

Photometric Test Report

Relevant Standards

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

Prepared For

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Project Number

DLF1812112

Data Number

DLF1812112-15a

Test Date

2018/12/14

Issue Date

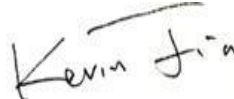
2018/12/15

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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	7796
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	104.0
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	34.37%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	14.29%
Power (Input Wattage)	IES LM-79-2008	Worst Case	75.0
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.157
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	0.995
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	8.75%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/14	IVGT5CU-70L740W4	O1
2	Goniophotometer Test	2018/12/14	IVGT5CU-70L740W4	O1
3	THD and PF Test	2018/12/14	IVGT5CU-70L740W4	O1

Remark(If any)

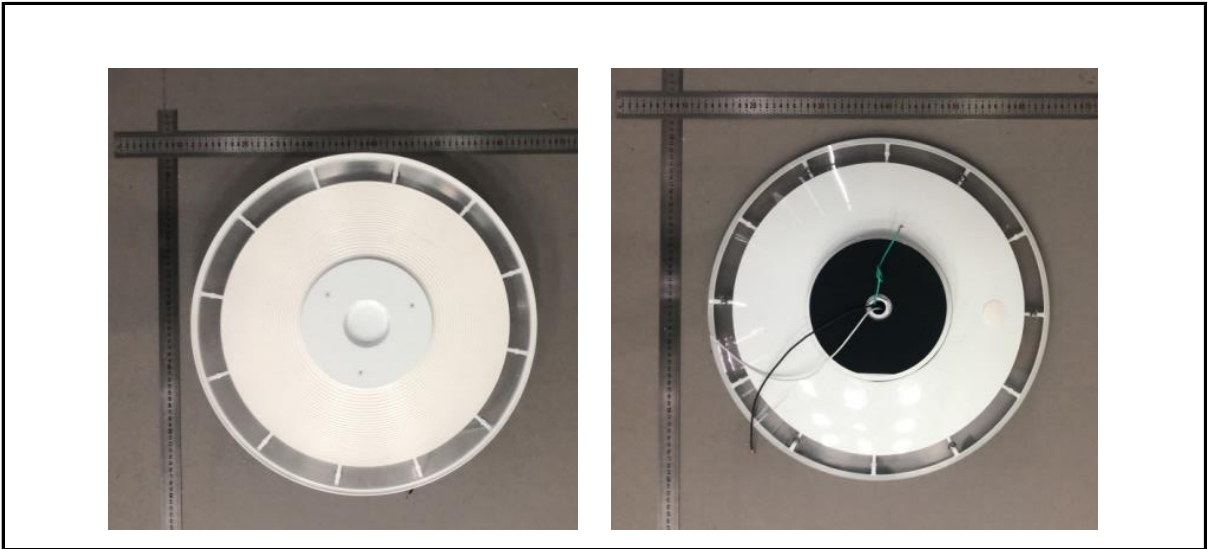
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3.0 Production Description

Luminaire Description: IVGT5CU-70L740W4

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.	IVGT5CU-70L740W4	Sample ID.	O1
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 ± 0.2 percent under load.

The sample was measured using 4π 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	479.94	60	0.157	75.0	0.995

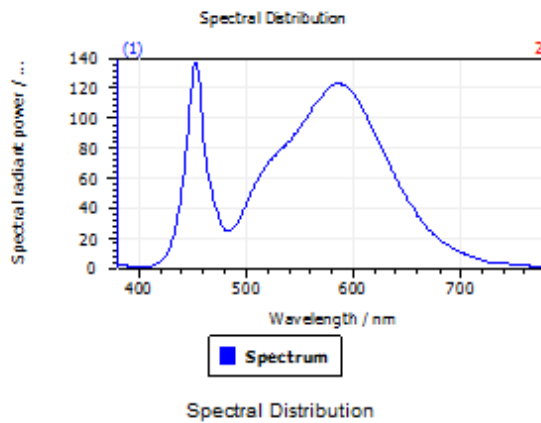
Test Result

CCT (K)	CRI (Ra)	Duv
3999	74.9	1.0E-04

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

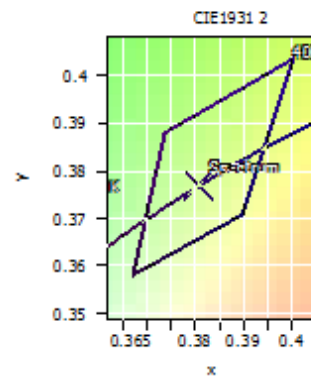


Spectral values

DominantWavelength	579.02 nm
Purity	0.274
PeakWavelength	452.51 nm
Width50%:	20.44 nm

Color Coordinates

Correlated Color Temperature		3999 K	
x: 0.3806	u: 0.2251	u': 0.2251	
y: 0.3771	v: 0.3345	v': 0.5017	
CRI01	71.3	CRI09	-29.2
CRI02	83.7	CRI10	61.8
CRI03	92.6	CRI11	67.8
CRI04	71.5	CRI12	49.0
CRI05	71.6	CRI13	74.1
CRI06	76.8	CRI14	96.2
CRI07	80.7	CRI15	63.8
CRI08	50.6	CRI16	62.1
ResultsCRI	74.9		



PlanckDistance 1.0E-004

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5CU-70L740W4	Sample ID.	O1
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 ± 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° vertical intervals and 10° horizontal intervals.

Test Conditions

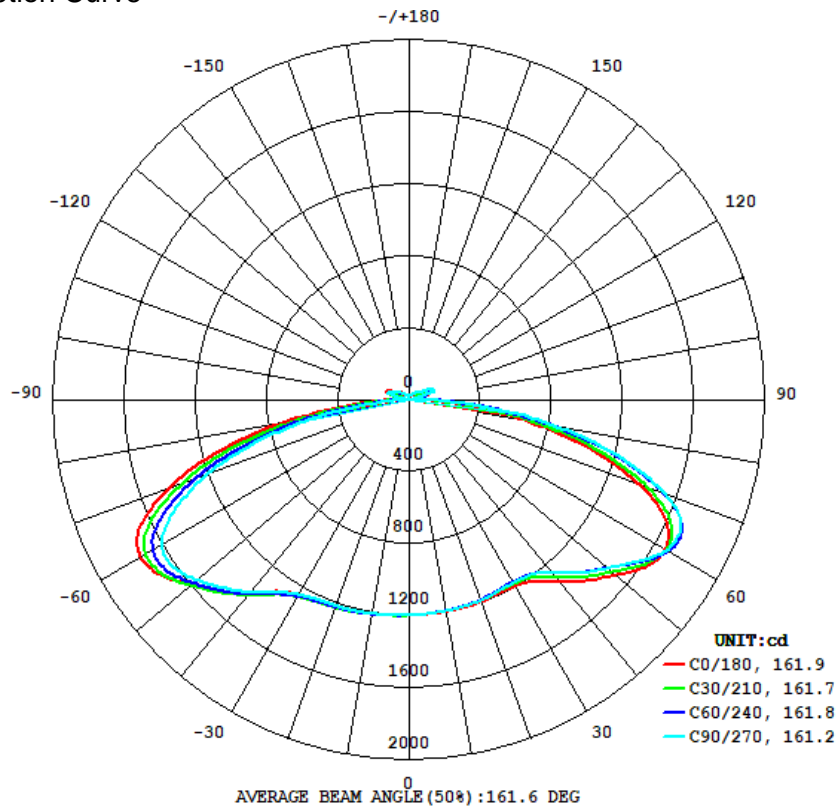
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.95	60	0.157	75.0	0.994	Light Down

Test Result

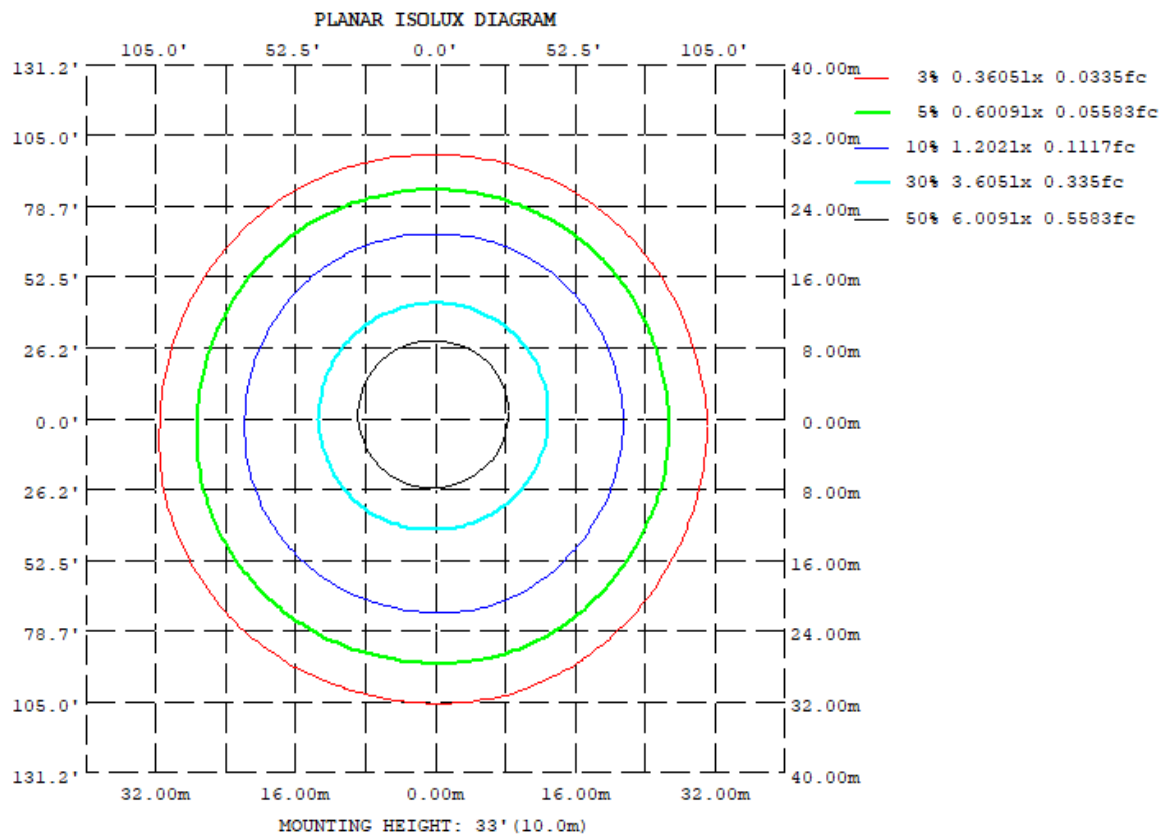
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7796	34.37%	14.29%	232.7	233.1	161.9	161.2	104.0

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	1195	1190	1192	1200	1209	1211	1207	1203		
20	1193	1182	1185	1207	1226	1228	1218	1206		
30	1195	1172	1173	1215	1252	1265	1250	1226		
40	1323	1274	1258	1332	1400	1419	1395	1379		
50	1516	1469	1457	1554	1601	1601	1559	1571		
60	1664	1671	1669	1756	1742	1692	1604	1663		
70	1375	1465	1533	1581	1439	1320	1209	1275		
80	660.7	762.8	828.6	864.0	697.2	582.3	478.5	516.2		
90	18.45	37.04	57.99	67.13	32.28	4.597	3.227	1.117		
100	20.48	31.04	27.77	31.69	25.19	47.10	53.62	58.02		
110	131.3	95.07	56.88	107.0	132.0	82.15	127.1	108.4		
120	94.89	92.57	112.9	87.43	96.38	87.75	91.06	77.38		
130	40.99	74.84	69.97	71.50	41.07	69.29	66.03	70.91		
140	63.01	53.52	48.20	52.04	57.78	51.46	53.65	52.19		
150	37.50	40.81	40.91	37.72	36.09	36.03	38.15	36.10		
160	27.95	28.74	31.90	30.14	28.84	27.58	33.08	28.49		
170	21.48	23.01	22.39	22.44	20.26	18.02	21.03	22.62		
180	18.90	14.34	13.06	12.47	18.15	17.21	15.35	16.30		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	114.51	0 - 10	114.51	1.47%
10-20	341.18	0 - 20	455.69	5.85%
20-30	559.82	0 - 30	1015.51	13.03%
30-40	800.04	0 - 40	1815.55	23.29%
40-50	1120.94	0 - 50	2936.49	37.67%
50-60	1458.43	0 - 60	4394.92	56.37%
60-70	1565.85	0 - 70	5960.77	76.46%
70-80	1113.86	0 - 80	7074.63	90.74%
80-90	341.51	0 - 90	7416.14	95.13%
90-100	23.44	0 - 100	7439.58	95.43%
100-110	79.95	0 - 110	7519.53	96.45%
110-120	110.57	0 - 120	7630.10	97.87%
120-130	66.24	0 - 130	7696.34	98.72%
130-140	46.54	0 - 140	7742.88	99.32%
140-150	28.30	0 - 150	7771.18	99.68%
150-160	15.60	0 - 160	7786.78	99.88%
160-170	7.65	0 - 170	7794.43	99.98%
170-180	1.74	0 - 180	7796.17	100.00%

3.2 Goniophotometer Test

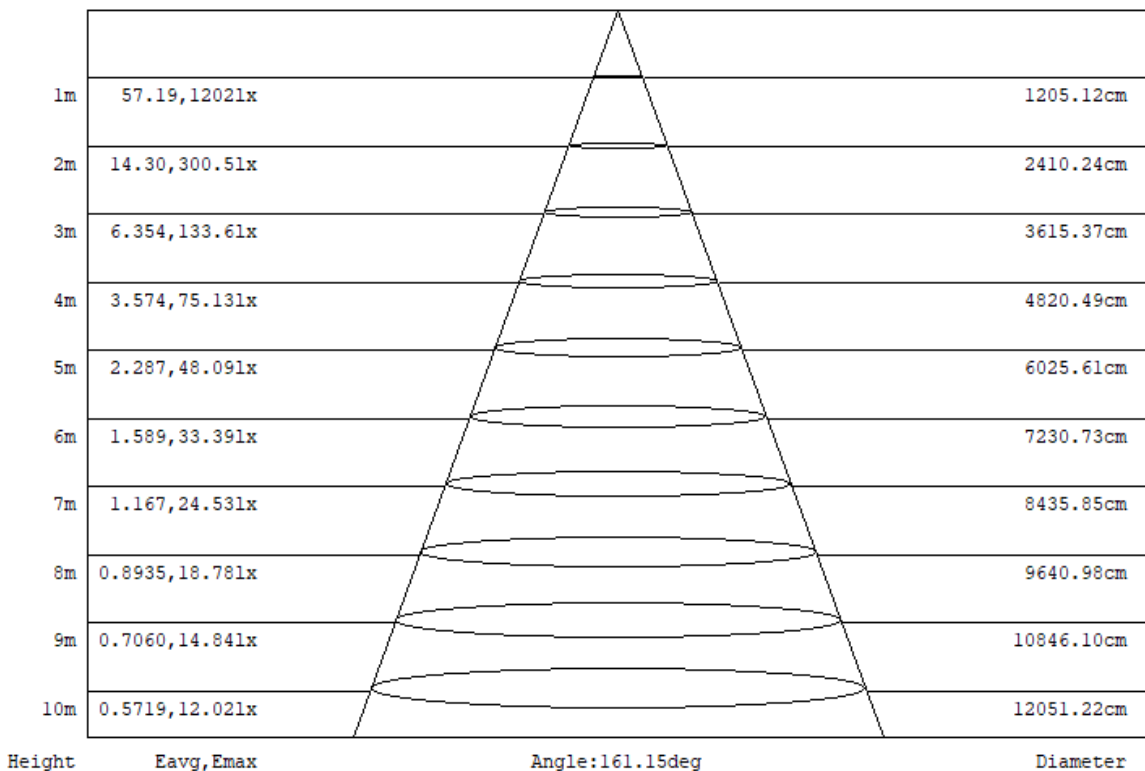
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	108	108	108	103	103	103	98	98	98	95
1	104	98	92	87	101	95	90	85	90	86	82	85	81	78	80	78	75	72
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	54	46	39	51	44	38	49	42	37	34
5	67	52	41	34	64	50	41	33	48	39	32	45	37	31	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	22	17	28	22	17	15
10	45	31	22	16	44	30	22	16	29	21	16	27	20	15	26	20	15	13

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	IVGT5CU-70L740W4	Sample ID.	O1
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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	479.94	60	0.157	75.0	0.995	8.75%

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*****