

Photometric Test Report

Relevant Standards

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

Prepared For

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2018/11/6

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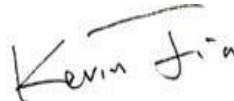
2018/11/7

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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	7596
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	95	109.2
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	36.06%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	14.77%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	4769
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	76
Power Factor	ANSI C82.77:2014	0.873	0.970
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	7.36%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/6	IVGT5C-70L750ZU	L1
2	Goniophotometer Test	2018/11/6	IVGT5C-70L750ZU	L1
3	THD and PF Test	2018/11/6	IVGT5C-70L750ZU	L1

Remark(If any)

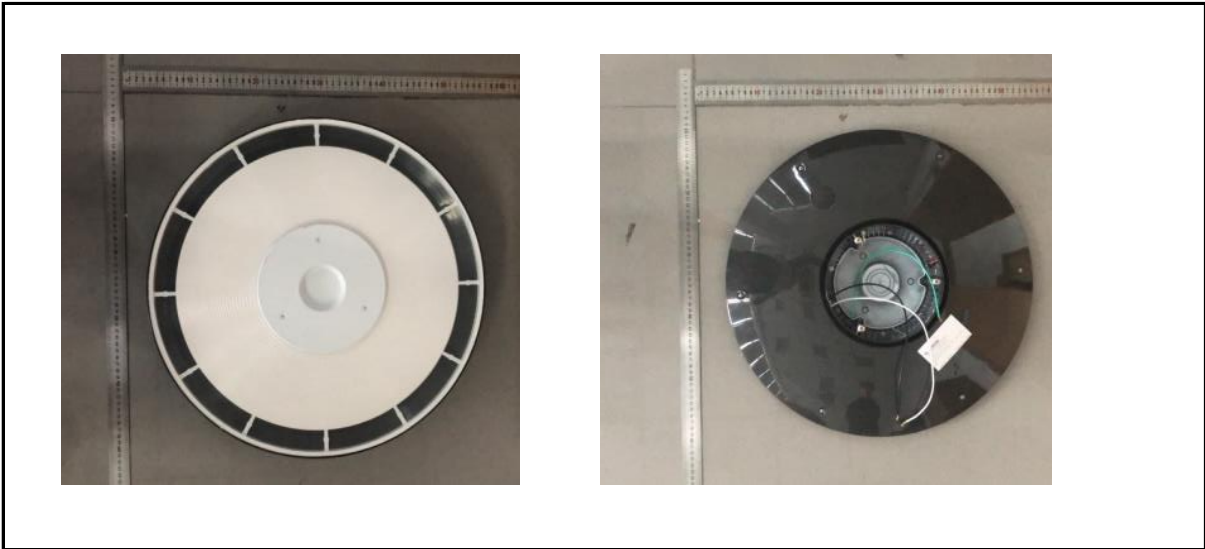
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3.0 Production Description

Luminaire Description: IVGT5C-70L750ZU

Electrical Specification: 120V-277V, 50/60HZ, 70W

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	IVGT5C-70L750ZU	Sample ID.	L1
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	120.07	60	0.588	70.4	0.997

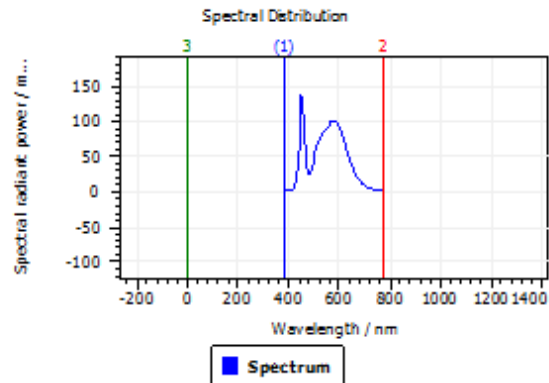
Test Result

CCT (K)	CRI (Ra)	Duv
4769	75.7	4.7E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

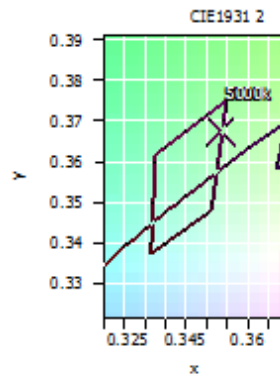
DominantWavelength	571.70 nm
Purity	0.163
PeakWavelength	452.02 nm
Radiant Power	17.52 W
Width50%:	22.59 nm

Color Coordinates

Correlated Color Temperatu 4769 K

x: 0.3533 u: 0.2108 u': 0.2108
y: 0.3676 v: 0.3290 v': 0.4934

ResultsCRICRI01	71.8	ResultsCRICRI09	-26.7
ResultsCRICRI02	82.1	ResultsCRICRI10	57.8
ResultsCRICRI03	90.1	ResultsCRICRI11	70.9
ResultsCRICRI04	74.0	ResultsCRICRI12	45.5
ResultsCRICRI05	72.4	ResultsCRICRI13	74.1
ResultsCRICRI06	75.0	ResultsCRICRI14	94.7
ResultsCRICRI07	84.1	ResultsCRICRI15	64.1
ResultsCRICRI08	56.1	ResultsCRICRI16	62.7
ResultsCRI	75.7		



PlanckDistance 4.7E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5C-70L750ZU	Sample ID.	L1
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

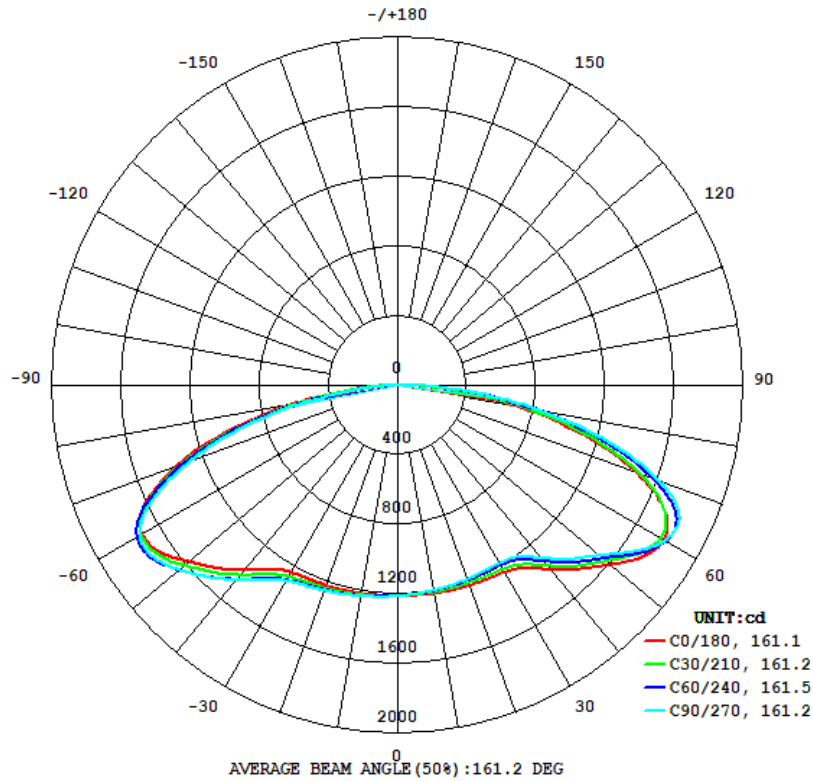
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	119.97	60	0.582	69.6	0.996	Light Down

Test Result

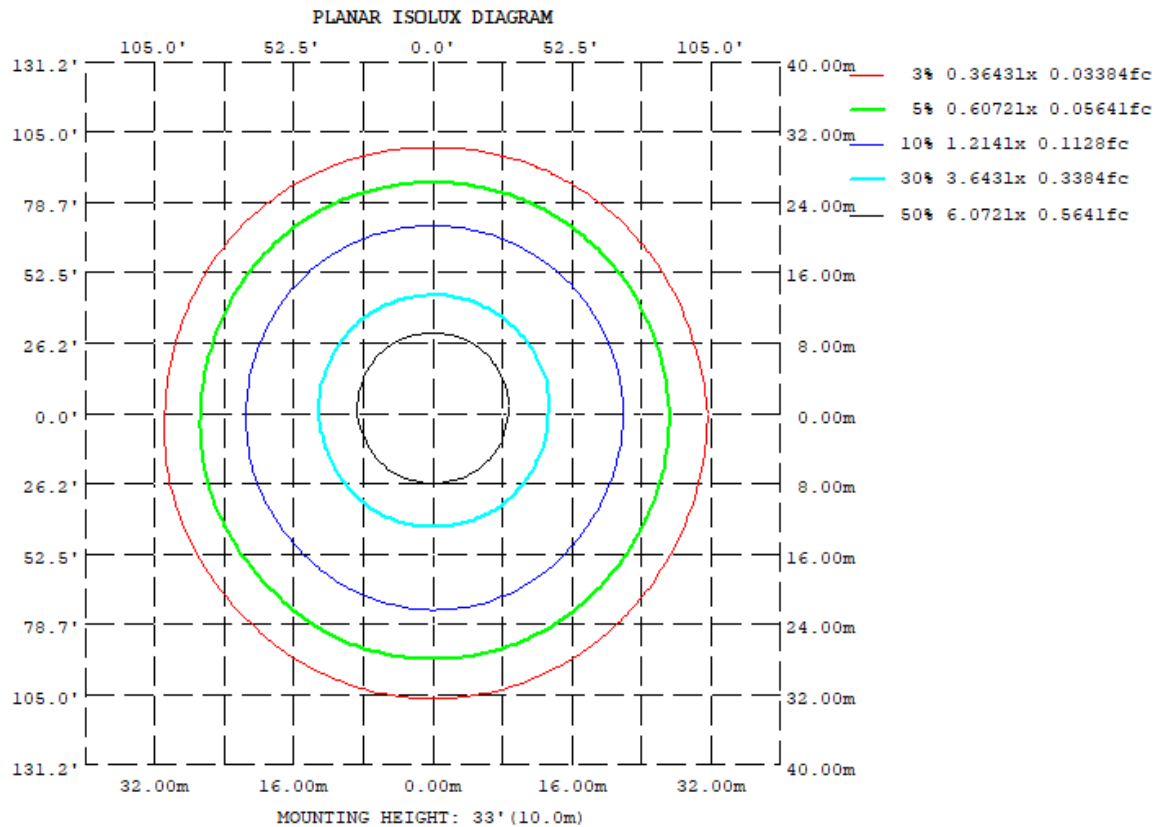
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7596	36.06%	14.77%	173.5	173.2	161.1	161.2	109.2

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

°	C0	C45	C90	C135	C180	C225	C270	C315
10	1216	1204	1198	1203	1217	1228	1232	1227
20	1225	1200	1185	1198	1226	1248	1257	1248
30	1241	1207	1180	1204	1244	1285	1301	1284
40	1384	1342	1299	1330	1389	1445	1462	1448
50	1605	1564	1524	1536	1581	1639	1653	1661
60	1780	1771	1786	1718	1709	1735	1721	1771
70	1475	1523	1609	1481	1364	1335	1284	1356
80	704.5	777.9	835.2	756.5	602.4	548.6	497.8	552.9
90	8.825	36.49	33.71	37.55	1.282	0.3224	0.3091	0.3333
100	0.7277	0.7080	0.7294	0.7260	0.9091	0.9135	0.9043	0.9169
110	1.013	1.019	0.9446	0.9735	1.500	1.473	1.387	1.285
120	1.132	1.204	1.229	1.211	1.677	1.871	1.680	1.758
130	1.318	1.414	1.468	1.378	7.282	2.145	2.172	1.959
140	1.383	1.556	1.666	1.655	2.241	2.336	2.542	2.441
150	1.570	1.648	2.205	1.688	2.562	2.605	2.697	2.580
160	1.660	1.705	2.366	1.671	2.594	2.581	3.062	2.580
170	1.565	4.478	2.681	1.673	2.142	2.672	3.096	2.576
180	1.797	2.304	2.031	2.337	1.827	1.903	1.997	1.997
DEG	LUMINOUS INTENSITY:cd							

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	115.89	0 - 10	115.89	1.53%
10-20	345.72	0 - 20	461.61	6.08%
20-30	569.72	0 - 30	1031.33	13.58%
30-40	819.94	0 - 40	1851.27	24.37%
40-50	1157.79	0 - 50	3009.06	39.61%
50-60	1515.07	0 - 60	4524.13	59.56%
60-70	1617.11	0 - 70	6141.24	80.85%
70-80	1121.80	0 - 80	7263.04	95.61%
80-90	319.41	0 - 90	7582.45	99.82%
90-100	4.76	0 - 100	7587.21	99.88%
100-110	1.07	0 - 110	7588.28	99.89%
110-120	1.32	0 - 120	7589.60	99.91%
120-130	1.88	0 - 130	7591.48	99.94%
130-140	1.52	0 - 140	7593.00	99.96%
140-150	1.44	0 - 150	7594.44	99.98%
150-160	1.01	0 - 160	7595.45	99.99%
160-170	0.64	0 - 170	7596.09	100.00%
170-180	0.21	0 - 180	7596.30	100.00%

3.2 Goniophotometer Test

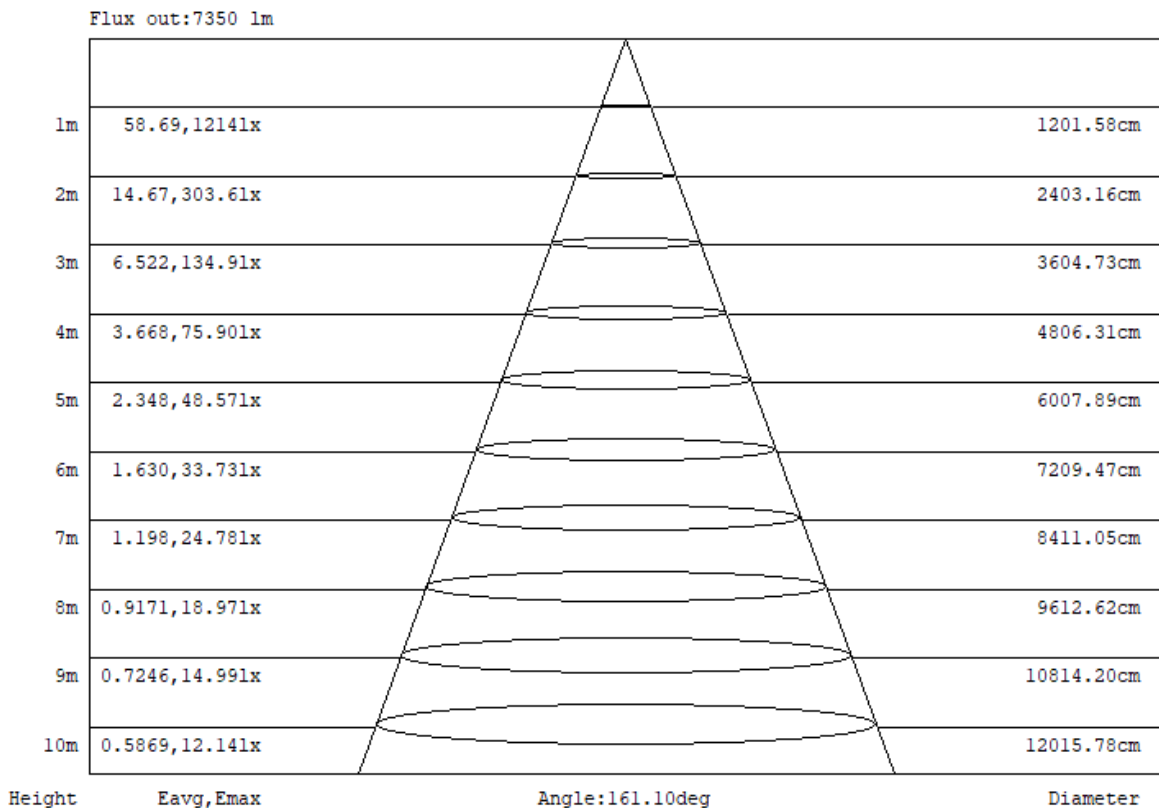
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	124	124	124	124	121	121	121	121	116	116	116	111	111	111	106	106	106	104
1	110	103	97	92	107	101	95	90	96	92	88	92	88	85	88	85	82	80
2	97	86	77	69	94	84	75	68	80	73	67	76	70	65	73	68	63	61
3	86	73	62	54	83	71	61	53	68	59	52	64	57	51	62	55	50	47
4	78	62	51	43	75	61	51	43	58	49	42	55	48	41	53	46	40	38
5	70	54	43	35	68	53	43	35	51	41	34	48	40	34	46	39	33	31
6	64	48	37	29	62	47	37	29	45	36	29	43	35	29	41	34	28	26
7	59	43	32	25	57	42	32	25	40	31	25	39	30	24	37	30	24	22
8	55	39	29	22	53	38	28	22	36	28	21	35	27	21	34	26	21	19
9	51	35	26	19	49	34	25	19	33	25	19	32	24	19	31	24	18	16
10	47	32	23	17	46	32	23	17	30	22	17	29	22	17	28	21	16	14

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	IVGT5C-70L750ZU	Sample ID.	L1
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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	0.252	67.8	0.970	7.36%
25.1	120.07	60	0.588	70.4	0.997	6.34%

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*****