	23	17	28	22	17	15
10	45	31	22	16	44	30	22	16	29	21	16	27	20	16	26	20	15	13

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	IVGT5CU-70L730WU	Sample ID.	N1
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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	276.94	60	0.254	68.3	0.971	7.39%
25.1	119.96	60	0.589	70.4	0.997	5.95%

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*****