

Photometric Test Report

Relevant Standards

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

Prepared For

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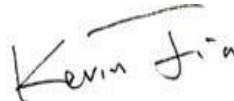
2018/12/20

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Approved By



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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	7664
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	102.8
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	34.57%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	14.31%
Power (Input Wattage)	IES LM-79-2008	Worst Case	74.6
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.156
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3037
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	71
Power Factor	ANSI C82.77:2014	0.873	0.995
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	9.41%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/19	IVGT5CU-70L730W4	N1
2	Goniophotometer Test	2018/12/19	IVGT5CU-70L730W4	N1
3	THD and PF Test	2018/12/19	IVGT5CU-70L730W4	N1

Remark(If any)

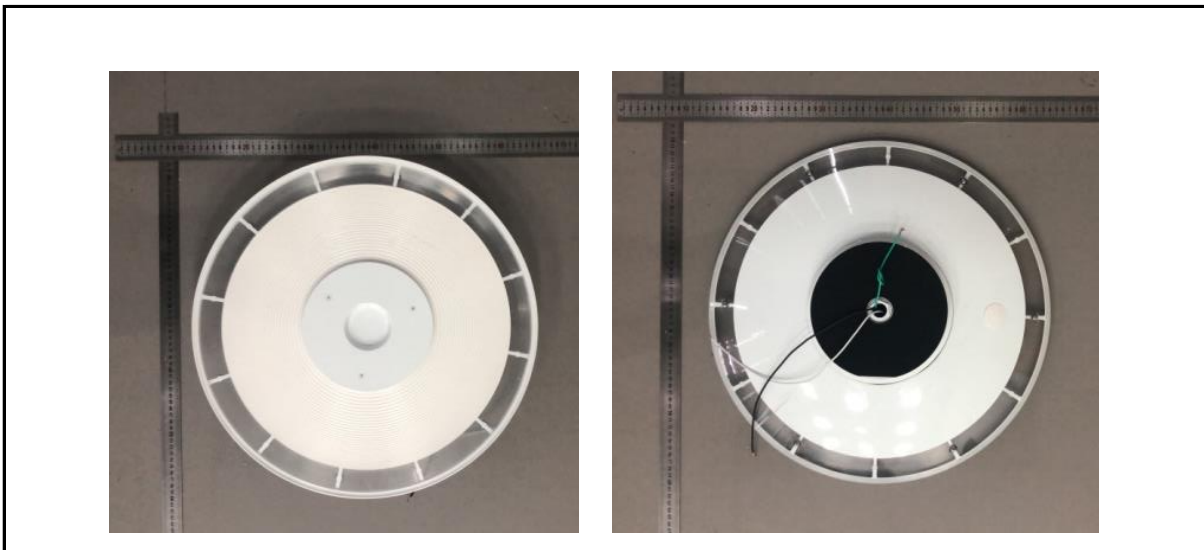
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3.0 Production Description

Luminaire Description: IVGT5CU-70L730W4

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-70L730W4	Sample ID.	N1
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	479.98	60	0.155	74.1	0.995

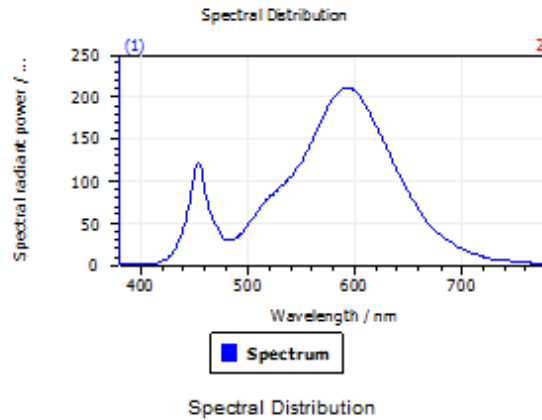
Test Result

CCT (K)	CRI (Ra)	Duv
3037	71.4	3.3E-04

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

DominantWavelength	582.78 nm
Purity	0.510
PeakWavelength	592.65 nm
Width50%	102.61 nm

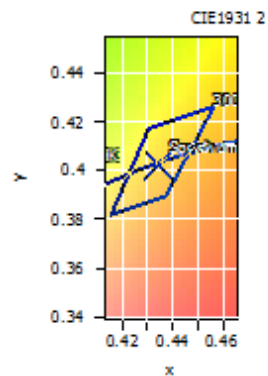
Color Coordinates

Correlated Color Temperature 3037 K

x: 0.4339 u: 0.2494 u': 0.2494
y: 0.4022 v: 0.3468 v': 0.5202

CRI01	67.4	CRI09	-39.7
CRI02	84.0	CRI10	64.1
CRI03	93.9	CRI11	60.3
CRI04	65.4	CRI12	52.9
CRI05	67.2	CRI13	70.8
CRI06	78.1	CRI14	97.1
CRI07	75.6	CRI15	58.9
CRI08	39.9	CRI16	56.6

ResultsCRI 71.4



PlanckDistance 3.3E-004

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5CU-70L730W4	Sample ID.	N1
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

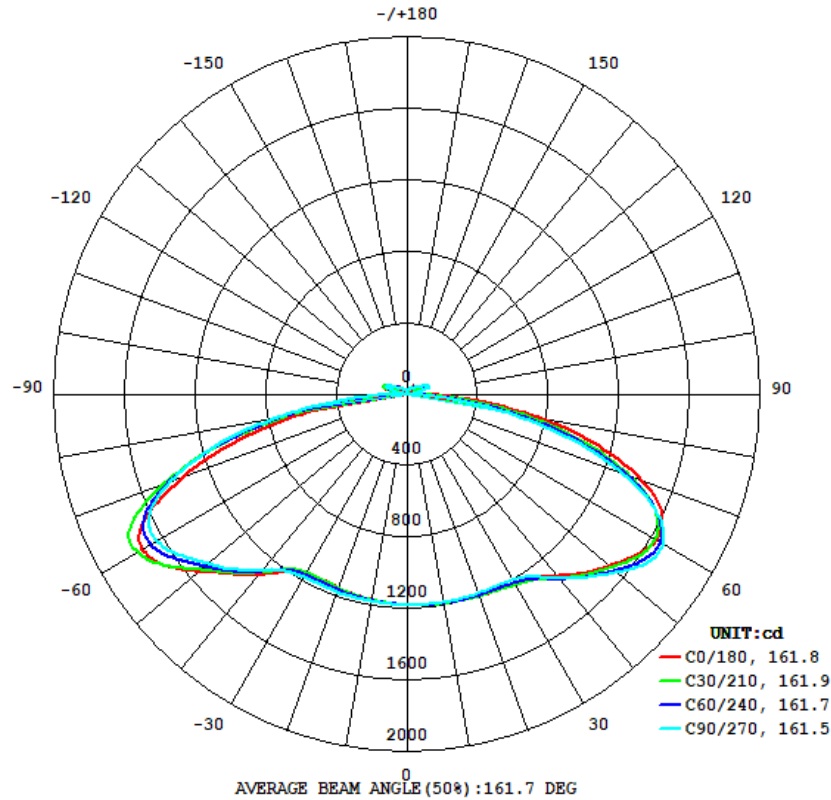
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.98	60	0.156	74.6	0.994	Light Down

Test Result

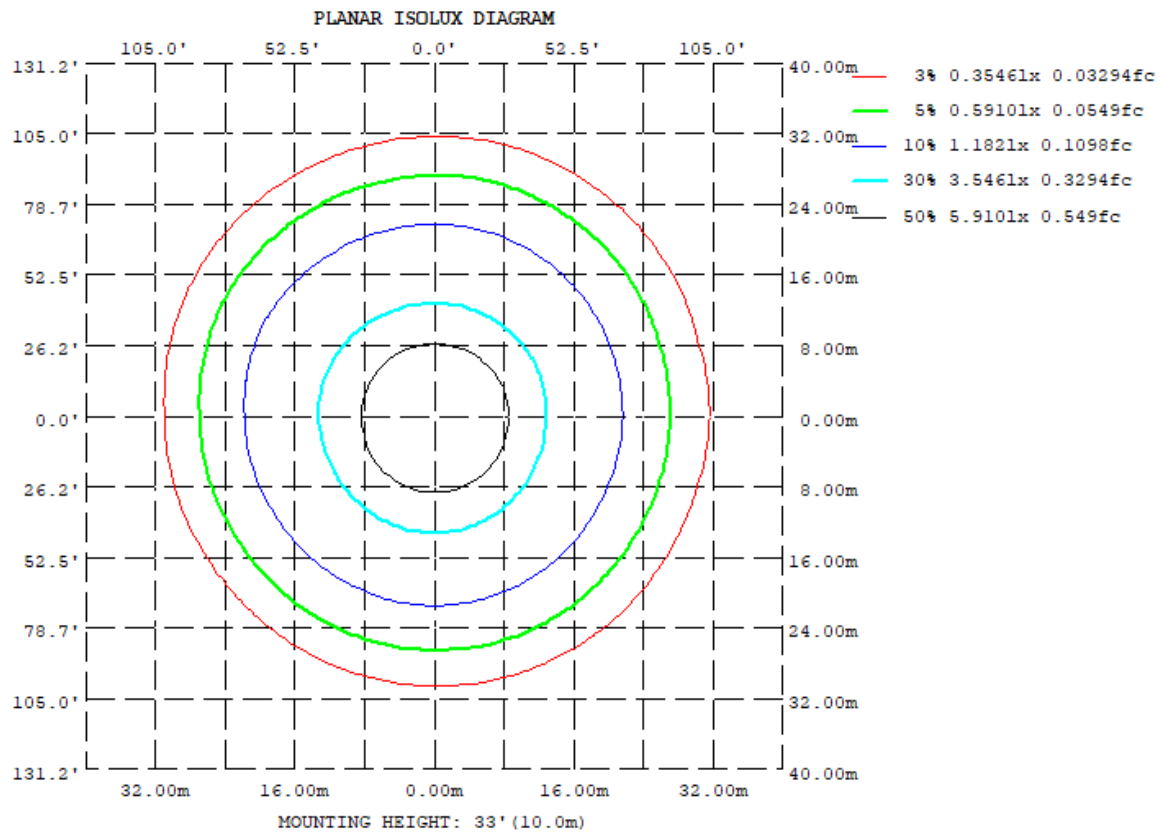
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7664	34.57%	14.31%	236.1	235.1	163.1	162.5	102.8

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	1188	1188	1182	1175	1170	1172	1177	1184		
20	1201	1199	1183	1166	1153	1158	1177	1194		
30	1225	1226	1199	1178	1156	1159	1183	1209		
40	1326	1349	1346	1333	1319	1298	1285	1312		
50	1493	1523	1550	1535	1543	1514	1477	1500		
60	1630	1642	1675	1661	1733	1724	1641	1656		
70	1418	1334	1301	1295	1354	1462	1429	1449		
80	758.0	637.7	548.7	547.9	559.8	699.0	750.0	780.4		
90	51.31	7.278	4.130	3.390	1.453	16.48	52.80	54.23		
100	18.11	33.32	49.65	55.53	48.74	40.55	31.39	24.19		
110	92.42	70.87	140.0	109.3	146.8	77.65	120.4	87.30		
120	93.77	90.12	98.90	80.91	86.17	97.92	99.67	82.46		
130	39.11	74.47	69.67	69.04	49.90	67.33	63.32	69.90		
140	66.98	60.61	53.65	52.05	52.48	49.74	49.24	53.63		
150	42.22	43.37	39.17	36.36	33.12	36.09	37.37	38.86		
160	27.16	27.74	33.13	26.10	26.78	29.20	34.62	28.88		
170	19.34	21.93	21.90	19.54	18.45	17.83	20.57	21.99		
180	18.81	12.83	12.85	12.42	18.15	17.49	16.66	17.39		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	112.58	0 - 10	112.58	1.47%
10-20	334.37	0 - 20	446.95	5.83%
20-30	547.50	0 - 30	994.45	12.97%
30-40	782.99	0 - 40	1777.44	23.19%
40-50	1101.12	0 - 50	2878.56	37.56%
50-60	1441.79	0 - 60	4320.35	56.37%
60-70	1552.89	0 - 70	5873.24	76.63%
70-80	1096.44	0 - 80	6969.68	90.93%
80-90	327.56	0 - 90	7297.24	95.21%
90-100	24.01	0 - 100	7321.25	95.52%
100-110	73.44	0 - 110	7394.69	96.48%
110-120	105.39	0 - 120	7500.08	97.86%
120-130	64.67	0 - 130	7564.75	98.70%
130-140	46.33	0 - 140	7611.08	99.30%
140-150	28.60	0 - 150	7639.68	99.68%
150-160	15.73	0 - 160	7655.41	99.88%
160-170	7.41	0 - 170	7662.82	99.98%
170-180	1.66	0 - 180	7664.48	100.00%

3.2 Goniophotometer Test

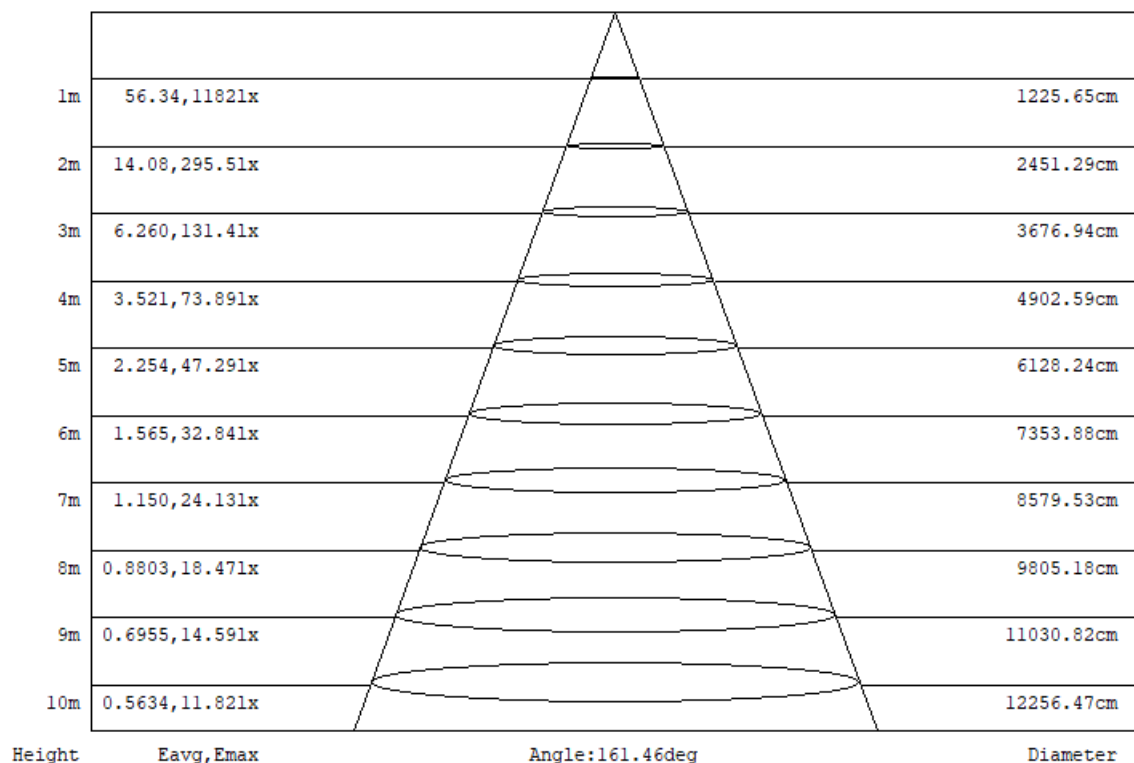
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	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	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	26	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-70L730W4	Sample ID.	N1
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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	479.98	60	0.155	74.1	0.995	9.41%

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*****