

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1811104**

## Data Number

**DLF1811104-16a**

## Test Date

**2018/11/7**

## Issue Date

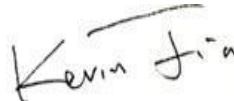
**2018/11/8**

## Prepared By



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## 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	7829
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	95	113.2
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	34.26%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	14.00%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	4814
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	76
Power Factor	ANSI C82.77:2014	0.873	0.970
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	7.54%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/7	IVGT5CU-70L750WU	P1
2	Goniophotometer Test	2018/11/7	IVGT5CU-70L750WU	P1
3	THD and PF Test	2018/11/7	IVGT5CU-70L750WU	P1

### Remark(If any)

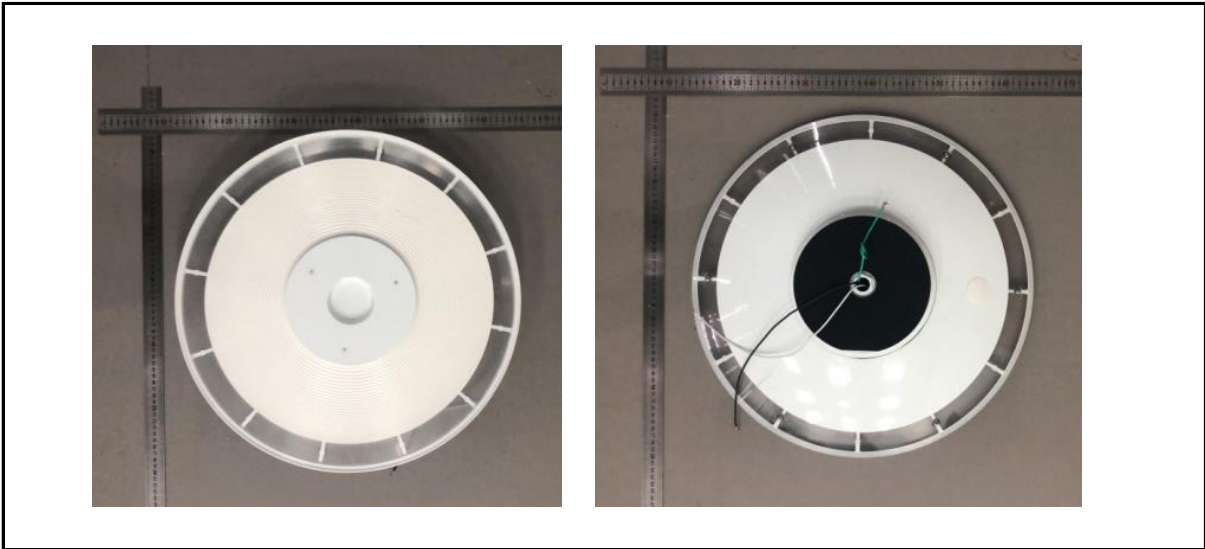
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### 3.0 Production Description

**Luminaire Description:** IVGT5CU-70L750WU

**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-70L750WU	Sample ID.	P1
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	120.02	60	0.588	70.3	0.997

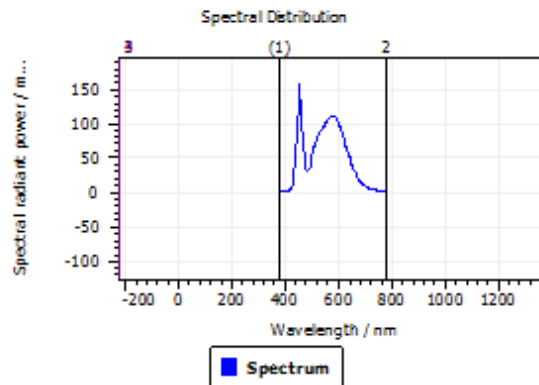
#### Test Result

CCT (K)	CRI (Ra)	Duv
4814	75.7	4.5E-03

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

DominantWavelength	571.33 nm
Purity	0.154
PeakWavelength	452.80 nm
Radiant Power	19.44 W
Width50%:	21.67 nm

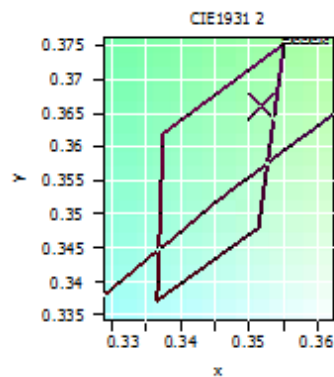
#### Color Coordinates

Correlated Color Temperature 4814 K

x: 0.3518 u: 0.2104 u': 0.2104  
y: 0.3660 v: 0.3283 v': 0.4925

ResultsCRICRI01	71.7	ResultsCRICRI09	-26.8
ResultsCRICRI02	82.8	ResultsCRICRI10	59.2
ResultsCRICRI03	90.8	ResultsCRICRI11	69.9
ResultsCRICRI04	73.1	ResultsCRICRI12	45.9
ResultsCRICRI05	72.3	ResultsCRICRI13	74.4
ResultsCRICRI06	75.7	ResultsCRICRI14	95.1
ResultsCRICRI07	83.7	ResultsCRICRI15	64.0
ResultsCRICRI08	55.5	ResultsCRICRI16	62.4

ResultsCRI 75.7



PlanckDistance 4.5E-003

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVGT5CU-70L750WU	Sample ID.	P1
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

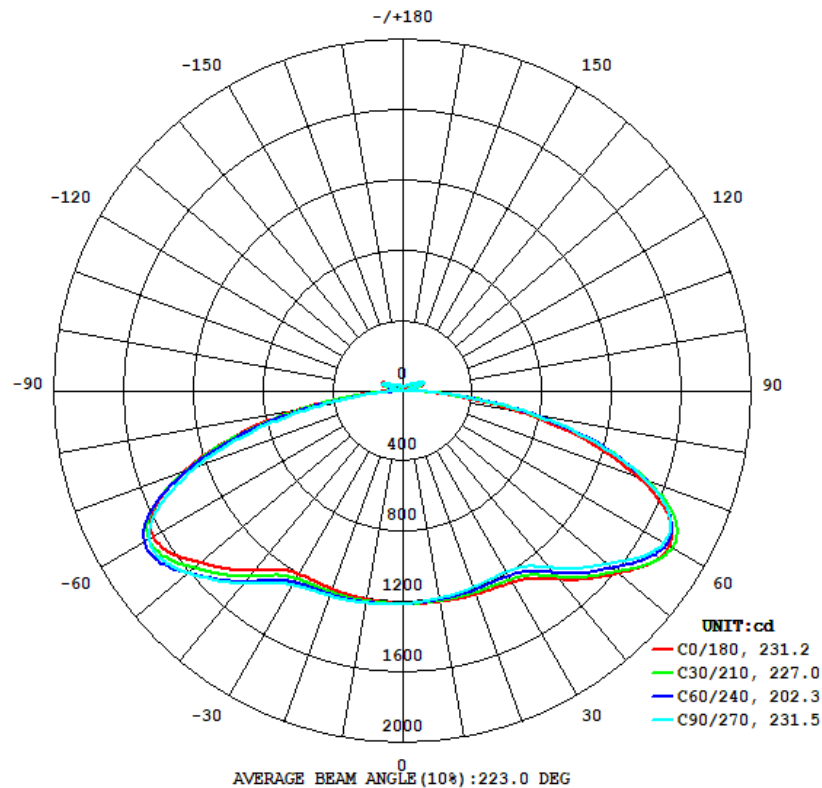
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	120.04	60	0.578	69.1	0.996	Light Down

#### Test Result

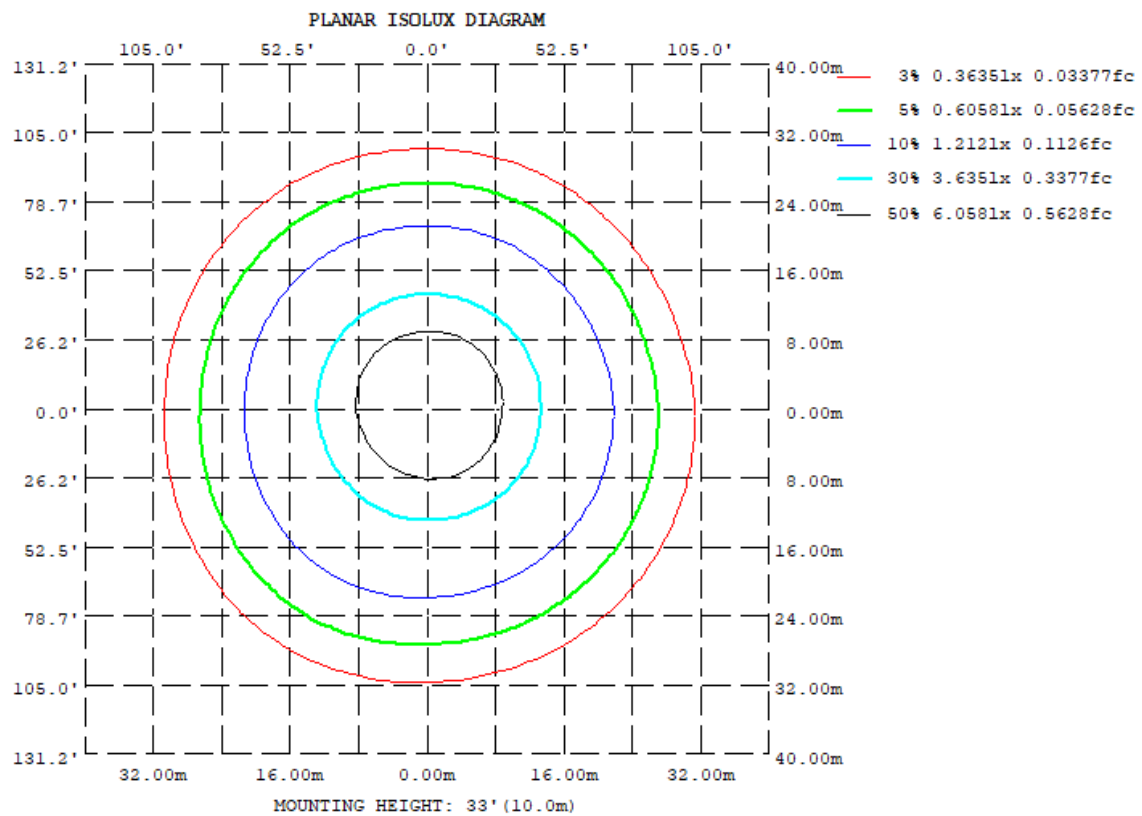
Flux (lm)	Zonal Lumen Requirement ( $60^{\circ}$ - $80^{\circ}$ )	Zonal Lumen Requirement ( $70^{\circ}$ - $80^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7829	34.26%	14.00%	231.2	231.5	160.8	160.4	113.2

### 4.3 Goniophotometer Test

#### Light Distrubtion Curve



#### Isolux Plot



### 4.3 Goniophotometer Test

#### Zonal Lumen Summary

DEG	C0	C45	C90	C135	C180	C225	C270	C315
7	1218	1209	1198	1196	1207	1219	1226	1225
10	1232	1211	1188	1181	1201	1226	1241	1244
20	1256	1226	1188	1171	1204	1247	1276	1287
30	1402	1365	1314	1289	1337	1401	1431	1449
40	1612	1583	1531	1496	1522	1593	1612	1641
50	1766	1765	1730	1731	1654	1706	1677	1721
60	1440	1488	1479	1540	1332	1331	1262	1305
80	683.5	755.5	748.0	783.2	601.3	562.6	489.9	538.0
90	19.36	32.16	34.10	39.62	14.17	3.886	4.111	1.143
100	18.95	27.58	24.92	27.46	21.67	44.77	44.88	43.59
110	128.8	93.31	122.3	97.02	129.0	91.05	125.4	82.25
120	99.32	87.51	104.1	84.48	88.51	77.01	84.05	85.50
130	36.86	69.34	67.30	66.41	40.13	64.04	60.28	69.69
140	56.67	49.36	47.17	50.78	56.17	46.66	45.90	51.27
150	35.83	35.66	37.57	36.36	34.54	36.12	38.49	40.47
160	27.64	26.78	32.90	26.58	27.58	27.14	33.27	32.00
170	18.56	25.66	24.64	21.22	18.86	18.24	21.69	22.33
180	17.25	17.41	16.40	19.61	17.34	17.60	16.72	17.87

LUMINOUS INTENSITY:cd



### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	115.69	0 - 10	115.69	1.48%
10-20	344.15	0 - 20	459.84	5.87%
20-30	565.24	0 - 30	1025.08	13.09%
30-40	811.92	0 - 40	1837.00	23.46%
40-50	1144.93	0 - 50	2981.93	38.09%
50-60	1491.38	0 - 60	4473.31	57.14%
60-70	1586.09	0 - 70	6059.40	77.39%
70-80	1096.38	0 - 80	7155.78	91.40%
80-90	313.28	0 - 90	7469.06	95.40%
90-100	19.25	0 - 100	7488.31	95.64%
100-110	75.73	0 - 110	7564.04	96.61%
110-120	106.95	0 - 120	7670.99	97.98%
120-130	63.47	0 - 130	7734.46	98.79%
130-140	43.52	0 - 140	7777.98	99.34%
140-150	26.80	0 - 150	7804.78	99.69%
150-160	15.24	0 - 160	7820.02	99.88%
160-170	7.54	0 - 170	7827.56	99.98%
170-180	1.74	0 - 180	7829.30	100.00%

### 3.2 Goniophotometer Test

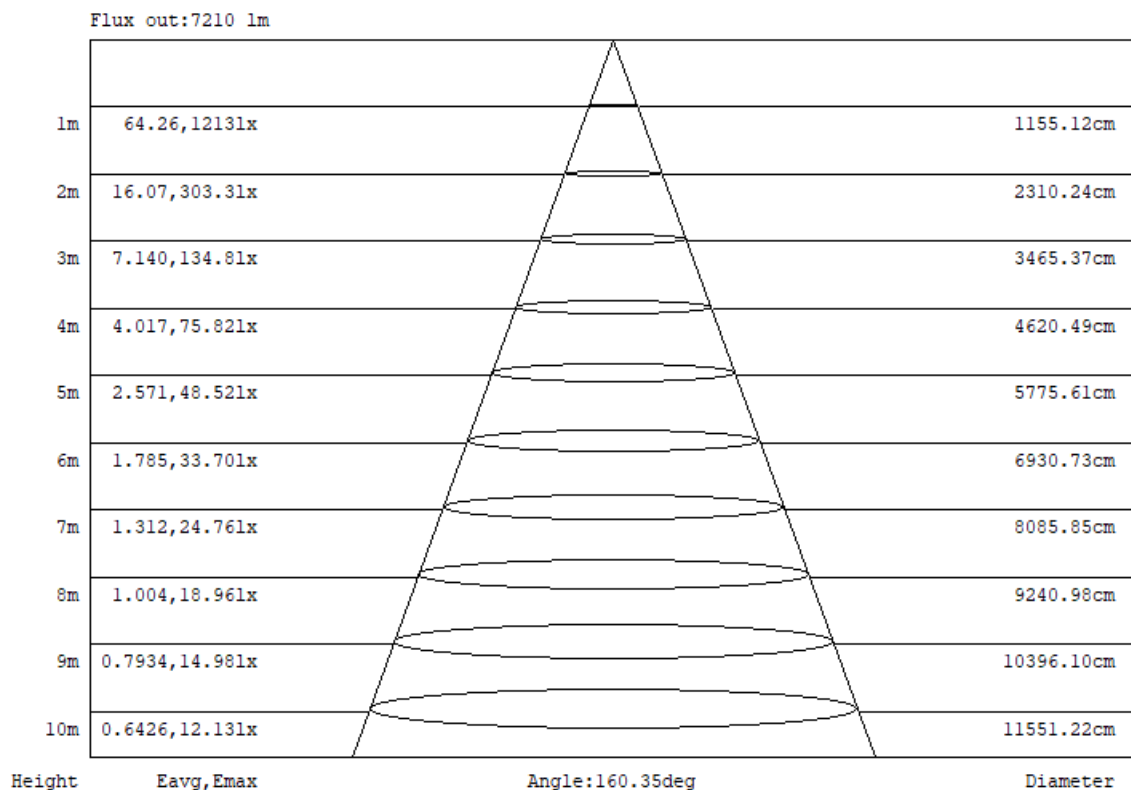
#### COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

##### 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	109	109	109	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	73	66	89	80	72	65	75	69	63	71	65	61	67	63	59	56
3	82	69	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	33	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-70L750WU	Sample ID.	P1
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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	277.01	60	0.250	67.1	0.970	7.54%
25.1	120.02	60	0.588	70.3	0.997	6.70%

## 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-derectional	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-derectional	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\*\*\*\*\*