

Photometric Test Report

Relevant Standards

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

Prepared For

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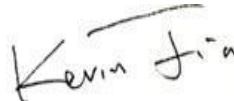
2018/11/8

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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	3489
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	95	49.7
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	42.85%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	17.29%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3987
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	75
Power Factor	ANSI C82.77:2014	0.873	0.971
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	7.07%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/7	IVGT5CU-70L740WU	O1
2	Goniophotometer Test	2018/11/7	IVGT5CU-70L740WU	O1
3	THD and PF Test	2018/11/7	IVGT5CU-70L740WU	O1

Remark(If any)

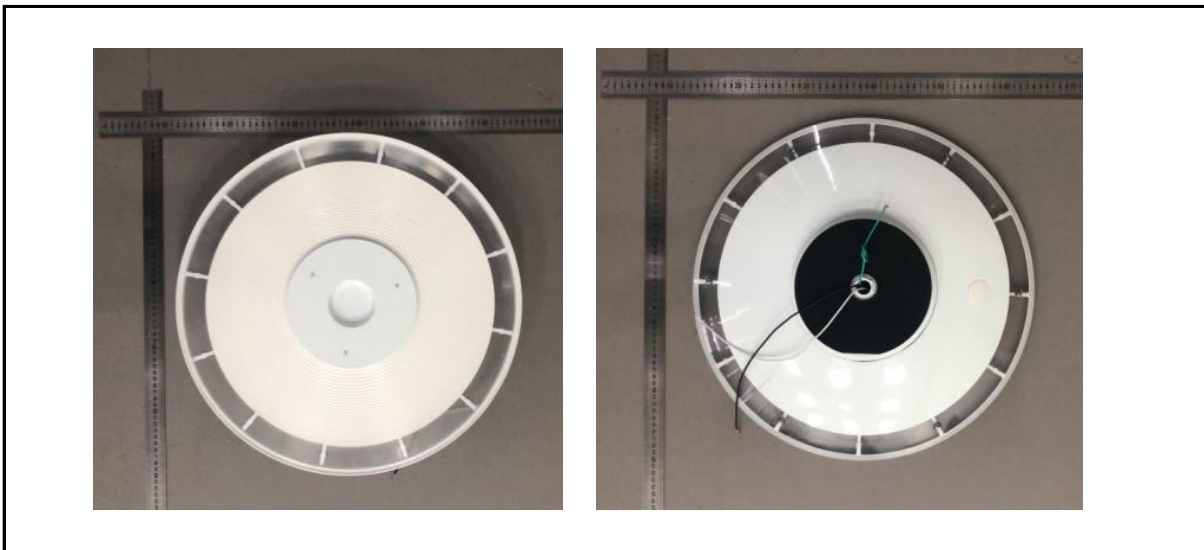
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3.0 Production Description

Luminaire Description: IVGT5CU-70L740WU

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.	IVGT5CU-70L740WU	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	120.02	60	0.594	71.0	0.996

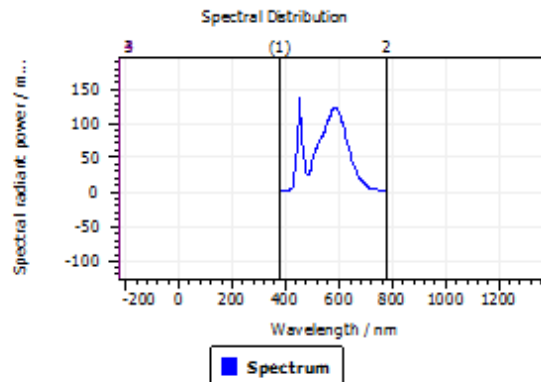
Test Result

CCT (K)	CRI (Ra)	Duv
3987	74.9	1.4E-04

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

DominantWavelength	579.05 nm
Purity	0.277
PeakWavelength	452.29 nm
Radiant Power	19.08 W
Width50%:	20.13 nm

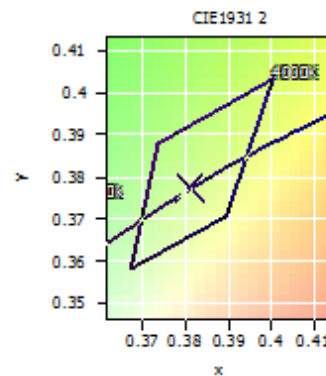
Color Coordinates

Correlated Color Temperatu 3987 K

x: 0.3811 u: 0.2253 u': 0.2253
y: 0.3775 v: 0.3347 v': 0.5020

ResultsCRICRI01	71.4	ResultsCRICRI09	-28.7
ResultsCRICRI02	83.6	ResultsCRICRI10	61.5
ResultsCRICRI03	92.5	ResultsCRICRI11	68.2
ResultsCRICRI04	71.9	ResultsCRICRI12	48.8
ResultsCRICRI05	71.7	ResultsCRICRI13	74.1
ResultsCRICRI06	76.6	ResultsCRICRI14	96.1
ResultsCRICRI07	80.9	ResultsCRICRI15	63.9
ResultsCRICRI08	51.0	ResultsCRICRI16	62.3

ResultsCRI 74.9



PlanckDistance 1.4E-004

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5CU-70L740WU	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

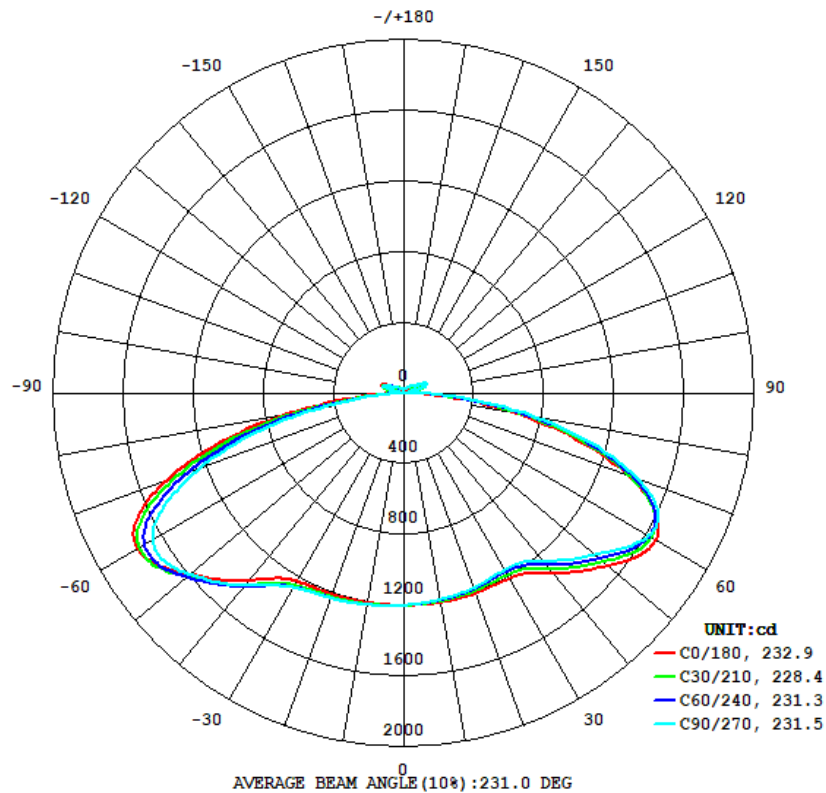
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	120.03	60	0.587	70.2	0.996	Light Down

Test Result

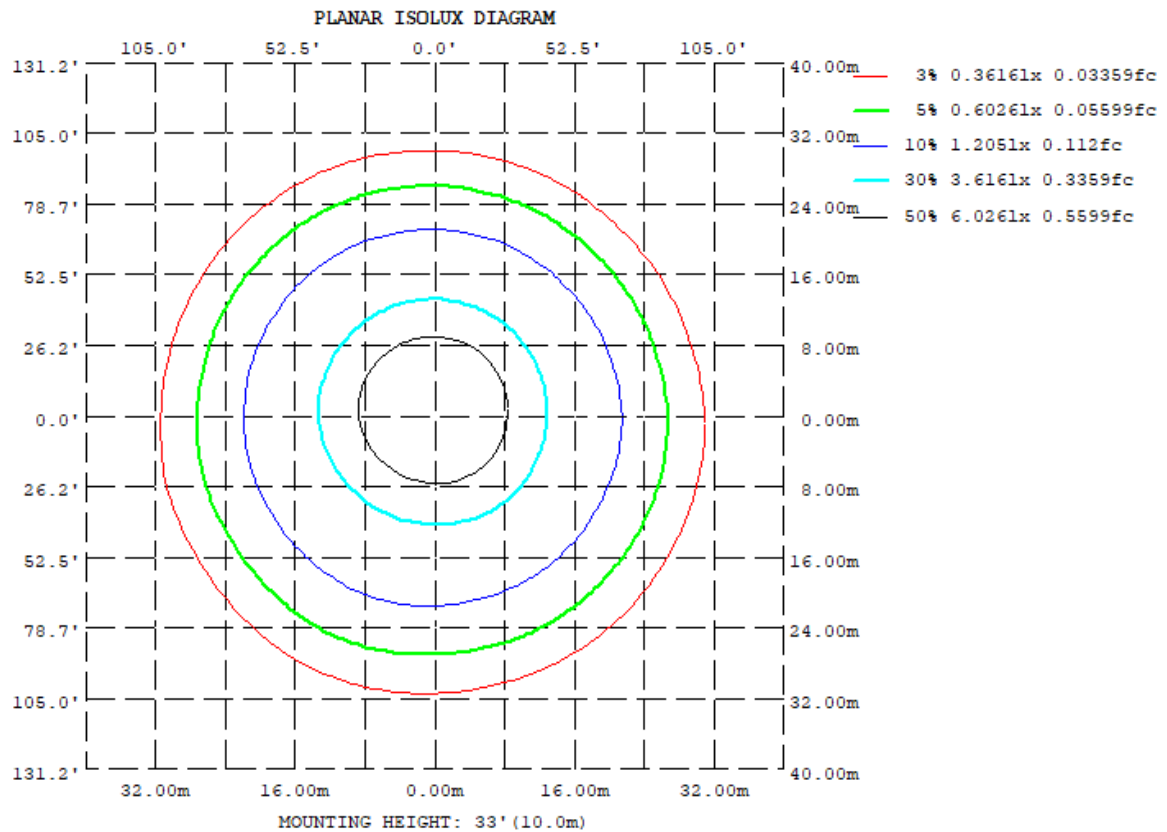
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
3489	42.85%	17.29%	232.9	231.5	161.2	160.4	49.7

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	1203	1192	1187	1192	1206	1215	1217	1211
20	1205	1184	1172	1185	1213	1232	1233	1224
30	1208	1176	1154	1176	1231	1264	1270	1254
40	1330	1285	1241	1279	1384	1425	1424	1397
50	1519	1472	1422	1473	1596	1621	1596	1569
60	1661	1625	1615	1662	1755	1730	1654	1633
70	1366	1385	1423	1471	1441	1354	1244	1242
80	645.4	705.4	743.3	765.6	662.6	570.1	484.7	500.8
90	20.42	36.07	43.81	47.49	20.59	3.528	3.724	1.263
100	19.47	33.93	28.11	28.78	22.74	57.41	55.86	55.48
110	134.9	90.61	113.9	101.7	139.9	95.76	124.9	92.65
120	94.36	92.42	107.3	81.30	94.96	80.93	83.65	80.61
130	40.06	71.91	67.35	71.36	50.24	63.74	59.14	67.32
140	58.21	54.91	49.49	52.31	54.61	45.65	45.16	49.61
150	32.55	38.94	37.56	40.11	35.70	34.25	36.26	38.67
160	29.09	28.37	33.93	27.15	27.08	25.77	31.31	30.28
170	17.44	19.79	21.74	19.66	18.27	16.88	21.74	20.78
180	17.56	17.18	11.06	12.59	16.87	17.15	15.72	16.52
DEG	LUMINOUS INTENSITY:cd							

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	26.54	0 - 10	26.54	0.76%
10-20	85.64	0 - 20	112.18	3.22%
20-30	162.89	0 - 30	275.07	7.89%
30-40	283.43	0 - 40	558.50	16.01%
40-50	494.59	0 - 50	1053.09	30.19%
50-60	772.66	0 - 60	1825.75	52.34%
60-70	891.45	0 - 70	2717.20	77.89%
70-80	603.28	0 - 80	3320.48	95.18%
80-90	162.24	0 - 90	3482.72	99.83%
90-100	1.76	0 - 100	3484.48	99.88%
100-110	0.53	0 - 110	3485.01	99.90%
110-120	0.64	0 - 120	3485.65	99.92%
120-130	0.83	0 - 130	3486.48	99.94%
130-140	0.66	0 - 140	3487.14	99.96%
140-150	0.57	0 - 150	3487.71	99.98%
150-160	0.42	0 - 160	3488.13	99.99%
160-170	0.28	0 - 170	3488.41	100.00%
170-180	0.09	0 - 180	3488.50	100.00%

3.2 Goniophotometer Test

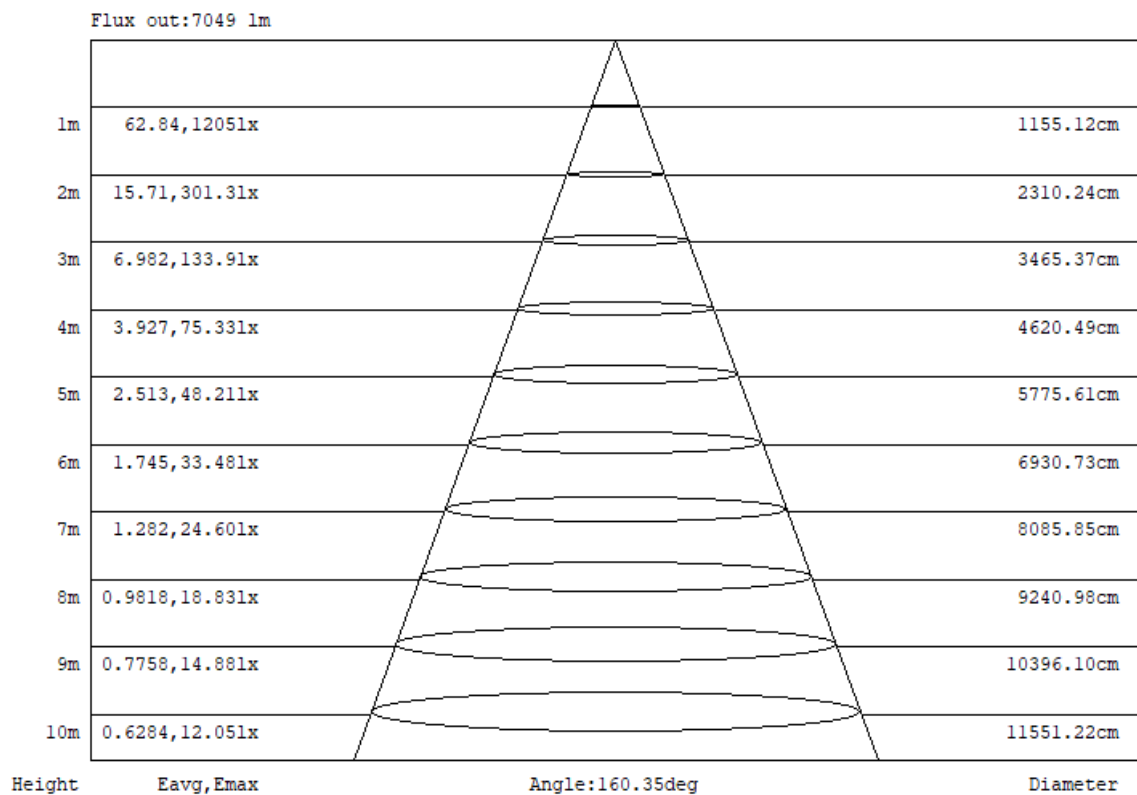
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	93	88	101	95	90	86	90	86	82	85	82	79	81	78	75	73
2	92	82	73	66	89	80	72	65	75	68	63	71	65	60	67	62	58	56
3	82	69	60	52	79	67	58	51	64	56	49	60	53	48	57	51	46	43
4	74	60	49	41	71	58	48	41	55	46	40	52	44	38	49	43	37	35
5	67	52	42	34	64	51	41	34	48	39	33	45	38	32	43	36	31	28
6	61	46	36	29	59	45	35	28	42	34	27	40	33	27	38	31	26	24
7	56	41	31	24	54	40	31	24	38	30	24	36	29	23	34	27	22	20
8	52	37	28	21	50	36	27	21	34	26	20	33	25	20	31	24	19	17
9	49	34	25	19	47	33	24	18	31	23	18	30	23	18	28	22	17	15
10	45	31	22	16	44	30	22	16	29	21	16	27	21	16	26	20	15	13

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	IVGT5CU-70L740WU	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	276.95	60	0.255	68.6	0.971	7.07%
25.1	120.02	60	0.594	71.0	0.996	6.50%

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*****