

Photometric Test Report

Relevant Standards

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

Prepared For

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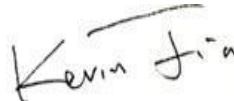
2018/12/15

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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	5941
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	123.0
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	40.00%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	16.94%
Power (Input Wattage)	IES LM-79-2008	Worst Case	48.3
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.103
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	0.980
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	20.04%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/14	IVGT5U-50L750W4	G1
2	Goniophotometer Test	2018/12/14	IVGT5U-50L750W4	G1
3	THD and PF Test	2018/12/14	IVGT5U-50L750W4	G1

Remark(If any)

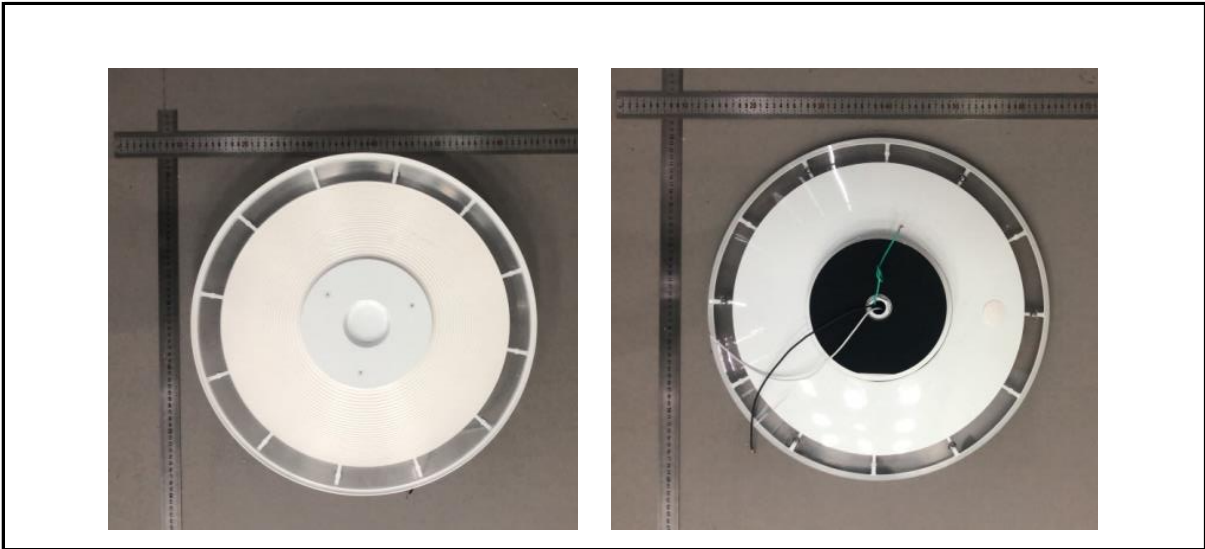
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3.0 Production Description

Luminaire Description: IVGT5U-50L750W4

Electrical Specification: 480V,50/60HZ, 50W

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	IVGT5U-50L750W4	Sample ID.	G1
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	479.97	60	0.103	48.3	0.980

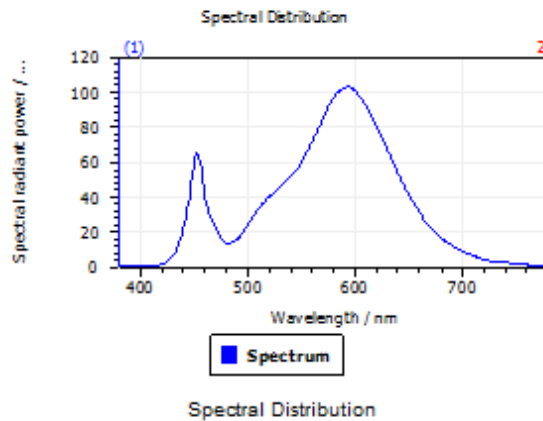
Test Result

CCT (K)	CRI (Ra)	Duv
4780	76	3.1E-04

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

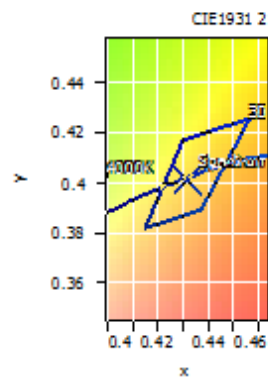


Spectral values

DominantWavelength	582.64 nm
Purity	0.500
PeakWavelength	592.79 nm
Width50%:	102.72 nm

Color Coordinates

Correlated Color Temperature		3071 K	
x: 0.4315	u: 0.2482	u': 0.2482	
y: 0.4014	v: 0.3463	v': 0.5195	
CRI01	67.3	CRI09	-42.2
CRI02	84.2	CRI10	64.8
CRI03	93.3	CRI11	60.7
CRI04	65.1	CRI12	53.5
CRI05	67.1	CRI13	71.0
CRI06	78.7	CRI14	96.7
CRI07	74.7	CRI15	58.0
CRI08	38.5	CRI16	55.5
ResultsCRI	71.1		



PlanckDistance 3.1E-004

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5U-50L750W4	Sample ID.	G1
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

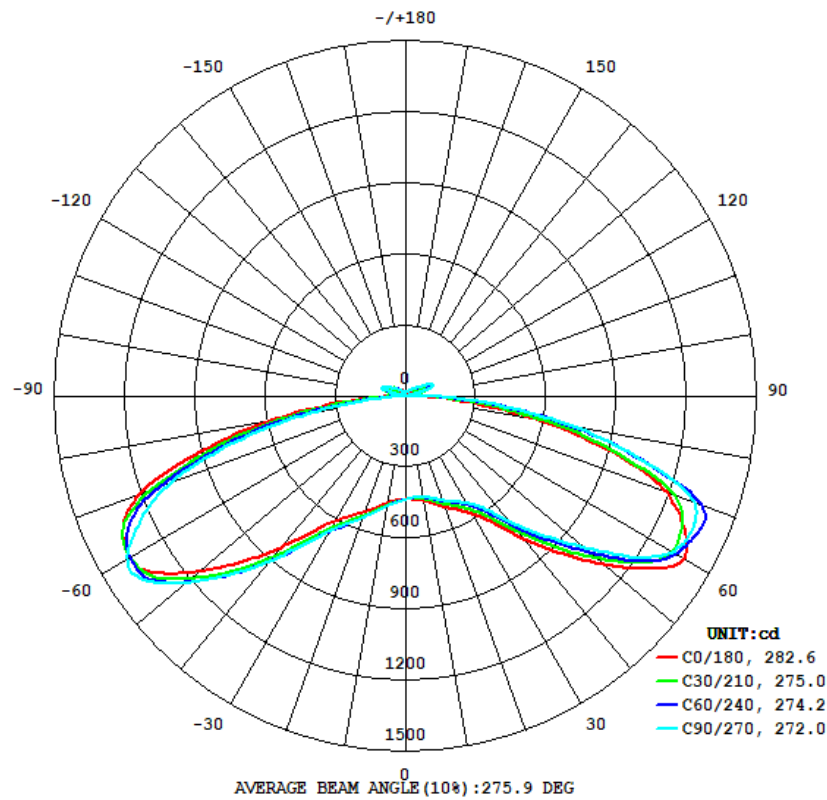
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.04	60	0.103	48.3	0.980	Light Down

Test Result

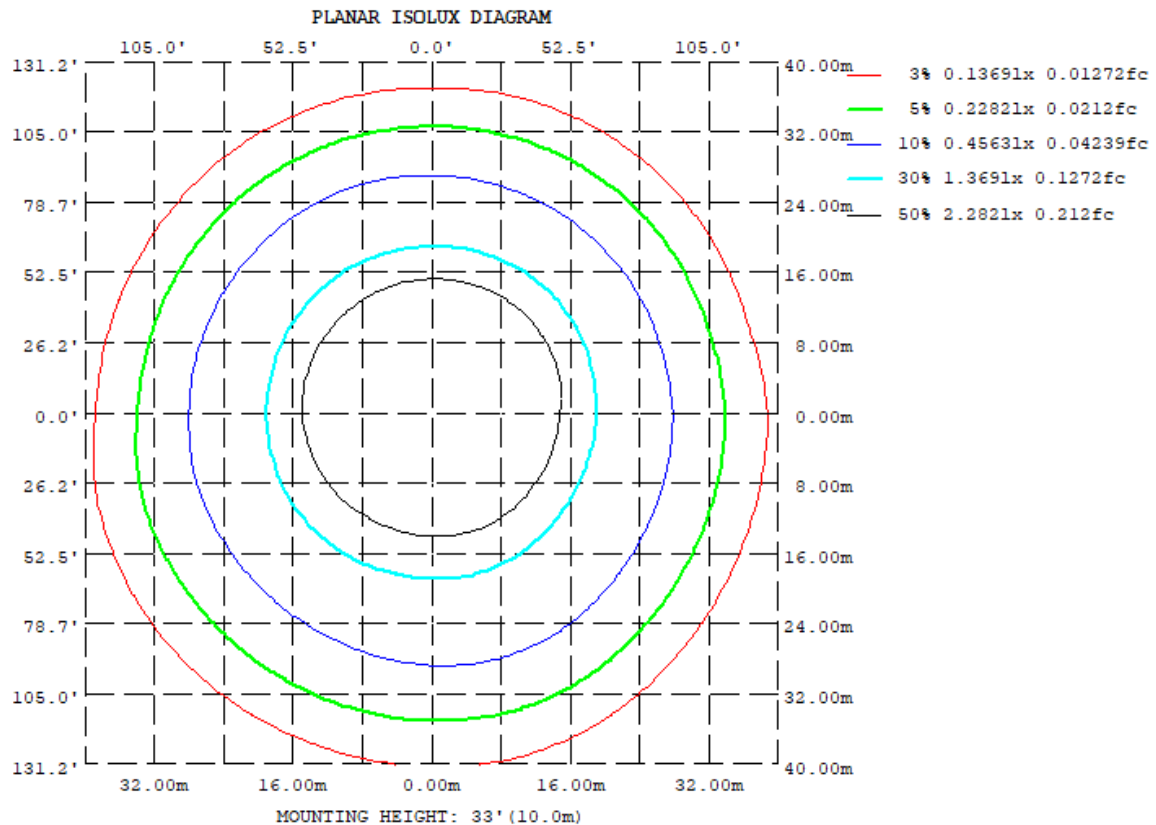
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
5941	40.00%	16.94%	282.6	272.0	170.6	170.1	123.0

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	449.8	438.8	434.7	439.5	457.6	469.7	471.5	465.0		
20	500.9	479.4	471.1	485.5	520.2	542.6	545.7	531.0		
30	577.4	543.2	524.0	550.9	609.0	655.0	658.1	627.4		
40	785.0	729.2	687.0	722.2	832.3	903.9	909.0	879.6		
50	1106	1046	996.9	1036	1150	1214	1225	1221		
60	1373	1315	1314	1340	1362	1362	1371	1457		
70	1184	1276	1313	1219	1214	1139	1070	1104		
80	567.2	648.5	709.0	707.8	568.1	482.4	416.0	457.9		
90	24.96	40.61	63.04	71.47	24.65	3.849	5.654	0.8297		
100	15.31	25.13	26.99	21.47	18.57	41.42	49.94	51.51		
110	106.9	77.12	43.14	81.39	104.2	74.43	111.8	87.37		
120	78.16	76.21	94.45	70.76	77.12	70.83	78.16	68.26		
130	29.89	59.82	58.16	59.78	31.48	56.51	54.77	56.23		
140	46.52	42.41	39.07	44.31	46.27	40.60	41.22	39.60		
150	28.01	30.46	32.60	31.14	27.48	27.57	27.73	26.74		
160	20.26	22.25	23.80	23.16	19.68	20.44	23.34	21.43		
170	14.67	17.57	17.55	17.67	14.64	14.39	16.07	16.52		
180	13.41	12.18	8.767	9.518	13.08	12.51	12.36	12.86		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	45.13	0 - 10	45.13	0.76%
10-20	145.14	0 - 20	190.27	3.20%
20-30	270.46	0 - 30	460.73	7.76%
30-40	461.05	0 - 40	921.78	15.52%
40-50	794.31	0 - 50	1716.09	28.89%
50-60	1206.89	0 - 60	2922.98	49.20%
60-70	1369.98	0 - 70	4292.96	72.26%
70-80	1006.16	0 - 80	5299.12	89.19%
80-90	311.60	0 - 90	5610.72	94.44%
90-100	22.81	0 - 100	5633.53	94.82%
100-110	69.93	0 - 110	5703.46	96.00%
110-120	97.21	0 - 120	5800.67	97.64%
120-130	57.89	0 - 130	5858.56	98.61%
130-140	39.30	0 - 140	5897.86	99.27%
140-150	23.24	0 - 150	5921.10	99.66%
150-160	12.55	0 - 160	5933.65	99.88%
160-170	6.05	0 - 170	5939.70	99.98%
170-180	1.37	0 - 180	5941.07	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	114	114	114	114	108	108	108	102	102	102	97	97	97	94
1	103	96	90	84	99	93	87	82	88	83	79	83	79	75	78	75	72	69
2	90	79	69	62	86	76	68	60	71	64	58	67	61	56	63	58	54	51
3	79	66	55	46	76	63	54	46	59	51	44	56	48	42	52	46	41	38
4	71	56	45	36	68	54	43	35	50	41	34	47	39	33	44	37	32	29
5	64	48	37	29	61	46	36	28	43	34	27	41	33	26	38	31	26	23
6	58	42	31	24	56	41	31	23	38	29	22	36	28	22	33	26	21	18
7	53	37	27	20	51	36	26	19	34	25	19	32	24	18	30	23	18	15
8	49	33	23	17	47	32	23	16	30	22	16	29	21	15	27	20	15	13
9	45	30	21	14	44	29	20	14	28	19	14	26	19	13	24	18	13	11
10	42	27	18	12	41	27	18	12	25	17	12	24	17	12	22	16	11	9

5.0 THD and PF Test

Model No.	IVGT5U-50L750W4	Sample ID.	G1
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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	479.97	60	0.103	48.3	0.980	20.04%

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*****