

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1812112**

## Data Number

**DLF1812112-8aMOD40**

## Test Date

**2018/12/14**

## Issue Date

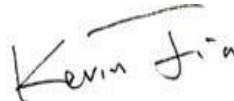
**2018/12/15**

## Prepared By



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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	5590
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	119.2
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	34.50%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	14.32%
Power (Input Wattage)	IES LM-79-2008	Worst Case	46.9
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.100
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3999
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	75
Power Factor	ANSI C82.77:2014	0.873	0.982
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	18.74%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/14	IVGT5CU-50L740W4	H1
2	Goniophotometer Test	2018/12/14	IVGT5CU-50L740W4	H1
3	THD and PF Test	2018/12/14	IVGT5CU-50L740W4	H1

### Remark(If any)

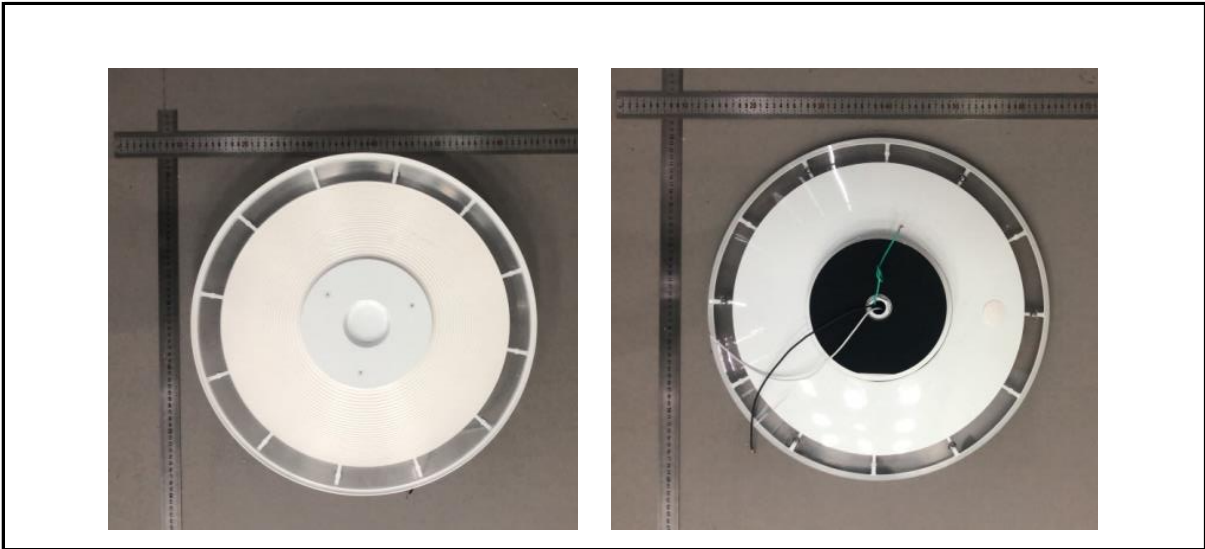
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### 3.0 Production Description

**Luminaire Description:** IVGT5CU-50L740W4

**Electrical Specification:** 480V,50/60HZ, 50W

#### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	IVGT5CU-50L740W4	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	480.03	60	0.099	46.9	0.982

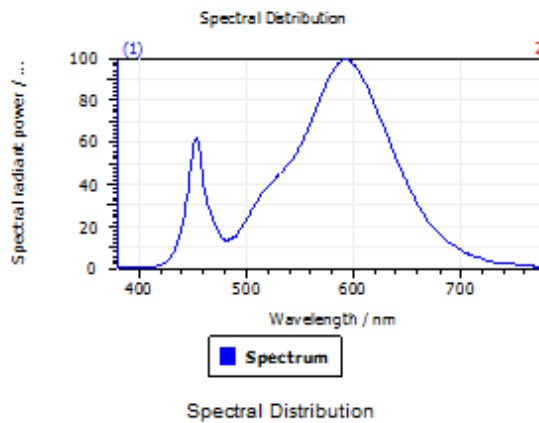
#### Test Result

CCT (K)	CRI (Ra)	Duv
3999	75	2.1E-04

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results

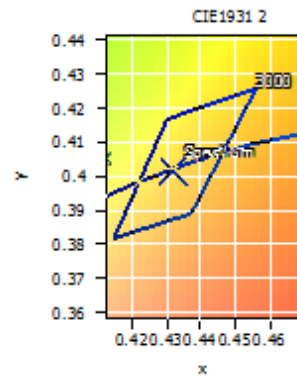


#### Spectral values

DominantWavelength	582.62 nm
Purity	0.503
PeakWavelength	582.86 nm
Width50%:	102.97 nm

#### Color Coordinates

Correlated Color Temperature		3066 K	
x: 0.4320	u: 0.2484	u': 0.2484	
y: 0.4018	v: 0.3465	v': 0.5197	
CRI01	67.5	CRI09	-41.0
CRI02	84.4	CRI10	65.1
CRI03	93.4	CRI11	60.8
CRI04	65.3	CRI12	53.5
CRI05	67.4	CRI13	71.2
CRI06	78.9	CRI14	96.7
CRI07	74.9	CRI15	58.3
CRI08	39.0	CRI16	55.8
ResultsCRI	71.3		



PlanckDistance 2.1E-004

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVGT5CU-50L740W4	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

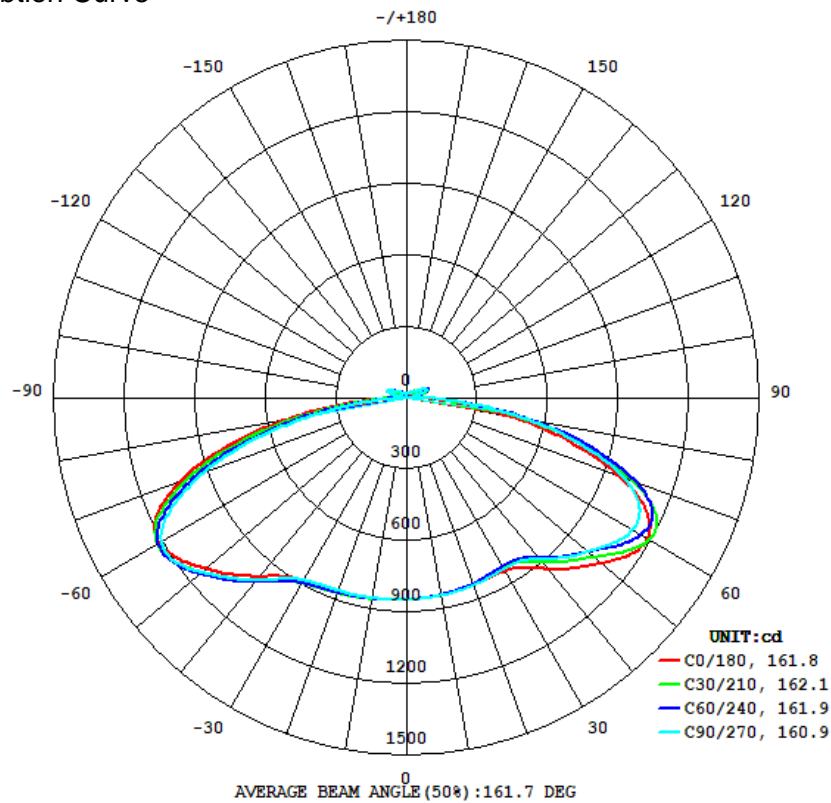
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.99	60	0.100	46.9	0.982	Light Down

#### Test Result

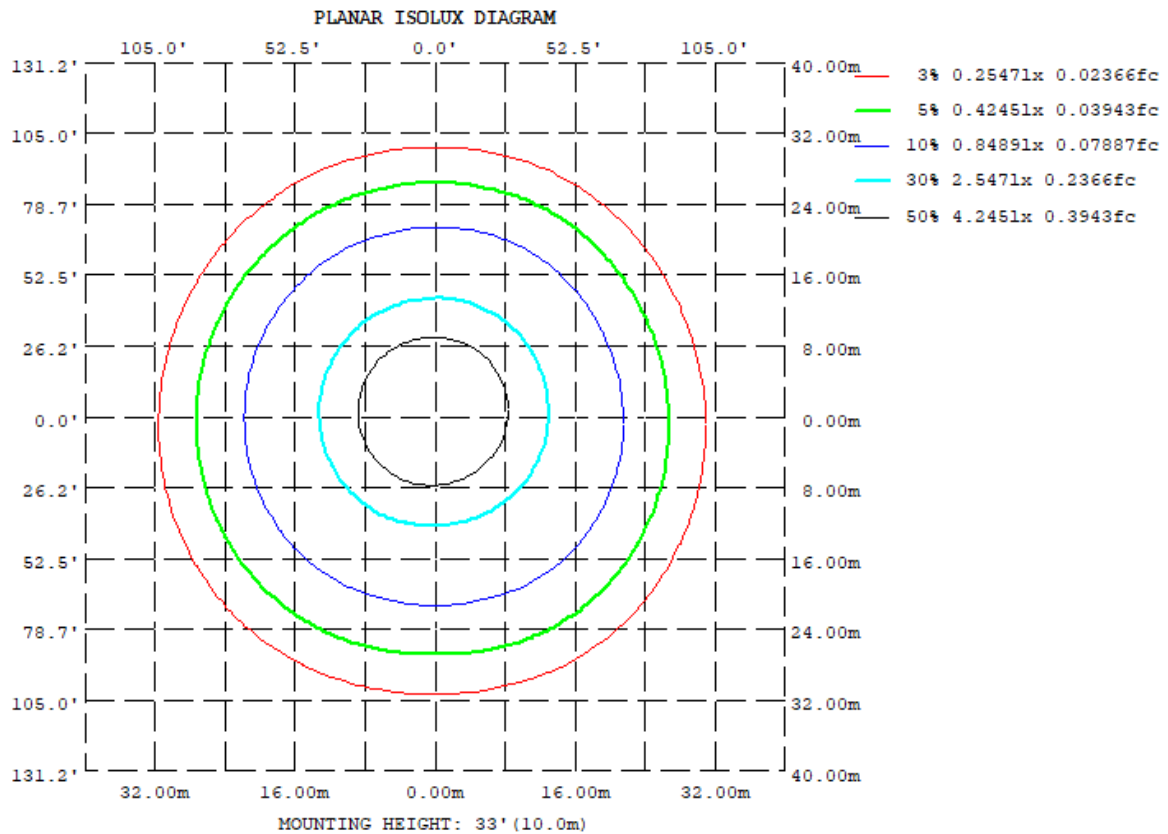
Flux (lm)	Zonal Lumen Requirement ( $60^{\circ}$ - $80^{\circ}$ )	Zonal Lumen Requirement ( $70^{\circ}$ - $80^{\circ}$ )	Field Angle( $10^{\circ}$ )		Beam Angle( $50^{\circ}$ )		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
5590	34.50%	14.32%	231.7	231.5	161.8	160.9	119.2

### 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	842.2	839.2	842.5	849.3	856.1	857.9	854.3	848.1		
20	836.4	828.8	836.8	855.3	869.1	871.8	861.4	848.1		
30	838.9	816.8	827.4	858.7	887.1	900.9	884.8	864.4		
40	940.0	888.0	884.5	928.2	979.4	1010	999.7	982.4		
50	1080	1019	1006	1069	1118	1148	1139	1132		
60	1183	1175	1111	1192	1215	1224	1204	1219		
70	963.3	1044	982.7	1070	1026	973.7	921.3	945.5		
80	446.3	534.5	521.5	583.0	510.1	438.2	374.4	390.4		
90	8.301	20.26	38.32	46.66	26.19	3.856	3.581	1.418		
100	17.85	21.84	20.68	17.78	13.40	27.99	29.37	32.61		
110	91.22	65.99	76.90	65.35	84.22	68.00	85.30	70.29		
120	65.10	66.62	72.38	55.84	69.29	56.02	62.78	56.44		
130	30.34	48.06	46.81	48.43	25.56	48.55	46.37	46.17		
140	40.45	35.34	31.83	35.15	39.85	35.32	35.42	33.10		
150	22.73	24.11	26.15	25.11	26.25	25.95	25.53	23.54		
160	18.08	19.30	20.74	19.17	18.28	19.75	22.08	18.61		
170	12.49	13.76	14.69	13.25	13.30	12.65	14.57	16.09		
180	12.56	12.06	11.66	11.81	12.27	12.00	11.10	11.31		



### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	82.35	0 - 10	82.35	1.47%
10-20	245.11	0 - 20	327.46	5.86%
20-30	401.91	0 - 30	729.37	13.05%
30-40	574.40	0 - 40	1303.77	23.32%
40-50	805.34	0 - 50	2109.11	37.73%
50-60	1048.92	0 - 60	3158.03	56.49%
60-70	1127.73	0 - 70	4285.76	76.67%
70-80	800.71	0 - 80	5086.47	90.99%
80-90	243.25	0 - 90	5329.72	95.34%
90-100	15.80	0 - 100	5345.52	95.63%
100-110	54.40	0 - 110	5399.92	96.60%
110-120	76.93	0 - 120	5476.85	97.98%
120-130	45.82	0 - 130	5522.67	98.80%
130-140	31.59	0 - 140	5554.26	99.36%
140-150	19.01	0 - 150	5573.27	99.70%
150-160	10.41	0 - 160	5583.68	99.89%
160-170	5.06	0 - 170	5588.74	99.98%
170-180	1.20	0 - 180	5589.94	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	85	90	86	82	85	82	78	81	78	75	73
2	92	82	73	66	89	79	71	65	75	68	62	71	65	60	67	62	58	55
3	82	69	59	51	79	67	58	50	63	55	49	60	53	47	56	51	46	43
4	74	60	49	41	71	58	48	40	55	46	39	51	44	38	49	42	37	34
5	67	52	41	34	64	50	41	33	48	39	32	45	37	32	43	36	31	28
6	61	46	36	28	59	45	35	28	42	34	27	40	32	27	38	31	26	23
7	56	41	31	24	54	40	30	24	38	29	23	36	28	23	34	27	22	20
8	52	37	27	21	50	36	27	21	34	26	20	32	25	20	31	24	19	17
9	48	34	24	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	15	26	20	15	13

## 5.0 THD and PF Test

Model No.	IVGT5CU-50L740W4	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	480.03	60	0.099	46.9	0.982	18.74%

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