

Photometric Test Report

Relevant Standards

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

Prepared For

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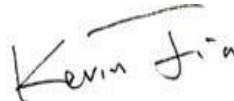
2018/12/15

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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	8144
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	109.8
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	35.57%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	14.83%
Power (Input Wattage)	IES LM-79-2008	Worst Case	74.2
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.155
Allowable CCTs* (K)	IES LM-79-2008	≤5700	4780
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	76
Power Factor	ANSI C82.77:2014	0.873	0.995
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	9.12%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/14	IVGT5CU-70L750W4	P1
2	Goniophotometer Test	2018/12/14	IVGT5CU-70L750W4	P1
3	THD and PF Test	2018/12/14	IVGT5CU-70L750W4	P1

Remark(If any)

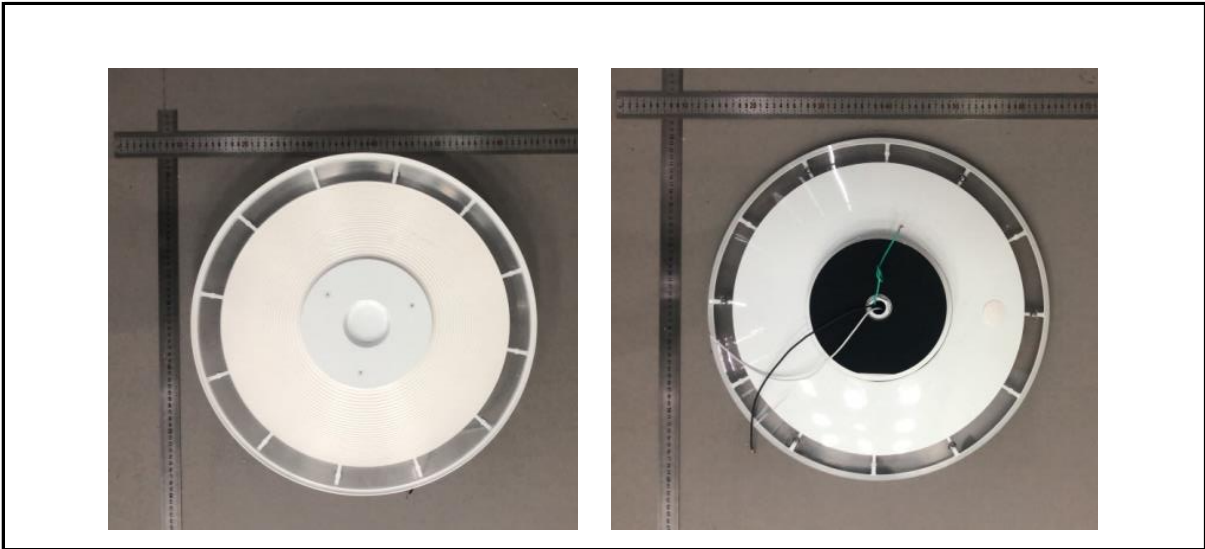
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3.0 Production Description

Luminaire Description: IVGT5CU-70L750W4

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-70L750W4	Sample ID.	P1
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	480	60	0.155	74.2	0.995

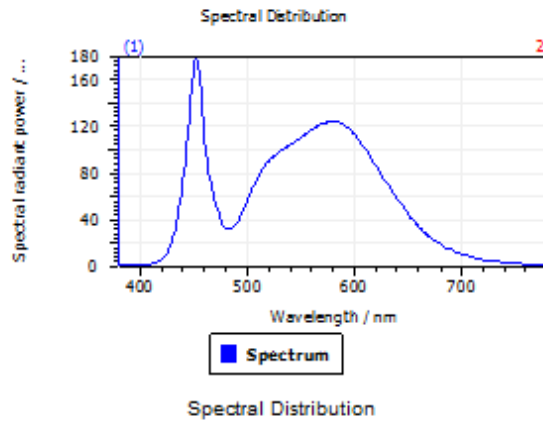
Test Result

CCT (K)	CRI (Ra)	Duv
4780	75.5	4.9E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

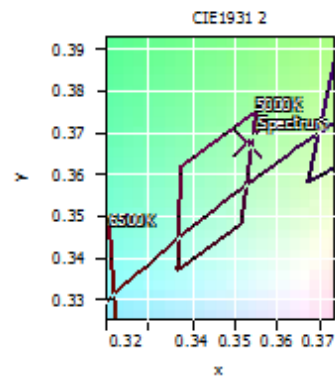


Spectral values

DominantWavelength	571.44 nm
Purity	0.163
PeakWavelength	452.00 nm
Width50%	20.45 nm

Color Coordinates

Correlated Color Temperature		4780 K	
x: 0.3530	u: 0.2105	u': 0.2105	
y: 0.3679	v: 0.3290	v': 0.4935	
CRI01	71.5	CRI09	-27.4
CRI02	82.0	CRI10	57.6
CRI03	90.1	CRI11	70.7
CRI04	73.8	CRI12	44.9
CRI05	72.2	CRI13	73.9
CRI06	74.8	CRI14	94.7
CRI07	84.0	CRI15	63.8
CRI08	55.8	CRI16	62.4
ResultsCRI	75.5		



PlanckDistance 4.9E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5CU-70L750W4	Sample ID.	P1
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

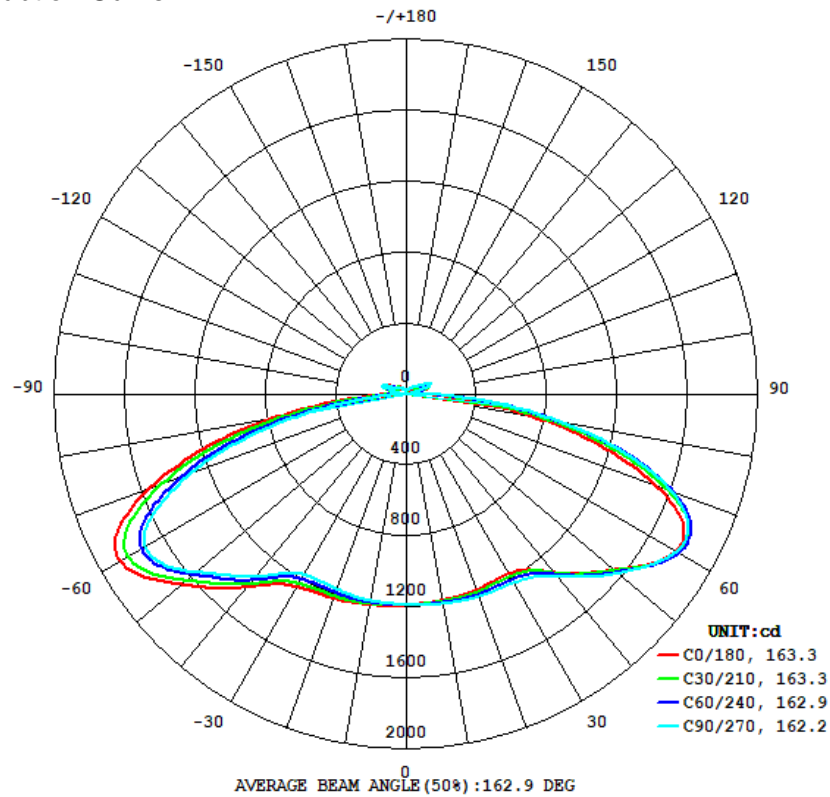
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.02	60	0.155	74.2	0.995	Light Down

Test Result

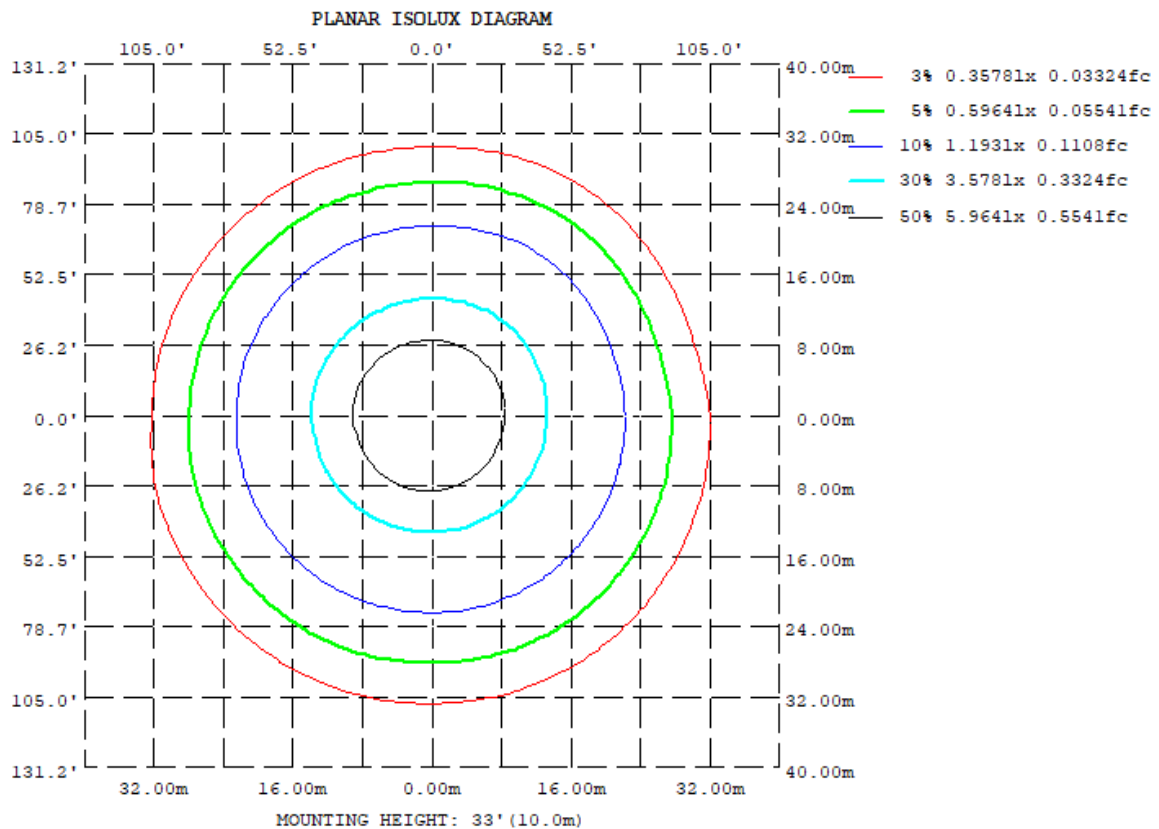
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10°)		Beam Angle(50°)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
8144	35.57%	14.83%	234.2	234.5	163.3	162.2	109.8

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1180	1189	1199	1205	1206	1196	1183	1176
20	1172	1192	1213	1227	1226	1201	1170	1157
30	1169	1195	1227	1258	1255	1219	1176	1158
40	1315	1323	1345	1389	1420	1383	1343	1340
50	1542	1555	1569	1628	1669	1607	1563	1592
60	1769	1788	1774	1847	1878	1779	1714	1842
70	1516	1605	1605	1661	1559	1418	1304	1442
80	733.5	854.8	887.5	919.7	754.3	623.3	502.8	575.6
90	28.06	50.43	77.78	81.99	25.90	4.646	5.446	3.581
100	27.45	32.96	24.99	28.40	21.96	51.45	66.47	65.30
110	142.0	97.44	58.02	98.27	139.8	109.9	148.0	97.75
120	89.78	99.37	115.7	82.69	102.8	74.45	81.90	80.52
130	47.35	69.30	73.25	76.81	43.13	69.31	62.86	65.60
140	61.02	52.83	50.94	59.07	61.86	53.57	54.42	50.60
150	32.43	36.52	42.51	42.34	41.75	39.49	36.80	35.06
160	27.90	30.69	34.28	32.44	27.91	30.55	32.43	28.09
170	19.53	21.87	24.07	25.28	21.46	19.30	20.73	20.58
180	18.43	17.61	18.43	13.49	17.88	17.87	17.18	16.99
DEG	LUMINOUS INTENSITY:cd							

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	113.64	0 - 10	113.64	1.40%
10-20	338.39	0 - 20	452.03	5.55%
20-30	554.48	0 - 30	1006.51	12.36%
30-40	798.51	0 - 40	1805.02	22.16%
40-50	1142.60	0 - 50	2947.62	36.19%
50-60	1533.43	0 - 60	4481.05	55.02%
60-70	1688.71	0 - 70	6169.76	75.76%
70-80	1208.09	0 - 80	7377.85	90.59%
80-90	373.49	0 - 90	7751.34	95.17%
90-100	27.12	0 - 100	7778.46	95.51%
100-110	85.90	0 - 110	7864.36	96.56%
110-120	113.46	0 - 120	7977.82	97.96%
120-130	66.03	0 - 130	8043.85	98.77%
130-140	46.60	0 - 140	8090.45	99.34%
140-150	28.66	0 - 150	8119.11	99.69%
150-160	15.79	0 - 160	8134.90	99.88%
160-170	7.65	0 - 170	8142.55	99.98%
170-180	1.76	0 - 180	8144.31	100.00%

3.2 Goniophotometer Test

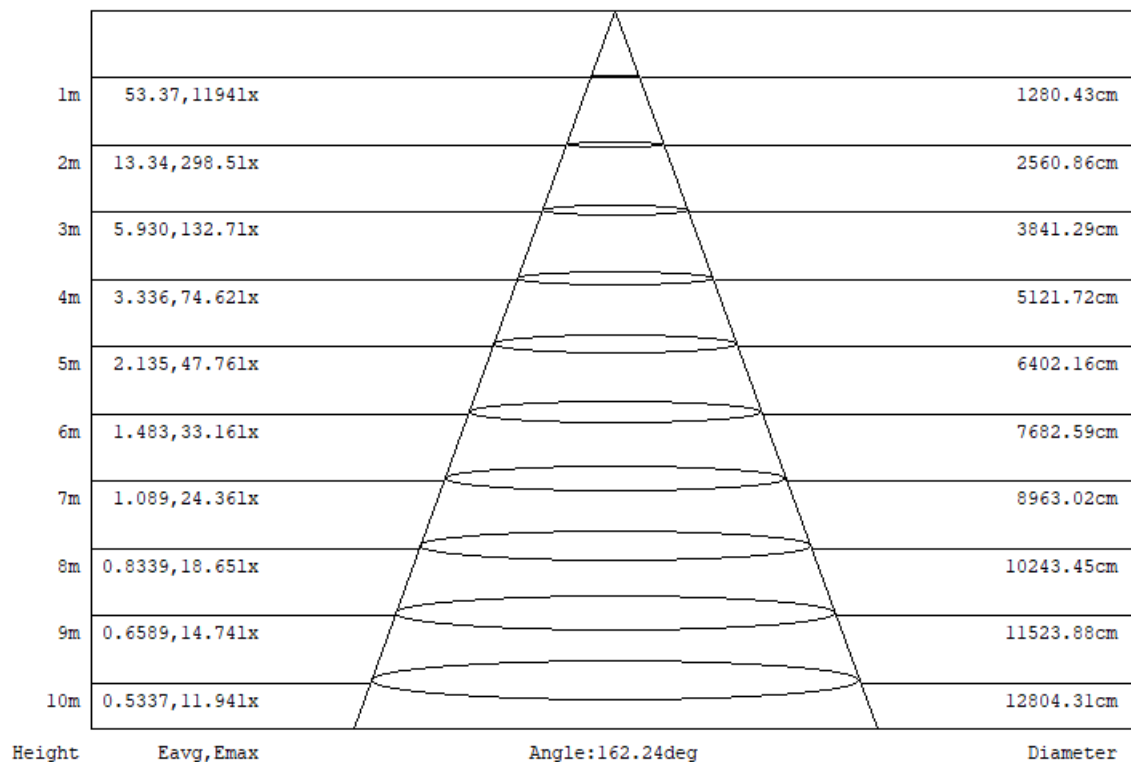
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	108	108	108	103	103	103	98	98	98	95
1	104	98	92	87	100	95	90	85	89	85	81	85	81	78	80	77	75	72
2	92	81	72	65	88	79	71	64	74	67	62	70	64	59	66	61	57	55
3	82	69	58	50	78	66	57	50	63	55	48	59	52	46	56	50	45	42
4	73	59	48	40	70	57	47	40	54	45	38	51	43	37	48	41	36	34
5	66	51	41	33	64	50	40	32	47	38	32	44	37	31	42	35	30	27
6	61	45	35	27	58	44	34	27	42	33	26	39	32	26	37	30	25	23
7	56	40	30	23	54	39	30	23	37	29	23	35	28	22	33	27	21	19
8	52	36	27	20	50	35	26	20	34	25	20	32	24	19	30	24	19	16
9	48	33	24	18	46	32	23	18	31	23	17	29	22	17	28	21	16	14
10	45	30	22	16	43	29	21	16	28	20	15	27	20	15	26	19	15	13

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	IVGT5CU-70L750W4	Sample ID.	P1
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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	60	0.155	74.2	0.995	9.12%

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*****