

# Photometric Test Report

## Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2014

## Prepared For

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## Project Number

**DLF1811104**

## Data Number

**DLF1811104-13a**


## Test Date

**2018/11/6**

## Issue Date

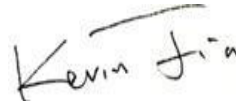
**2018/11/7**

## 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	7560
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	95	109.4
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	40.60%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	16.66%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3044
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%	7.21%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/6	IVGT5U-70L730WU	M1
2	Goniophotometer Test	2018/11/6	IVGT5U-70L730WU	M1
3	THD and PF Test	2018/11/6	IVGT5U-70L730WU	M1

### Remark(If any)

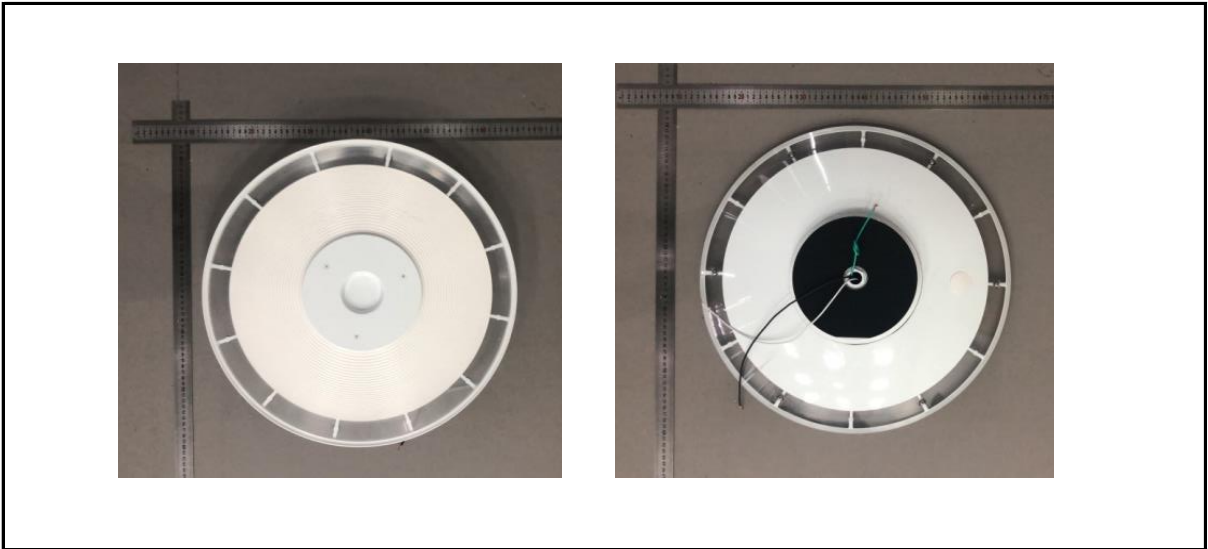
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### 3.0 Production Description

**Luminaire Description:** IVGT5U-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.	IVGT5U-70L730WU	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	119.96	60	0.585	69.9	0.997

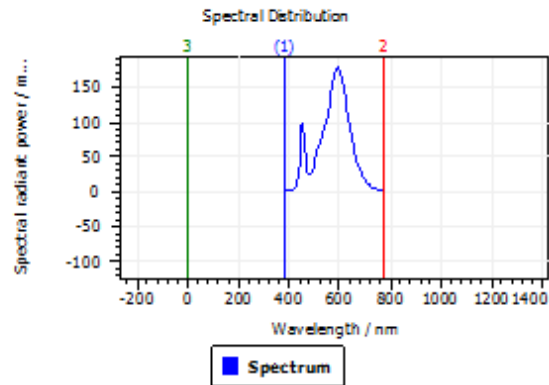
#### Test Result

CCT (K)	CRI (Ra)	Duv
3044	71.4	2.8E-04

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

DominantWavelength	582.74 nm
Purity	0.508
PeakWavelength	592.98 nm
Radiant Power	23.4 W
Width50%	102.88 nm

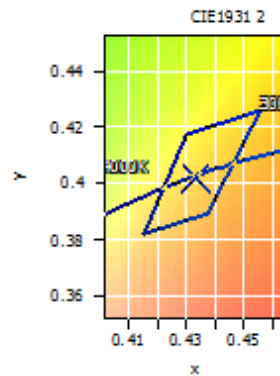
#### Color Coordinates

Correlated Color Temperatu 3044 K

x: 0.4334 u: 0.2491 u': 0.2491  
y: 0.4021 v: 0.3467 v': 0.5201

ResultsCRICRI01	67.4	ResultsCRICRI09	-40.4
ResultsCRICRI02	84.0	ResultsCRICRI10	64.1
ResultsCRICRI03	93.9	ResultsCRICRI11	60.7
ResultsCRICRI04	65.5	ResultsCRICRI12	53.2
ResultsCRICRI05	67.3	ResultsCRICRI13	70.9
ResultsCRICRI06	78.2	ResultsCRICRI14	97.0
ResultsCRICRI07	75.4	ResultsCRICRI15	58.6
ResultsCRICRI08	39.6	ResultsCRICRI16	56.3

ResultsCRI 71.4



PlanckDistance 2.8E-004

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVGT5U-70L730WU	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

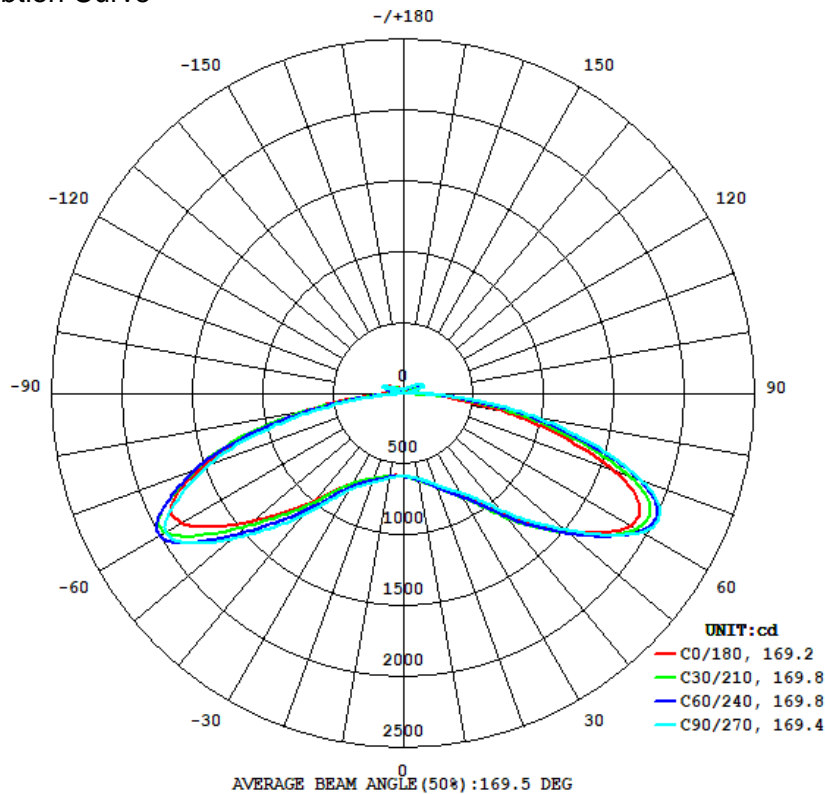
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	120.04	60	0.578	69.1	0.996	Light Down

#### Test Result

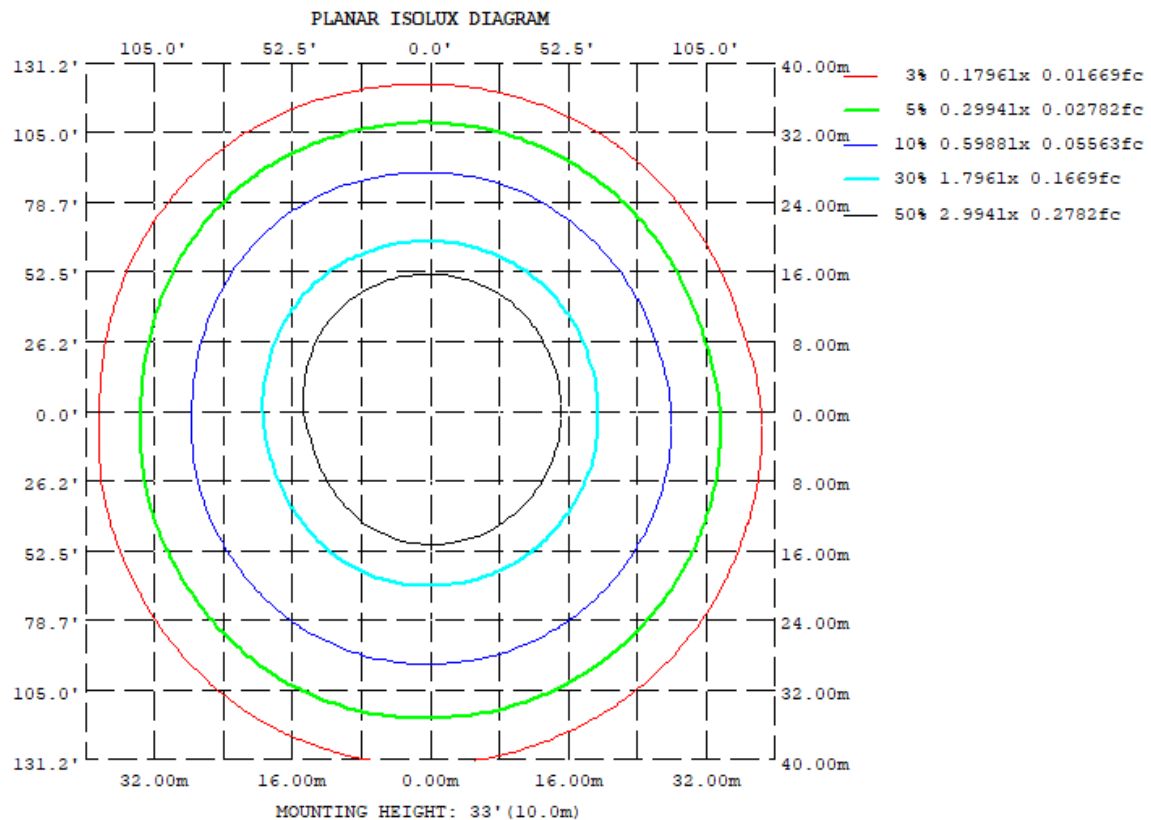
Flux (lm)	Zonal Lumen Requirement ( $60^{\circ}$ - $80^{\circ}$ )	Zonal Lumen Requirement ( $70^{\circ}$ - $80^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7560	40.60%	16.66%	280.7	276.3	169.2	169.4	109.4

### 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	626.3	625.4	614.2	598.4	593.5	596.9	610.0	621.8		
20	705.9	709.6	692.9	658.9	642.3	646.5	673.3	694.6		
30	838.1	856.0	815.8	756.7	731.5	744.3	792.6	819.2		
40	1127	1142	1076	986.0	987.0	1038	1126	1141		
50	1516	1545	1499	1386	1403	1502	1598	1576		
60	1865	1927	1959	1852	1829	2008	1954	1926		
70	1588	1754	1804	1746	1524	1609	1477	1430		
80	716.0	855.8	945.0	919.5	699.2	674.2	546.3	555.1		
90	22.01	42.46	59.47	60.55	21.85	2.740	7.747	1.937		
100	18.04	30.69	39.09	30.87	23.86	56.80	65.33	62.29		
110	134.4	80.70	74.30	114.7	151.3	95.80	155.6	117.7		
120	102.7	117.5	140.0	83.07	105.9	94.91	95.08	73.71		
130	42.27	82.24	84.54	77.08	42.23	68.32	60.90	64.76		
140	62.80	58.42	58.58	59.41	58.63	51.39	49.24	49.27		
150	35.75	42.04	44.08	44.00	37.43	40.62	40.79	38.53		
160	30.75	33.22	37.04	33.56	28.32	30.79	36.35	32.92		
170	23.03	25.20	28.24	24.05	22.52	20.51	24.48	25.04		
180	21.56	22.40	14.59	13.43	21.54	22.63	19.32	18.43		



### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	57.27	0 - 10	57.27	0.76%
10-20	182.47	0 - 20	239.74	3.17%
20-30	340.05	0 - 30	579.79	7.67%
30-40	580.63	0 - 40	1160.42	15.35%
40-50	998.92	0 - 50	2159.34	28.56%
50-60	1552.12	0 - 60	3711.46	49.09%
60-70	1809.63	0 - 70	5521.09	73.03%
70-80	1259.81	0 - 80	6780.90	89.69%
80-90	365.16	0 - 90	7146.06	94.52%
90-100	25.46	0 - 100	7171.52	94.86%
100-110	91.72	0 - 110	7263.24	96.07%
110-120	120.74	0 - 120	7383.98	97.67%
120-130	71.43	0 - 130	7455.41	98.61%
130-140	48.10	0 - 140	7503.51	99.25%
140-150	29.66	0 - 150	7533.17	99.64%
150-160	16.86	0 - 160	7550.03	99.86%
160-170	8.47	0 - 170	7558.50	99.97%
170-180	1.96	0 - 180	7560.46	100.00%

### 3.2 Goniophotometer Test

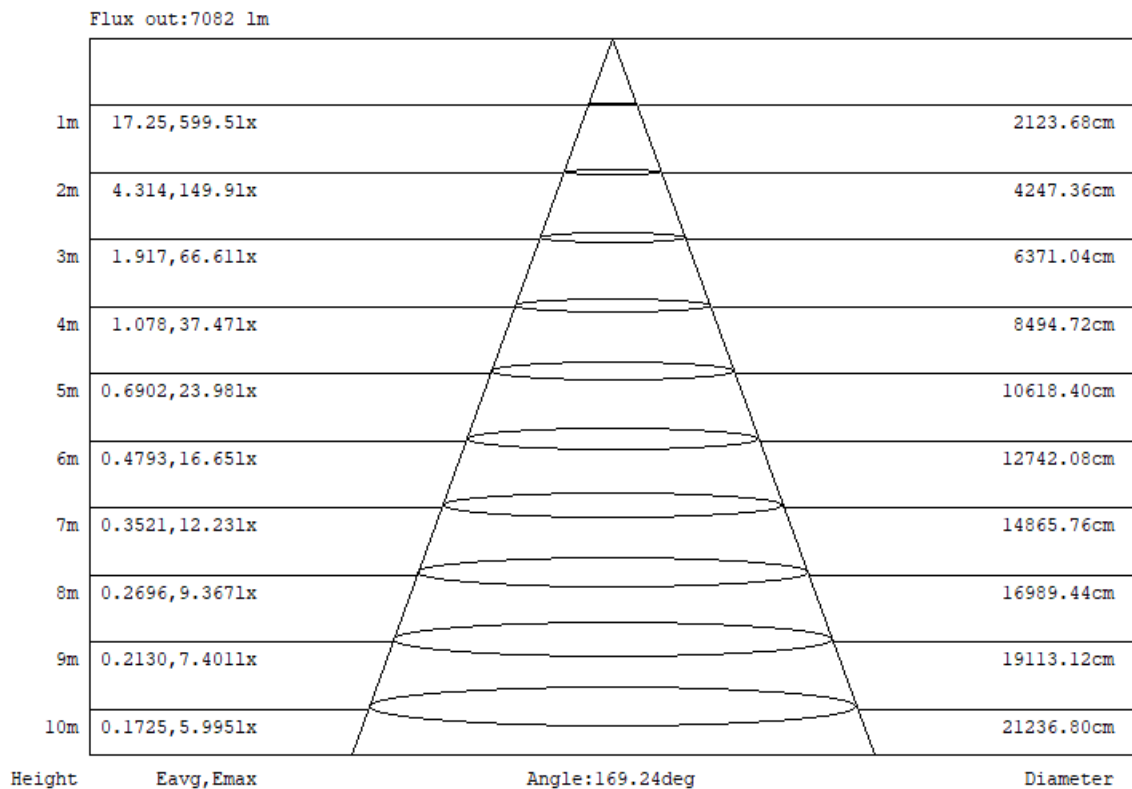
#### COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

##### 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	252	252	252	252	245	245	245	245	232	232	232	219	219	219	208	208	208	203
1	221	206	193	182	213	200	188	177	188	178	170	177	169	162	168	161	155	149
2	193	169	149	133	185	164	145	130	153	138	125	144	131	120	135	125	115	109
3	170	141	118	100	163	136	115	98	127	109	94	119	104	91	112	99	88	82
4	152	119	95	77	145	115	93	76	108	89	73	101	84	71	95	80	69	62
5	137	103	79	62	131	99	77	61	93	74	59	87	70	57	82	67	55	49
6	124	90	67	50	119	87	65	49	82	62	48	76	59	46	72	57	45	39
7	114	80	57	42	109	77	56	41	72	54	40	68	51	39	64	49	37	32
8	105	71	50	35	101	69	49	35	65	47	34	61	45	33	58	43	32	27
9	97	64	44	30	93	62	43	30	59	41	29	56	40	28	52	38	27	23
10	91	59	39	27	87	57	39	26	54	37	25	51	35	25	48	34	24	20

#### CONE OF LIGHT DIAGRAM



## 5.0 THD and PF Test

Model No.	IVGT5U-70L730WU	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	276.99	60	0.251	67.5	0.971	7.21%
25.1	119.96	60	0.585	69.9	0.997	6.29%

## 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\*\*\*\*\*