

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1811104**

## Data Number

**DLF1811104-5a**

## Test Date

**2018/11/9**

## Issue Date

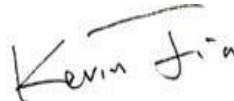
**2018/11/12**

## 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	5415
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	95	120.9
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	41.46%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	16.70%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3049
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	72
Power Factor	ANSI C82.77:2014	0.873	0.952
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	12.88%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/9	IVGT5-50L730ZU	E1
2	Goniophotometer Test	2018/11/9	IVGT5-50L730ZU	E1
3	THD and PF Test	2018/11/9	IVGT5-50L730ZU	E1

### Remark(If any)

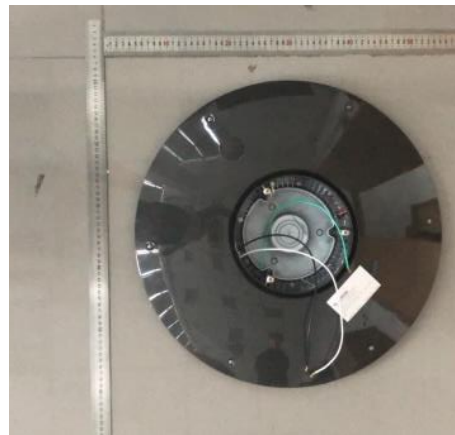
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### 3.0 Production Description

**Luminaire Description:** IVGT5-50L730ZU

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

#### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	IVGT5-50L730ZU	Sample ID.	E1
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	120.08	60	0.383	45.4	0.988

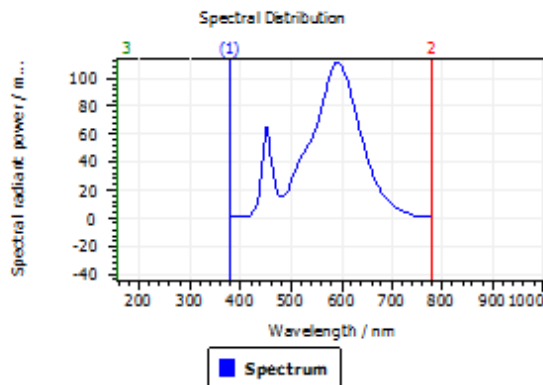
#### Test Result

CCT (K)	CRI (Ra)	Duv
3049	71.5	7.2E-04

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

DominantWavelength	582.88 nm
Purity	0.501
PeakWavelength	593.20 nm
Radiant Power	14.62 W
Width50%	102.42 nm

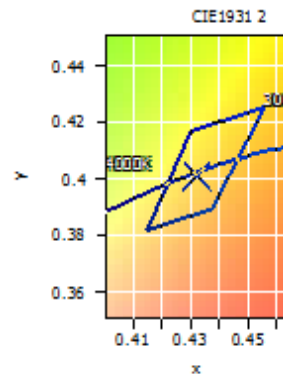
#### Color Coordinates

Correlated Color Temperature 3049 K

x: 0.4325 u: 0.2491 u': 0.2491  
y: 0.4007 v: 0.3463 v': 0.5194

ResultsCRICRI01	67.6	ResultsCRICRI09	-40.4
ResultsCRICRI02	84.2	ResultsCRICRI10	64.7
ResultsCRICRI03	93.7	ResultsCRICRI11	61.1
ResultsCRICRI04	65.7	ResultsCRICRI12	53.7
ResultsCRICRI05	67.5	ResultsCRICRI13	71.1
ResultsCRICRI06	78.6	ResultsCRICRI14	96.9
ResultsCRICRI07	75.2	ResultsCRICRI15	58.8
ResultsCRICRI08	39.4	ResultsCRICRI16	56.4

ResultsCRI 71.5



PlanckDistance 7.2E-004

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVGT5-50L730ZU	Sample ID.	E1
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

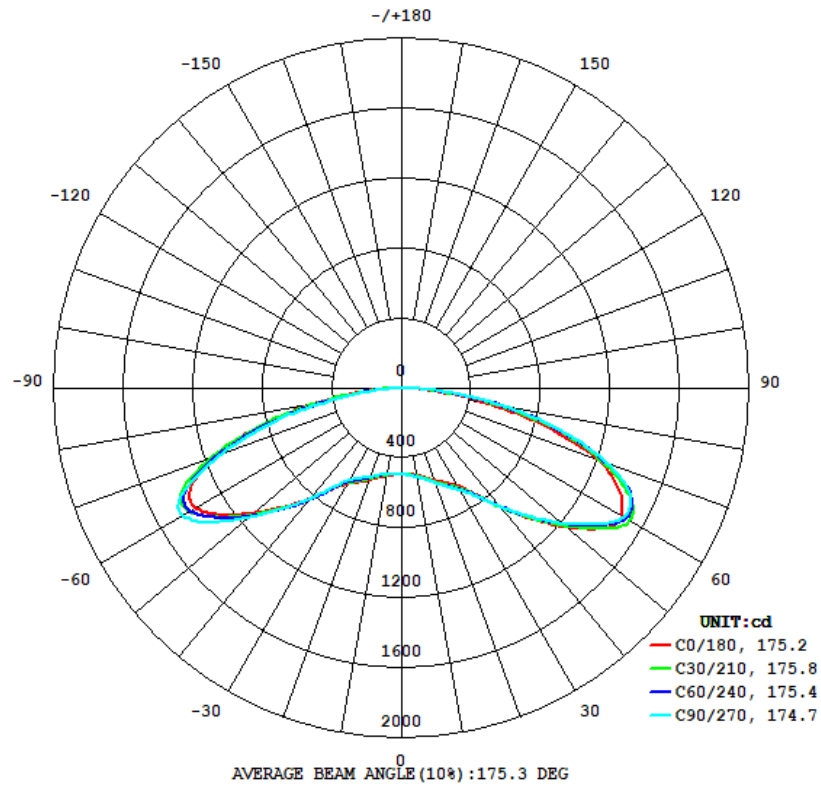
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	119.98	60	0.378	44.8	0.988	Light Down

#### Test Result

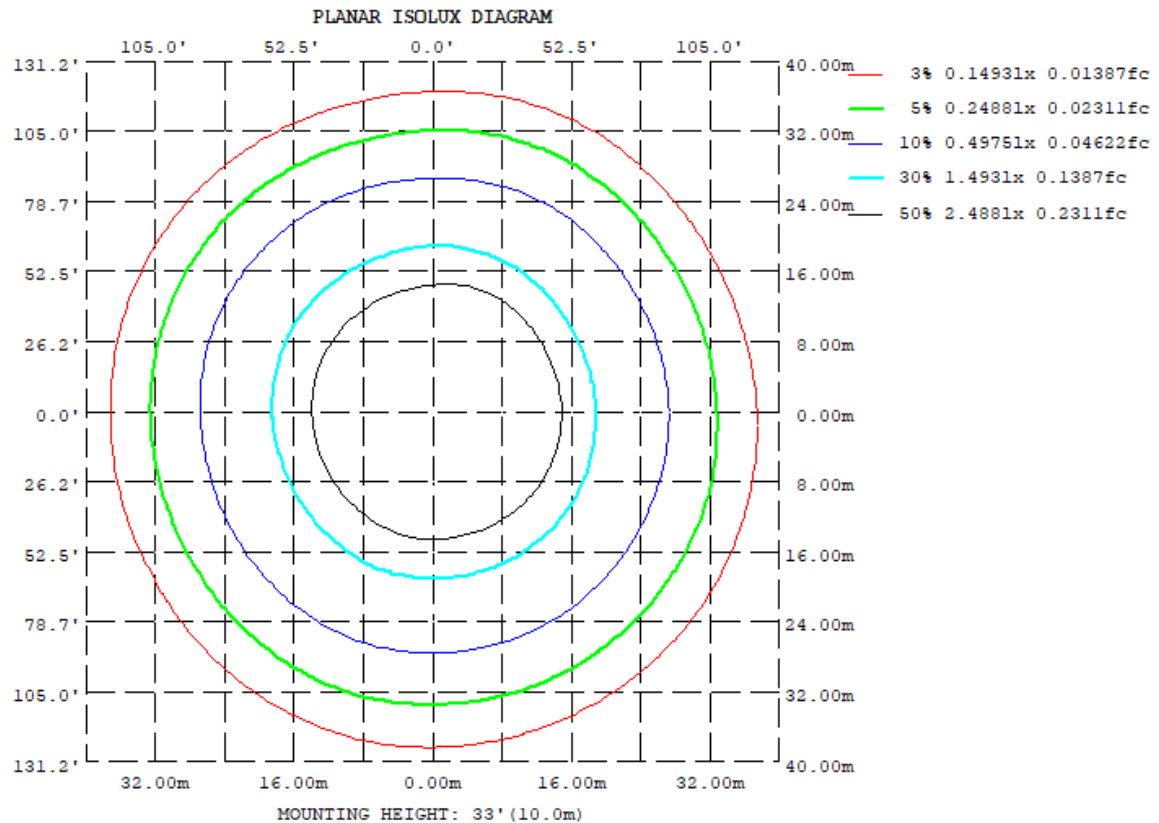
Flux (lm)	Zonal Lumen Requirement ( $60^{\circ}$ - $80^{\circ}$ )	Zonal Lumen Requirement ( $70^{\circ}$ - $80^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
5415	41.46%	16.70%	176.7	175.4	169.4	168.4	120.9

### 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	510.0	515.6	519.2	517.4	512.5	505.9	501.4	504.6		
20	565.4	578.9	580.4	575.2	563.7	551.5	542.3	548.9		
30	650.8	668.1	676.8	665.9	635.2	624.8	610.9	621.5		
40	890.3	888.4	888.1	859.6	826.1	837.7	828.3	860.9		
50	1239	1219	1206	1147	1113	1142	1153	1219		
60	1463	1508	1475	1388	1370	1414	1455	1455		
70	1207	1241	1258	1181	1139	1158	1102	1165		
80	498.0	574.0	594.9	576.4	506.6	478.4	419.5	433.8		
90	3.055	4.407	3.543	15.38	2.753	0.3374	0.2281	0.2344		
100	0.6126	0.5986	0.6135	0.6122	0.7719	0.7623	0.7331	0.7225		
110	0.8052	0.8464	0.8185	0.8468	1.319	1.281	1.105	1.060		
120	0.8347	0.9276	0.9829	0.9814	1.377	1.543	1.387	1.337		
130	0.8891	1.017	1.159	1.025	1.488	1.676	1.714	1.438		
140	0.8714	1.017	1.253	1.175	1.592	1.686	1.840	1.710		
150	0.9270	1.037	1.442	1.159	1.687	1.710	1.703	1.619		
160	0.9362	1.047	1.880	1.058	1.626	1.485	1.580	1.495		
170	1.056	2.590	2.363	1.040	1.213	1.346	1.266	3.211		
180	0.9263	1.139	1.158	1.138	1.088	1.055	1.144	1.155		



### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	48.03	0 - 10	48.03	0.89%
10-20	152.08	0 - 20	200.11	3.70%
20-30	279.12	0 - 30	479.23	8.85%
30-40	466.63	0 - 40	945.86	17.47%
40-50	788.18	0 - 50	1734.04	32.03%
50-60	1192.55	0 - 60	2926.59	54.05%
60-70	1340.69	0 - 70	4267.28	78.81%
70-80	904.32	0 - 80	5171.60	95.51%
80-90	235.26	0 - 90	5406.86	99.86%
90-100	1.28	0 - 100	5408.14	99.88%
100-110	0.91	0 - 110	5409.05	99.90%
110-120	1.07	0 - 120	5410.12	99.92%
120-130	1.25	0 - 130	5411.37	99.94%
130-140	1.06	0 - 140	5412.43	99.96%
140-150	0.93	0 - 150	5413.36	99.98%
150-160	0.66	0 - 160	5414.02	99.99%
160-170	0.40	0 - 170	5414.42	100.00%
170-180	0.13	0 - 180	5414.55	100.00%

### 3.2 Goniophotometer Test

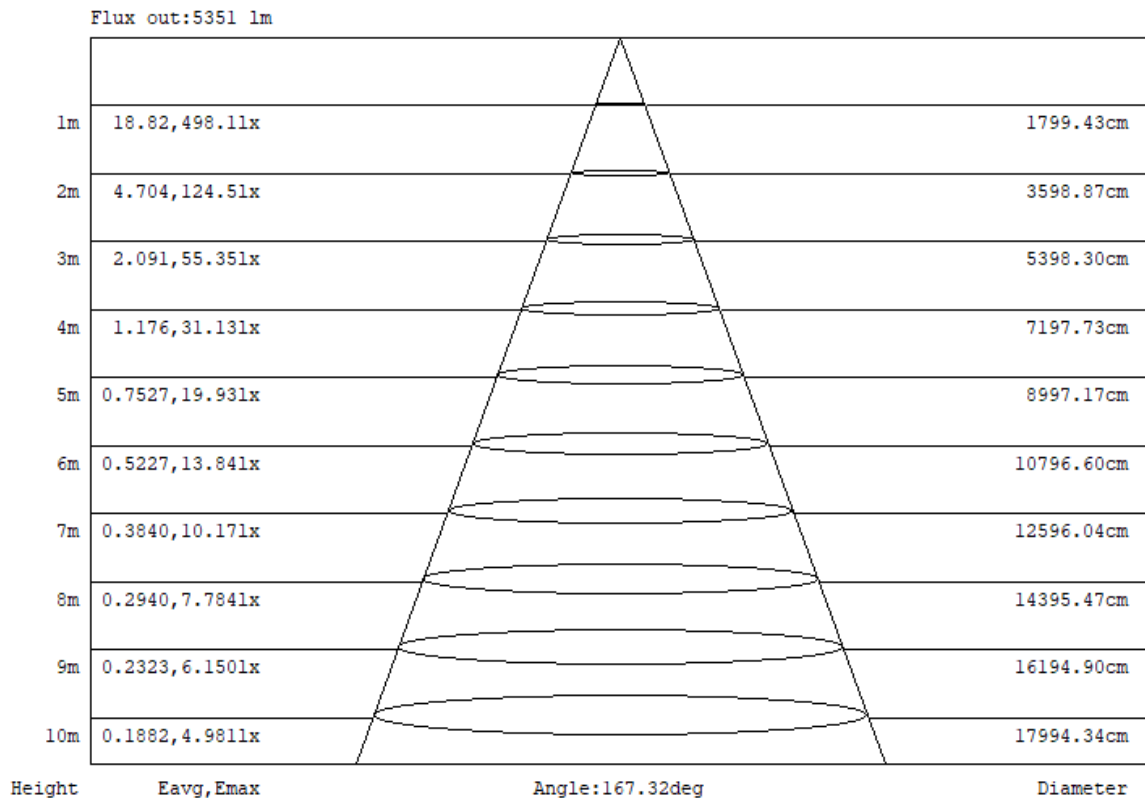
#### COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

##### 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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	104	98	92	86	101	95	90	85	91	86	82	87	83	79	83	80	77	75
2	91	80	71	63	88	78	70	62	74	67	61	71	65	59	67	62	58	55
3	81	67	56	48	78	65	55	47	62	53	46	59	51	45	56	50	44	41
4	72	57	45	37	69	55	45	37	52	43	36	50	42	35	47	40	35	32
5	65	49	38	29	62	48	37	29	45	36	29	43	35	28	41	34	28	25
6	59	43	32	24	57	42	31	24	40	30	23	38	29	23	36	29	23	20
7	54	38	27	20	52	37	27	20	35	26	20	33	25	19	32	25	19	17
8	50	34	24	17	48	33	23	17	32	23	17	30	22	16	29	22	16	14
9	46	31	21	15	44	30	21	15	29	20	14	27	20	14	26	19	14	12
10	43	28	19	13	41	27	19	13	26	18	13	25	18	12	24	17	12	10

#### CONE OF LIGHT DIAGRAM



## 5.0 THD and PF Test

Model No.	IVGT5-50L730ZU	Sample ID.	E1
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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	277.04	60	0.169	44.6	0.952	12.88%
25.1	120.08	60	0.383	45.4	0.988	13.35%

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