

Photometric Test Report

Relevant Standards

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

Prepared For

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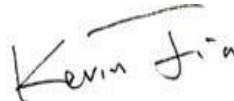
2018/12/15

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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	5543
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	115.2
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	35.62%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	14.63%
Power (Input Wattage)	IES LM-79-2008	Worst Case	48.1
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.102
Allowable CCTs* (K)	IES LM-79-2008	≤5700	4015
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	75
Power Factor	ANSI C82.77:2014	0.873	0.980
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	19.13%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/14	IVGT5C-50L740Z4	F1
2	Goniophotometer Test	2018/12/14	IVGT5C-50L740Z4	F1
3	THD and PF Test	2018/12/14	IVGT5C-50L740Z4	F1

Remark(If any)

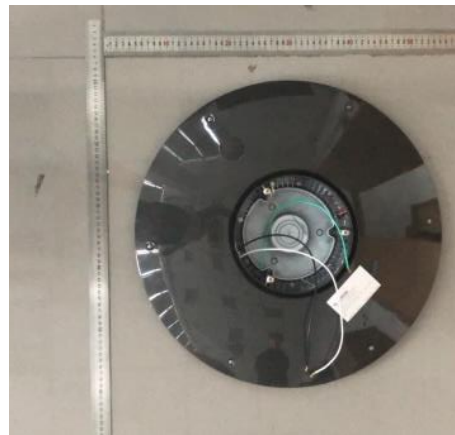
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3.0 Production Description

Luminaire Description: IVGT5C-50L740Z4

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.	IVGT5C-50L740Z4	Sample ID.	F1
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	480.04	60	0.102	48.1	0.980

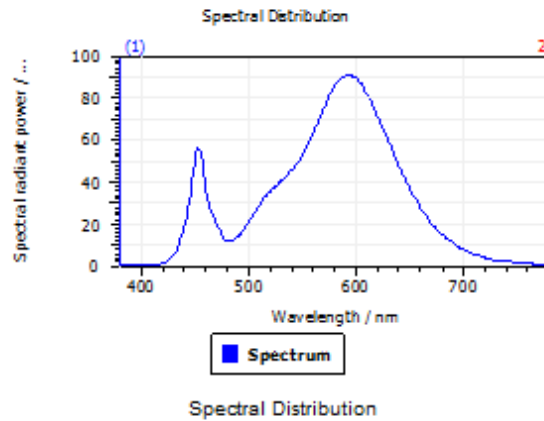
Test Result

CCT (K)	CRI (Ra)	Duv
4015	75	1.8E-04

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

DominantWavelength	582.65 nm
Purity	0.506
PeakWavelength	592.94 nm
Width50%:	102.60 nm

Color Coordinates

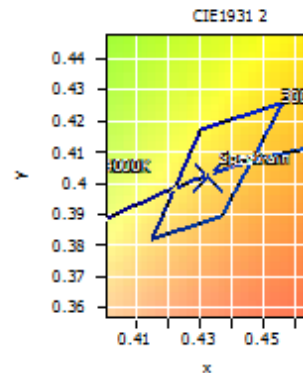
Correlated Color Temperatu 3056 K

x: 0.4327 u: 0.2487 u': 0.2487

y: 0.4021 v: 0.3467 v': 0.5200

CRI01	67.5	CRI09	-41.0
CRI02	84.2	CRI10	64.7
CRI03	93.6	CRI11	60.8
CRI04	65.4	CRI12	53.0
CRI05	67.3	CRI13	71.0
CRI06	78.6	CRI14	96.9
CRI07	75.1	CRI15	58.4
CRI08	39.1	CRI16	55.9

ResultsCRI 71.3



PlanchDistance 1.8E-004

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5C-50L740Z4	Sample ID.	F1
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

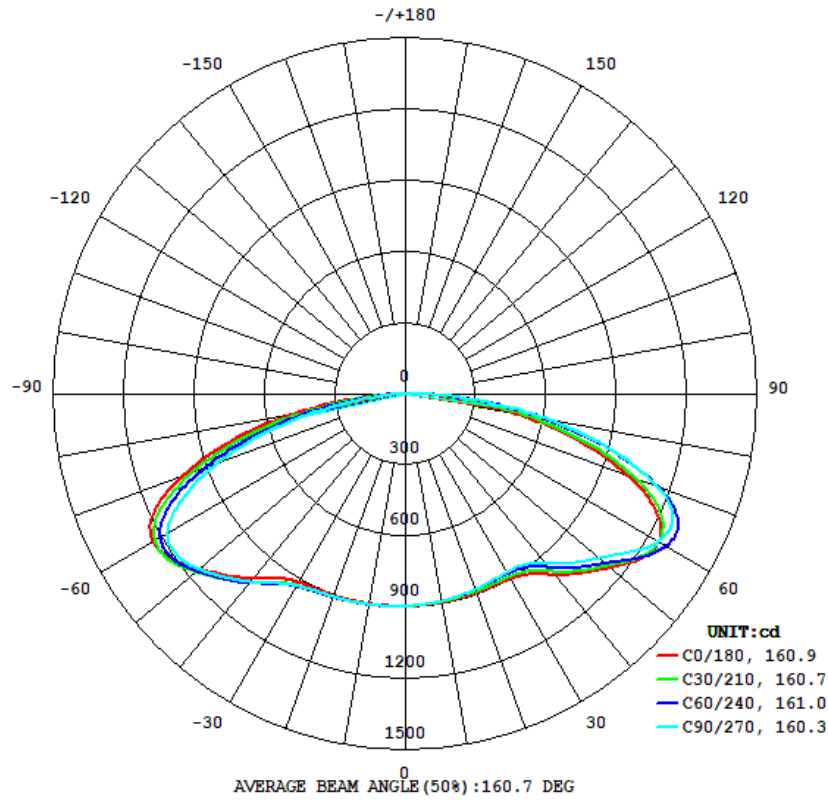
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.94	60	0.102	48.1	0.980	Light Down

Test Result

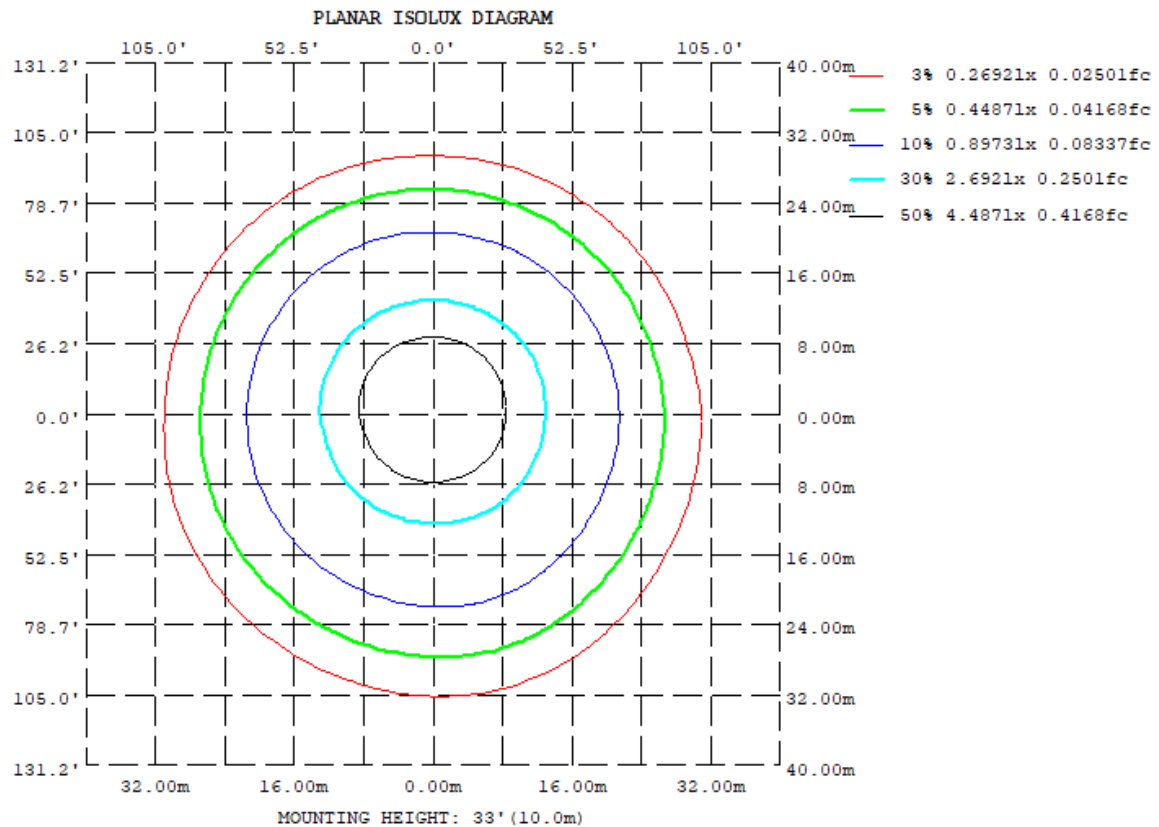
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
5543	35.62%	14.63%	173.7	173.1	160.9	160.3	115.2

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	893.5	888.0	887.3	891.9	899.4	902.7	902.2	899.1		
20	891.8	880.4	875.4	888.9	904.7	911.9	909.8	901.5		
30	899.8	881.8	867.4	890.7	917.6	936.4	933.5	917.7		
40	996.2	968.4	933.3	963.7	1015	1043	1035	1027		
50	1140	1122	1077	1103	1149	1167	1150	1164		
60	1247	1266	1245	1233	1242	1221	1169	1213		
70	1015	1094	1143	1095	1015	938.1	853.4	906.4		
80	475.3	558.2	610.7	587.0	478.5	391.5	317.0	344.6		
90	4.482	21.42	38.31	45.05	11.63	0.6097	0.2489	0.2684		
100	0.5862	0.5268	0.5277	0.5486	0.5289	0.6573	0.5476	0.5712		
110	0.7871	0.7748	0.7356	0.8185	1.026	0.9477	0.8931	0.8318		
120	0.8697	0.8997	1.014	0.9690	1.240	1.156	1.080	1.099		
130	0.9736	1.044	1.234	1.118	1.420	3.061	1.341	1.254		
140	1.033	1.189	1.379	1.313	1.732	1.764	1.614	1.560		
150	1.146	1.766	1.293	1.320	2.023	2.054	1.836	1.864		
160	1.172	1.447	1.345	1.474	2.039	2.885	2.011	1.935		
170	3.776	1.723	1.385	1.260	2.069	2.444	1.750	1.715		
180	0.7777	1.483	1.456	1.611	1.416	1.419	1.511	1.514		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	87.41	0 - 10	87.41	1.58%
10-20	259.57	0 - 20	346.98	6.26%
20-30	425.50	0 - 30	772.48	13.93%
30-40	607.10	0 - 40	1379.58	24.89%
40-50	846.01	0 - 50	2225.59	40.15%
50-60	1094.90	0 - 60	3320.49	59.90%
60-70	1163.55	0 - 70	4484.04	80.89%
70-80	810.89	0 - 80	5294.93	95.52%
80-90	237.25	0 - 90	5532.18	99.80%
90-100	4.85	0 - 100	5537.03	99.88%
100-110	0.77	0 - 110	5537.80	99.90%
110-120	0.96	0 - 120	5538.76	99.91%
120-130	1.13	0 - 130	5539.89	99.94%
130-140	1.07	0 - 140	5540.96	99.95%
140-150	1.00	0 - 150	5541.96	99.97%
150-160	0.82	0 - 160	5542.78	99.99%
160-170	0.53	0 - 170	5543.31	100.00%
170-180	0.18	0 - 180	5543.49	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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	105	99	93	88	102	97	91	87	92	88	84	88	84	81	84	81	79	76
2	93	83	74	67	90	80	72	66	77	70	64	73	67	62	70	65	61	58
3	83	70	60	52	80	68	59	51	65	57	50	62	55	49	59	53	48	46
4	75	60	49	41	72	59	49	41	56	47	40	53	46	40	51	44	39	36
5	68	52	42	34	65	51	41	34	49	40	33	47	39	33	45	38	32	30
6	62	46	36	28	60	45	35	28	43	34	28	41	34	28	40	33	27	25
7	57	41	31	24	55	40	31	24	39	30	24	37	29	24	36	29	23	21
8	53	37	28	21	51	36	27	21	35	27	21	34	26	21	32	26	20	18
9	49	34	25	18	47	33	24	18	32	24	18	31	23	18	30	23	18	16
10	46	31	22	16	44	30	22	16	29	22	16	28	21	16	27	21	16	14

5.0 THD and PF Test

Model No.	IVGT5C-50L740Z4	Sample ID.	F1
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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	480.04	60	0.102	48.1	0.980	19.13%

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*****