

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1811104**

## Data Number

**DLF1811104-8a**

## Test Date

**2018/11/7**

## Issue Date

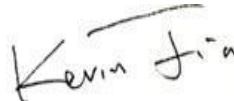
**2018/11/8**

## 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	5501
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	95	123.4
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	34.48%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	14.24%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3041
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	72
Power Factor	ANSI C82.77:2014	0.873	0.949
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	13.42%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/7	IVGT5CU-50L730WU	H1
2	Goniophotometer Test	2018/11/7	IVGT5CU-50L730WU	H1
3	THD and PF Test	2018/11/7	IVGT5CU-50L730WU	H1

### Remark(If any)

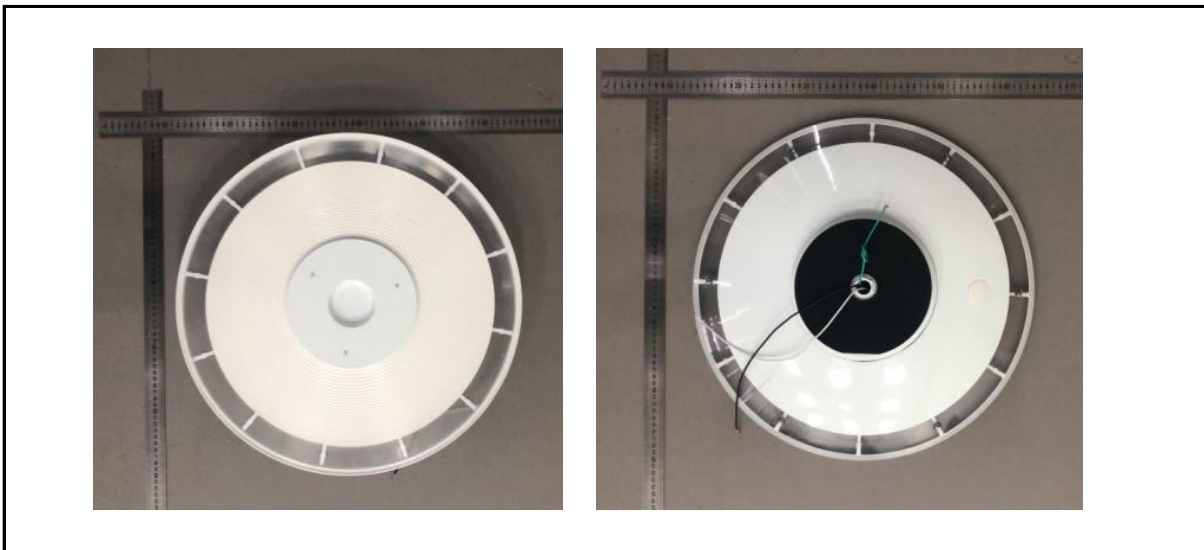
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### 3.0 Production Description

**Luminaire Description:** IVGT5CU-50L730WU

**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.	IVGT5CU-50L730WU	Sample ID.	H1
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	120.03	60	0.381	45.2	0.988

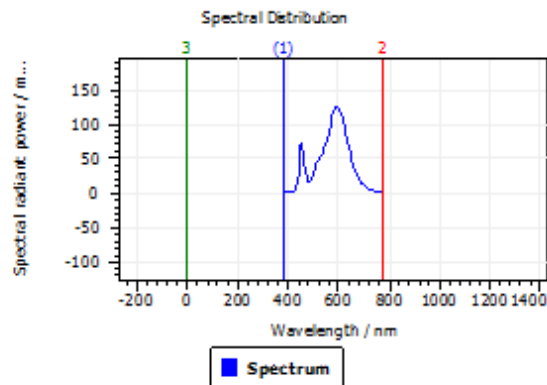
#### Test Result

CCT (K)	CRI (Ra)	Duv
3041	71.7	1.1E-04

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

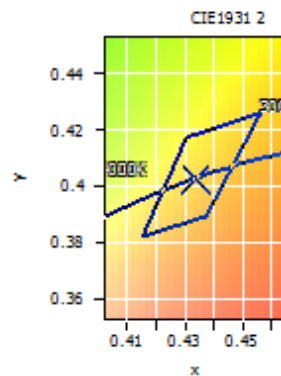
DominantWavelength	582.69 nm
Purity	0.511
PeakWavelength	593.18 nm
Radiant Power	16.64 W
Width50%:	102.92 nm

#### Color Coordinates

Correlated Color Temperatu 3041 K

x: 0.4339 u: 0.2492 u': 0.2492  
y: 0.4027 v: 0.3469 v': 0.5204

ResultsCRICRI01	67.8	ResultsCRICRI09	-39.4
ResultsCRICRI02	84.1	ResultsCRICRI10	64.4
ResultsCRICRI03	94.0	ResultsCRICRI11	61.4
ResultsCRICRI04	66.0	ResultsCRICRI12	53.0
ResultsCRICRI05	67.6	ResultsCRICRI13	71.1
ResultsCRICRI06	78.5	ResultsCRICRI14	97.1
ResultsCRICRI07	75.7	ResultsCRICRI15	58.9
ResultsCRICRI08	40.0	ResultsCRICRI16	56.6
ResultsCRI	71.7		



PlanckDistance 1.1E-004

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVGT5CU-50L730WU	Sample ID.	H1
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

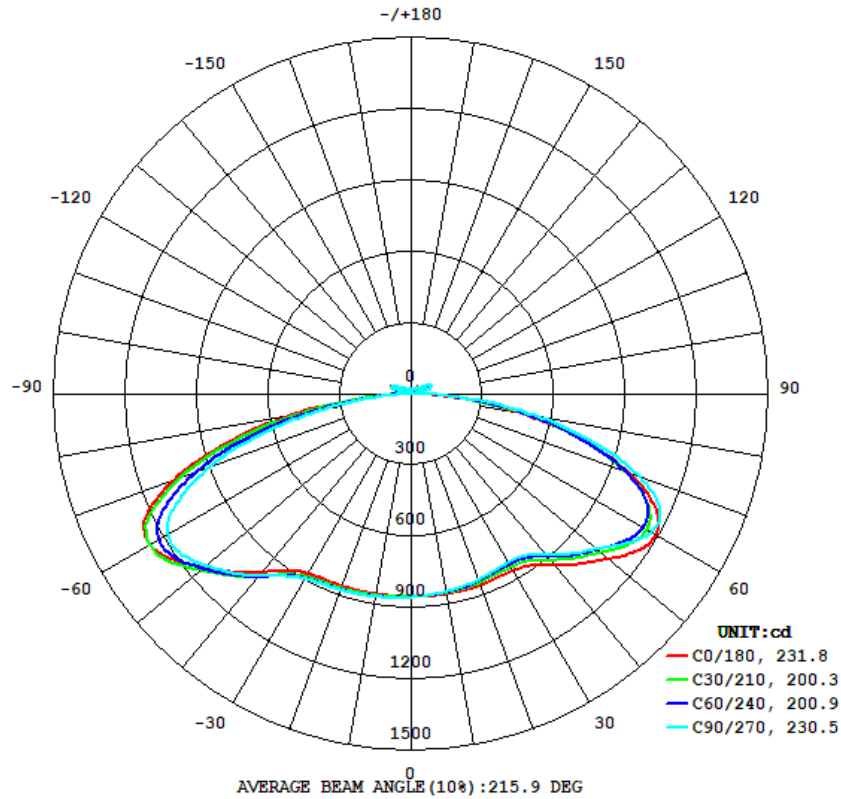
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	119.99	60	0.376	44.6	0.987	Light Down

#### Test Result

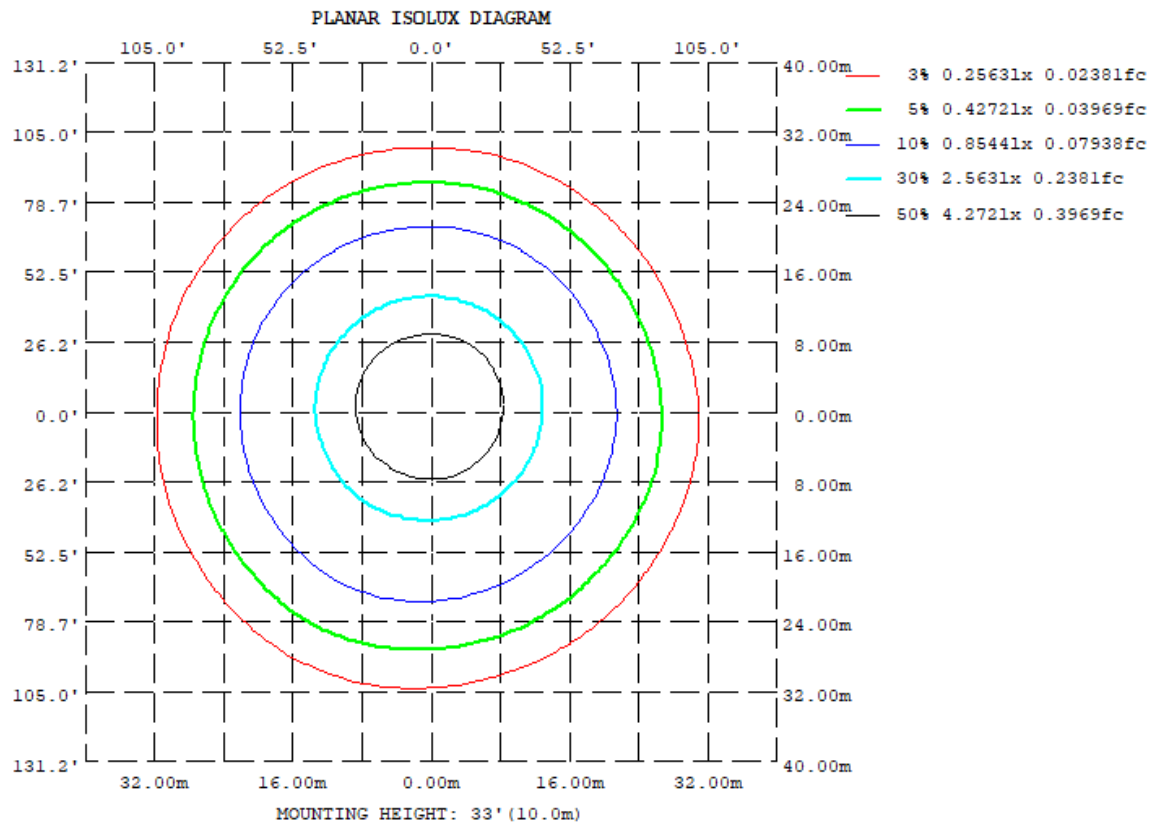
Flux (lm)	Zonal Lumen Requirement ( $60^{\circ}$ - $80^{\circ}$ )	Zonal Lumen Requirement ( $70^{\circ}$ - $80^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
5501	34.48%	14.24%	231.8	230.5	161.8	160.7	123.4

### 4.3 Goniophotometer Test

#### Light Distrubtion Curve



#### Isolux Plot



### 4.3 Goniophotometer Test

#### Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd									
$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315		
10	856.2	848.4	845.3	849.2	857.3	863.8	867.4	864.6		
20	856.0	840.6	831.7	841.7	861.2	873.8	877.6	874.0		
30	858.5	833.4	818.4	839.3	874.6	893.5	899.5	893.4		
40	944.6	903.4	884.7	924.2	981.9	1007	1002	992.4		
50	1080	1026	1017	1077	1137	1154	1126	1119		
60	1188	1127	1163	1235	1267	1255	1179	1178		
70	973.0	955.1	1022	1110	1063	1006	900.9	903.5		
80	466.9	487.5	528.5	576.9	501.0	445.5	368.6	378.4		
90	13.59	27.68	30.48	36.04	16.96	2.775	1.069	1.466		
100	13.22	20.45	22.17	22.26	15.09	32.27	34.58	35.72		
110	88.24	53.95	86.63	73.10	92.69	64.19	86.70	66.72		
120	66.47	63.64	74.63	52.96	65.38	58.66	62.75	58.03		
130	29.81	47.40	45.13	48.53	26.20	45.52	42.26	47.82		
140	40.70	34.97	32.62	35.45	37.49	31.87	31.18	34.24		
150	21.97	23.27	23.96	26.20	23.35	24.56	25.53	26.14		
160	17.94	18.42	19.69	19.02	17.52	18.56	20.14	19.86		
170	11.52	12.90	13.77	12.65	12.52	12.29	17.36	15.90		
180	11.56	11.32	10.35	11.81	11.02	11.23	10.92	11.36		



### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	81.74	0 - 10	81.74	1.49%
10-20	242.96	0 - 20	324.70	5.90%
20-30	397.44	0 - 30	722.14	13.13%
30-40	566.68	0 - 40	1288.82	23.43%
40-50	794.24	0 - 50	2083.06	37.87%
50-60	1035.94	0 - 60	3119.00	56.70%
60-70	1113.29	0 - 70	4232.29	76.94%
70-80	783.23	0 - 80	5015.52	91.18%
80-90	233.44	0 - 90	5248.96	95.42%
90-100	15.59	0 - 100	5264.55	95.70%
100-110	53.19	0 - 110	5317.74	96.67%
110-120	74.54	0 - 120	5392.28	98.03%
120-130	44.31	0 - 130	5436.59	98.83%
130-140	30.16	0 - 140	5466.75	99.38%
140-150	18.15	0 - 150	5484.90	99.71%
150-160	10.02	0 - 160	5494.92	99.89%
160-170	4.81	0 - 170	5499.73	99.98%
170-180	1.12	0 - 180	5500.85	100.00%

### 3.2 Goniophotometer Test

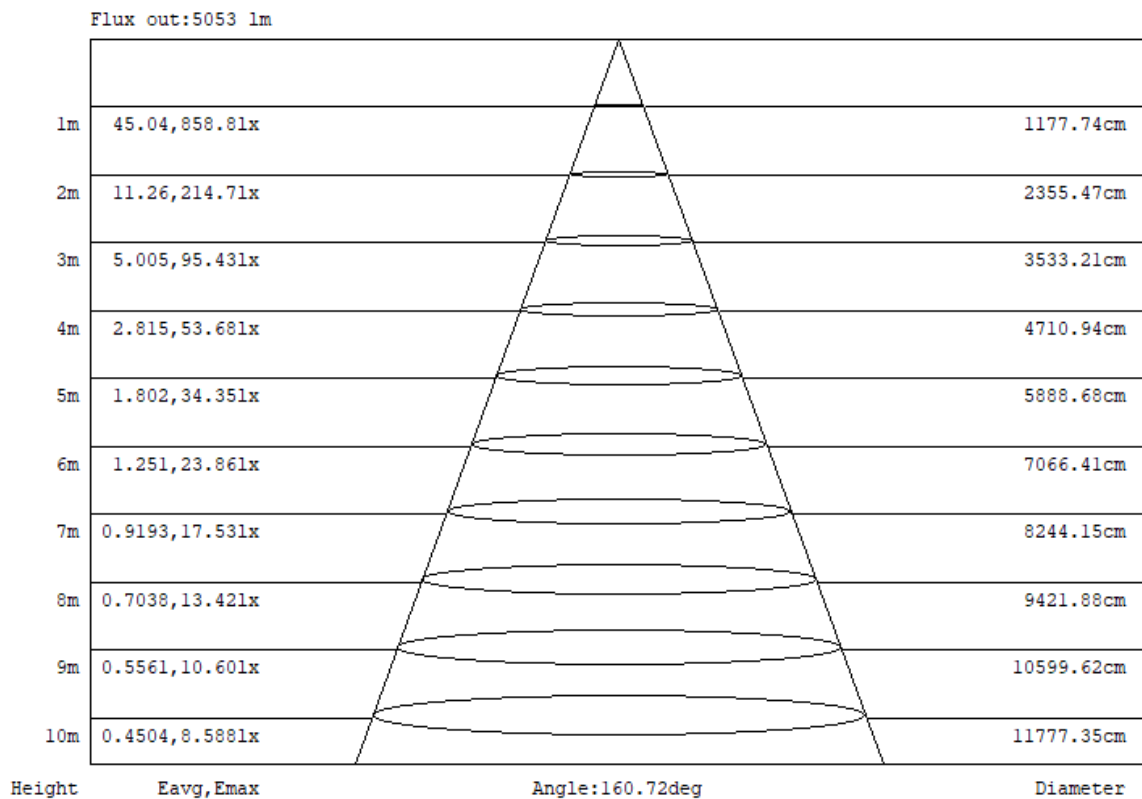
#### COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

##### 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	118	118	118	118	115	115	115	115	109	109	109	103	103	103	98	98	98	95
1	104	98	92	87	101	95	90	86	90	86	82	85	82	79	81	78	75	73
2	92	82	73	66	89	79	72	65	75	68	63	71	65	60	67	62	58	56
3	82	69	59	51	79	67	58	51	63	55	49	60	53	47	57	51	46	43
4	74	60	49	41	71	58	48	41	55	46	39	52	44	38	49	42	37	35
5	67	52	42	34	64	51	41	33	48	39	32	45	38	32	43	36	31	28
6	61	46	36	28	59	45	35	28	42	34	27	40	32	27	38	31	26	24
7	56	41	31	24	54	40	31	24	38	29	23	36	28	23	34	27	22	20
8	52	37	27	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-50L730WU	Sample ID.	H1
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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	276.98	60	0.169	44.3	0.949	13.42%
25.1	120.03	60	0.381	45.2	0.988	13.58%

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