

Photometric Test Report

Relevant Standards

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

Prepared For

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2018/12/14

Issue Date

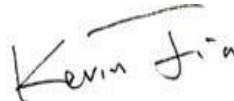
2018/12/15

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1.0 Test Summary

DLC Technical Requirements v4.4

Outdoor - Low Output Parking Garage Luminaire			
Requirement Category	Test Method	Requirements	Test value
Lamp Output (lm)	IES LM-79-2008	2000	3617
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	115.7
Zonal Lumen Requirement (60°-80°)	IES LM-79-2008	≥30%	36.29%
Zonal Lumen Requirement (70°-80°)	IES LM-79-2008	≤25%	14.99%
Power (Input Wattage)	IES LM-79-2008	Worst Case	31.3
Input Voltage	IES LM-79-2008	Worst Case	480
Input Current	IES LM-79-2008	Worst Case	0.067
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3053
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	72
Power Factor	ANSI C82.77:2014	0.873	0.965
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	26.97%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/14	IVGT5C-30L730Z4	B1
2	Goniophotometer Test	2018/12/14	IVGT5C-30L730Z4	B1
3	THD and PF Test	2018/12/14	IVGT5C-30L730Z4	B1

Remark(If any)

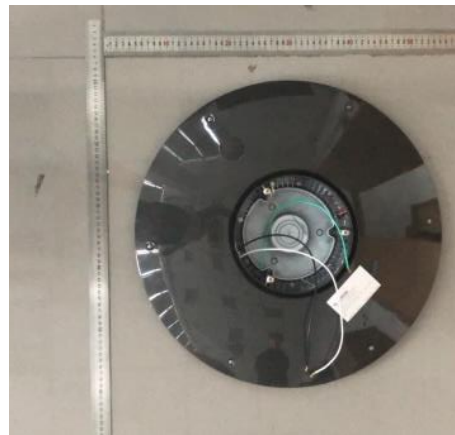
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3.0 Production Description

Luminaire Description: IVGT5C-30L730Z4

Electrical Specification: 480V,50/60HZ, 30W

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	IVGT5C-30L730Z4	Sample ID.	B1
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	0.067	30.9	0.965

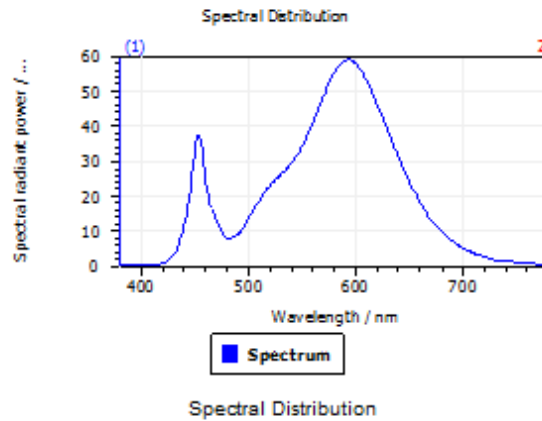
Test Result

CCT (K)	CRI (Ra)	Duv
3053	71.5	3.5E-04

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

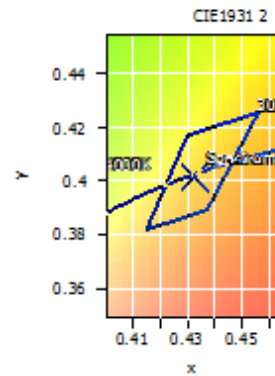


Spectral values

DominantWavelength	582.73 nm
Purity	0.505
PeakWavelength	593.09 nm
Width50%:	102.31 nm

Color Coordinates

Correlated Color Temperature		3053 K	
x: 0.4327	u: 0.2488	u': 0.2488	
y: 0.4017	v: 0.3465	v': 0.5198	
CRI01	67.7	CRI09	-40.4
CRI02	84.4	CRI10	65.1
CRI03	93.5	CRI11	61.0
CRI04	65.5	CRI12	53.1
CRI05	67.5	CRI13	71.2
CRI06	78.8	CRI14	96.9
CRI07	75.1	CRI15	58.7
CRI08	39.3	CRI16	56.2
ResultsCRI	71.5		



PlanckDistance 3.5E-004

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVGT5C-30L730Z4	Sample ID.	B1
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

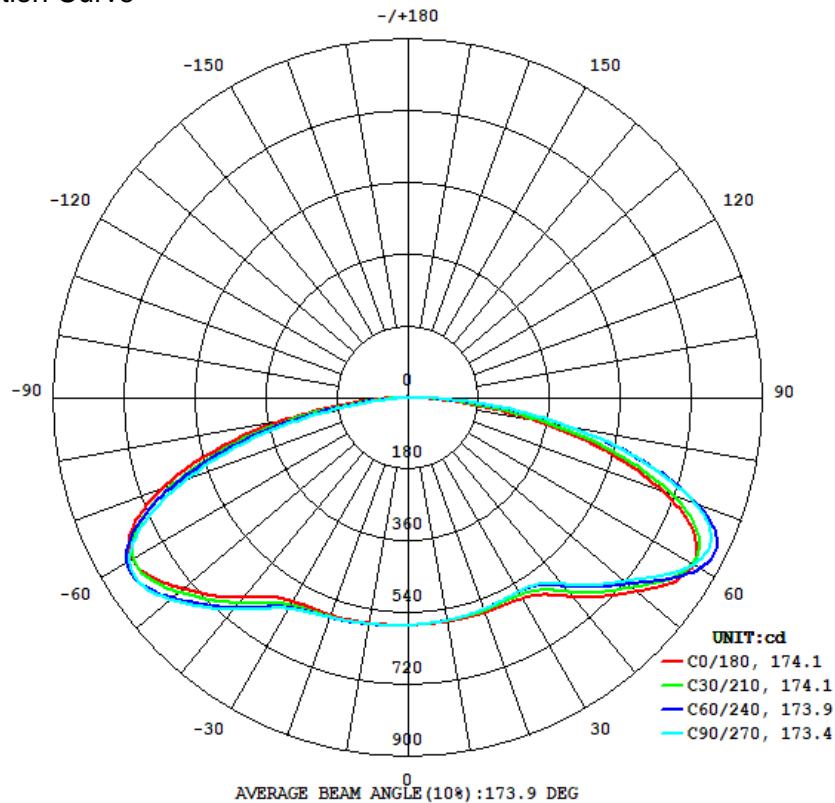
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.01	60	0.067	31.3	0.966	Light Down

Test Result

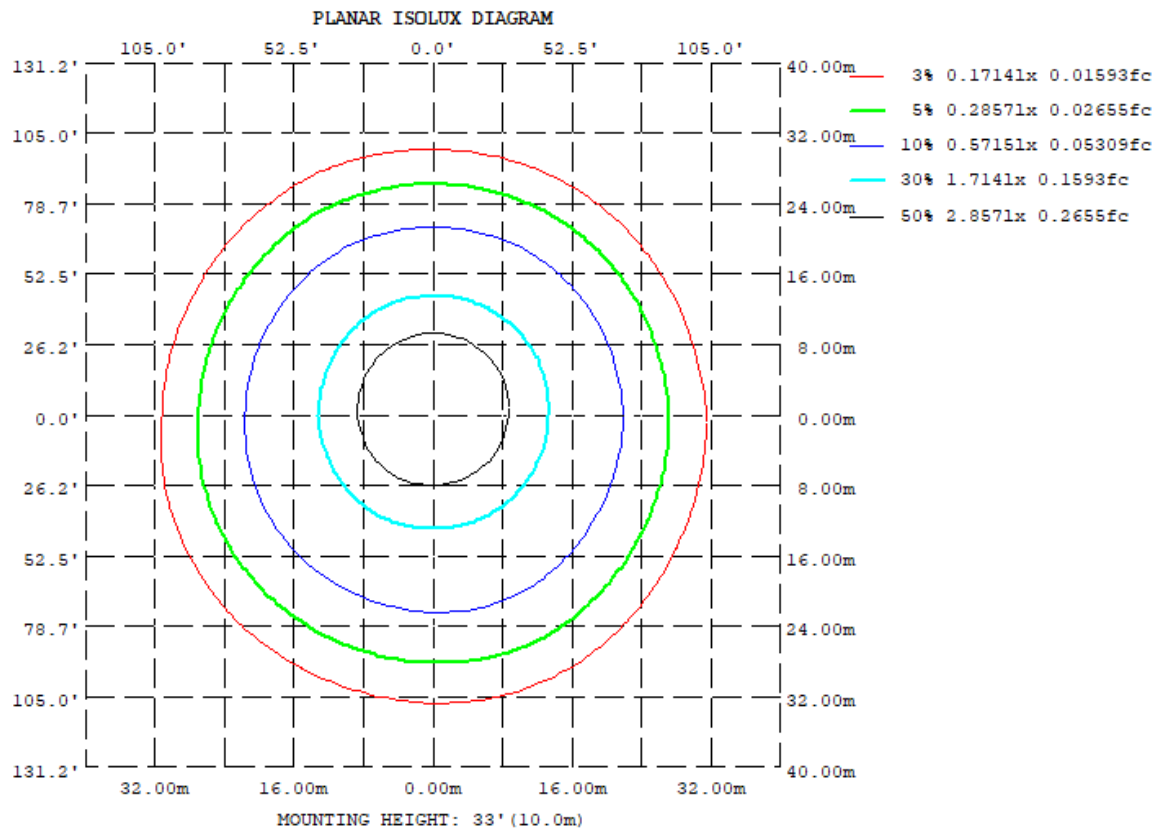
Flux (lm)	Zonal Lumen Requirement (60° - 80°)	Zonal Lumen Requirement (70° - 80°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
3617	36.29%	14.99%	174.1	173.4	161.7	161.5	115.7

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	570.4	567.6	567.2	570.7	574.8	577.0	576.3	574.5		
20	573.0	565.4	563.7	572.1	580.9	586.3	586.5	581.9		
30	581.0	565.8	561.4	575.8	590.1	605.5	611.3	601.5		
40	652.1	625.9	611.1	629.8	655.0	681.4	694.7	686.6		
50	756.3	734.1	716.2	734.1	745.4	771.3	787.8	793.4		
60	836.3	844.9	835.8	835.2	808.7	814.0	815.4	845.7		
70	688.8	745.6	772.8	753.7	665.9	631.1	599.7	636.3		
80	322.7	385.3	415.0	409.0	316.6	266.5	225.9	247.9		
90	5.708	15.64	28.38	31.54	9.237	0.2288	0.1665	0.1911		
100	0.3898	0.3570	0.3624	0.3620	0.3579	0.3723	0.3575	0.3794		
110	0.5302	0.5179	0.5169	0.4937	0.7034	0.7097	0.6451	0.6314		
120	0.5810	0.5972	0.6038	0.5985	0.8321	0.9194	0.8141	0.7823		
130	0.6413	0.6878	0.7358	0.6923	1.021	3.252	1.034	0.9152		
140	0.6872	0.7853	0.8332	0.9597	1.072	1.166	1.185	1.093		
150	0.7733	0.8385	0.8835	0.8489	1.226	1.337	1.203	1.190		
160	0.8139	0.8711	0.9015	0.8548	1.263	1.244	1.639	1.439		
170	0.8006	0.8853	0.8735	1.634	1.029	0.9843	1.378	1.286		
180	0.9168	0.9699	0.9994	0.7512	0.9210	0.9310	0.9872	0.9882		

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	54.57	0 - 10	54.57	1.51%
10-20	162.83	0 - 20	217.40	6.01%
20-30	268.58	0 - 30	485.98	13.43%
30-40	386.98	0 - 40	872.96	24.13%
40-50	546.91	0 - 50	1419.87	39.25%
50-60	717.20	0 - 60	2137.07	59.08%
60-70	770.53	0 - 70	2907.60	80.38%
70-80	542.33	0 - 80	3449.93	95.37%
80-90	159.81	0 - 90	3609.74	99.79%
90-100	3.31	0 - 100	3613.05	99.88%
100-110	0.51	0 - 110	3613.56	99.89%
110-120	0.64	0 - 120	3614.20	99.91%
120-130	0.84	0 - 130	3615.04	99.94%
130-140	0.73	0 - 140	3615.77	99.96%
140-150	0.65	0 - 150	3616.42	99.97%
150-160	0.51	0 - 160	3616.93	99.99%
160-170	0.33	0 - 170	3617.26	100.00%
170-180	0.11	0 - 180	3617.37	100.00%

3.2 Goniophotometer Test

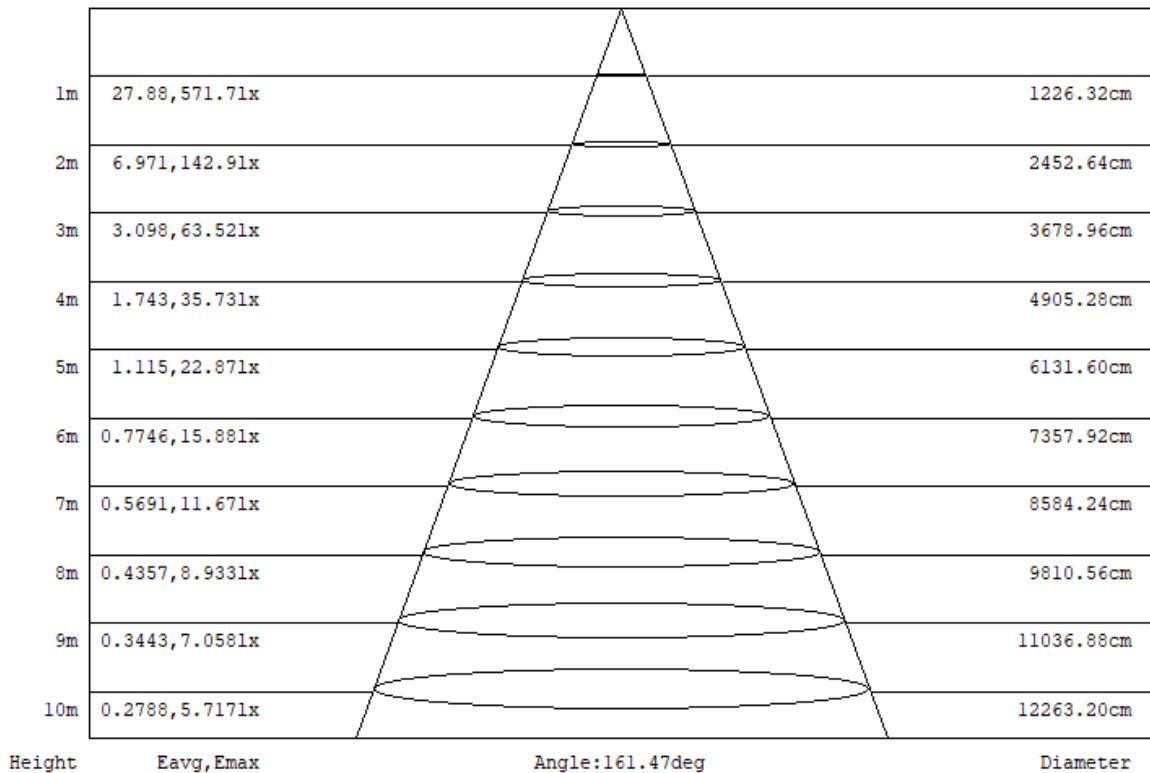
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	96	91	86	92	88	84	88	84	81	84	81	78	76
2	93	82	73	66	90	80	72	65	76	69	64	73	67	62	70	65	60	58
3	83	69	59	51	80	68	58	51	64	56	50	61	54	49	59	53	48	45
4	74	60	49	41	72	58	48	41	55	47	40	53	45	39	51	44	39	36
5	67	52	41	33	65	51	41	33	48	40	33	46	38	32	44	37	32	29
6	61	46	35	28	59	45	35	28	43	34	27	41	33	27	39	32	27	24
7	56	41	31	24	55	40	30	24	38	30	23	37	29	23	35	28	23	21
8	52	37	27	21	50	36	27	21	35	26	20	33	26	20	32	25	20	18
9	49	34	24	18	47	33	24	18	32	24	18	30	23	18	29	23	18	16
10	45	31	22	16	44	30	22	16	29	21	16	28	21	16	27	20	16	14

CONE OF LIGHT DIAGRAM



5.0 THD and PF Test

Model No.	IVGT5C-30L730Z4	Sample ID.	B1
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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	0.067	30.9	0.965	26.97%

6.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	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*****