

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1812112**

## Data Number

**DLF1812112-9aMOD50**

## Test Date

**2018/12/14**

## Issue Date

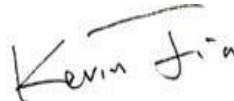
**2018/12/15**

## Prepared By



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## 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	7765
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	105.5
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	42.53%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	17.56%
Power (Input Wattage)	IES LM-79-2008	Worst Case	73.6
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.154
Allowable CCTs* (K)	IES LM-79-2008	≤5700	4781
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%	10.28%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/14	IVGT5-70L750Z4	I1
2	Goniophotometer Test	2018/12/14	IVGT5-70L750Z4	I1
3	THD and PF Test	2018/12/14	IVGT5-70L750Z4	I1

### Remark(If any)

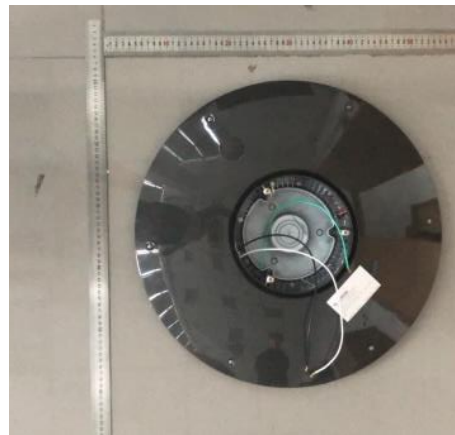
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### 3.0 Production Description

**Luminaire Description:** IVGT5-70L750Z4

**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.	IVGT5-70L750Z4	Sample ID.	I1
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	480.01	60	0.154	73.6	0.995

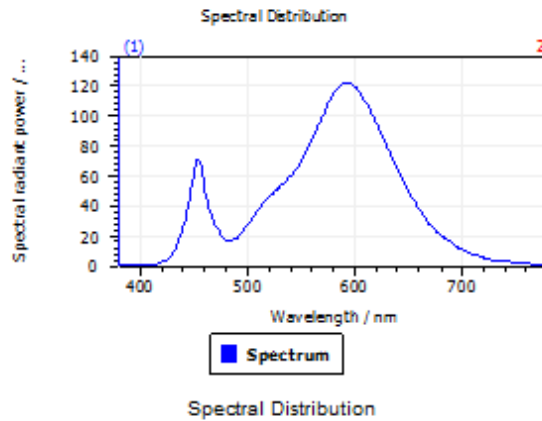
#### Test Result

CCT (K)	CRI (Ra)	Duv
4781	76	8.3E-04

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results

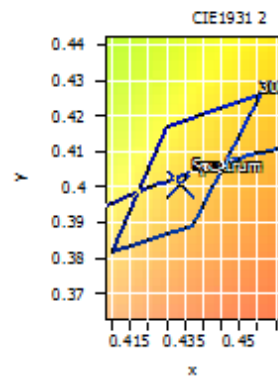


#### Spectral values

DominantWavelength	583.01 nm
Purity	0.506
PeakWavelength	592.92 nm
Width50%:	101.68 nm

#### Color Coordinates

Correlated Color Temperature		3026 K	
x: 0.4339	u: 0.2500	u': 0.2500	
y: 0.4010	v: 0.3465	v': 0.5197	
CRI01	67.6	CRI09	-39.2
CRI02	84.2	CRI10	64.4
CRI03	93.9	CRI11	60.4
CRI04	65.5	CRI12	53.1
CRI05	67.5	CRI13	71.0
CRI06	78.3	CRI14	97.1
CRI07	75.5	CRI15	59.3
CRI08	40.1	CRI16	57.0
ResultsCRI	71.6		



PlanckDistance 8.3E-004

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVGT5-70L750Z4	Sample ID.	I1
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

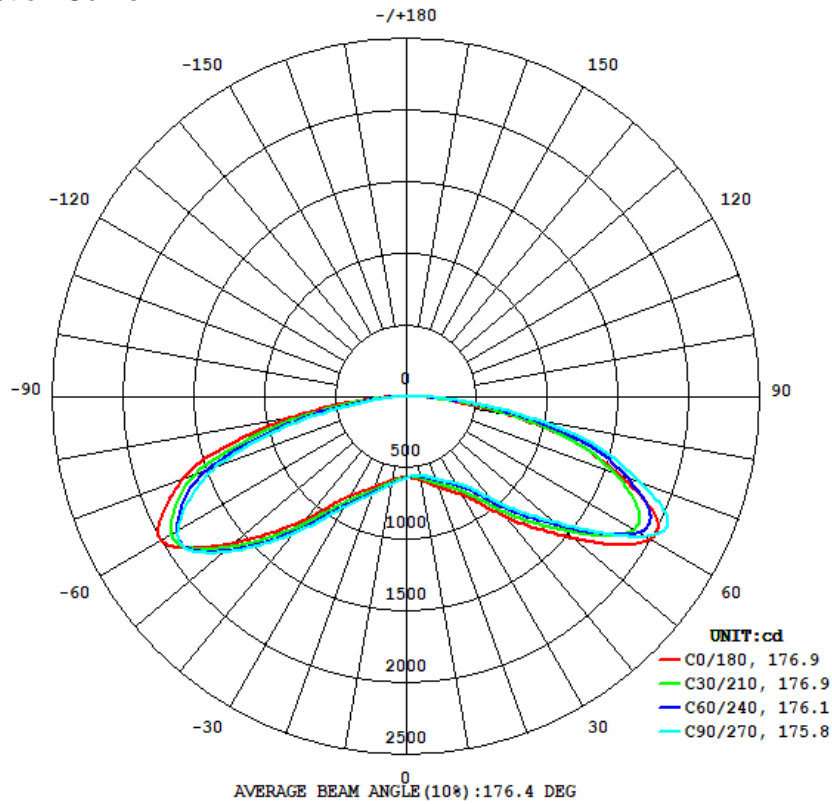
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.96	60	0.154	73.6	0.996	Light Down

#### Test Result

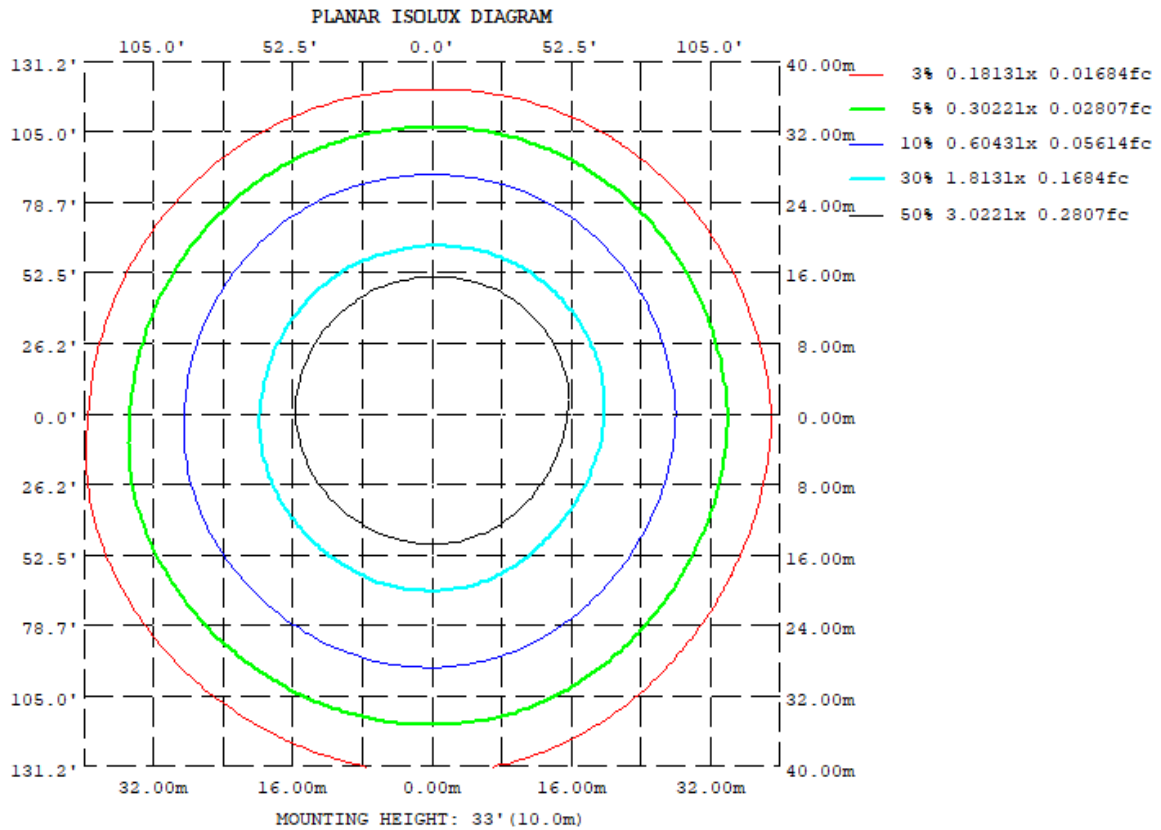
Flux (lm)	Zonal Lumen Requirement ( $60^{\circ}$ - $80^{\circ}$ )	Zonal Lumen Requirement ( $70^{\circ}$ - $80^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7765	42.53%	17.56%	176.9	175.8	170.1	169.1	105.5

### 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	594.6	575.5	565.1	570.7	592.5	612.4	621.6	615.4		
20	678.4	637.1	615.0	632.6	671.9	707.7	726.8	718.3		
30	797.9	737.6	703.0	740.6	799.8	861.2	893.4	872.6		
40	1099	1003	937.0	997.4	1117	1205	1245	1228		
50	1543	1426	1364	1442	1591	1655	1695	1714		
60	1988	1851	1957	1950	2005	1884	1862	2036		
70	1607	1593	1760	1747	1687	1543	1431	1507		
80	737.7	801.4	940.9	947.3	799.8	628.6	511.6	582.2		
90	4.263	24.02	44.74	62.76	26.49	0.6023	0.3857	0.4242		
100	0.9035	0.8414	0.8315	0.8523	0.7938	0.8085	0.7853	0.8481		
110	1.208	1.208	1.142	1.096	1.395	1.405	1.389	1.363		
120	1.299	1.340	1.330	1.254	1.525	1.745	1.631	1.560		
130	1.380	1.483	1.634	1.324	1.938	9.511	1.904	1.762		
140	1.507	1.610	1.917	1.478	1.741	1.963	2.076	2.119		
150	1.744	1.519	1.588	5.023	1.949	1.976	1.918	2.119		
160	1.297	1.470	1.631	3.592	1.791	1.850	1.926	2.303		
170	2.721	1.357	3.967	1.483	12.56	1.471	11.17	2.207		
180	1.360	1.449	1.402	1.506	1.388	1.394	1.543	1.521		



### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	59.41	0 - 10	59.41	0.77%
10-20	192.21	0 - 20	251.62	3.24%
20-30	364.63	0 - 30	616.25	7.94%
30-40	632.78	0 - 40	1249.03	16.08%
40-50	1103.22	0 - 50	2352.25	30.29%
50-60	1707.10	0 - 60	4059.35	52.27%
60-70	1939.11	0 - 70	5998.46	77.25%
70-80	1363.43	0 - 80	7361.89	94.80%
80-90	387.49	0 - 90	7749.38	99.79%
90-100	6.56	0 - 100	7755.94	99.88%
100-110	1.20	0 - 110	7757.14	99.89%
110-120	1.44	0 - 120	7758.58	99.91%
120-130	1.74	0 - 130	7760.32	99.93%
130-140	1.50	0 - 140	7761.82	99.95%
140-150	1.30	0 - 150	7763.12	99.97%
150-160	1.02	0 - 160	7764.14	99.98%
160-170	0.89	0 - 170	7765.03	100.00%
170-180	0.38	0 - 180	7765.41	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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	104	97	91	85	101	95	89	84	90	85	81	86	82	78	82	79	76	74
2	91	79	70	62	88	77	69	61	73	66	60	70	63	58	66	61	57	54
3	80	66	55	46	77	64	54	46	61	52	45	58	50	44	55	48	43	40
4	71	56	44	36	68	54	44	35	51	42	35	49	41	34	46	39	34	31
5	64	48	37	28	62	47	36	28	44	35	28	42	34	27	40	33	27	24
6	58	42	31	23	56	41	30	23	39	29	23	37	29	22	35	28	22	19
7	53	37	26	19	51	36	26	19	34	25	19	33	25	18	31	24	18	16
8	49	33	23	16	47	32	23	16	31	22	16	29	21	16	28	21	15	13
9	46	30	20	14	44	29	20	14	28	19	14	27	19	13	26	18	13	11
10	42	27	18	12	41	27	18	12	25	17	12	24	17	12	23	17	12	10

## 5.0 THD and PF Test

Model No.	IVGT5-70L750Z4	Sample ID.	I1
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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	480.01	60	0.154	73.6	0.995	10.28%

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