

Photometric Test Report

Relevant Standards

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

Prepared For

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Data Number

DLF1810114-1a

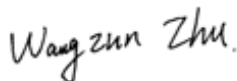
Test Date

2018/10/30

Issue Date

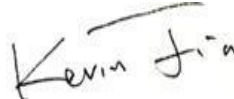
2018/10/31

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v4.3

Outdoor - Low output Outdoor Pole/Arm-Mounted Area and Roadway Luminaires			
Requirement Category	Test Method	Requirements	Test value
Lamp Output (lm)	IES LM-79-2008	1000	4109
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	109.7
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	3.60%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3013
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	81
Power Factor	ANSI C82.77:2014	0.873	0.910
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	17.36%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/10/30	IVAT2-45L730U	A1
2	Goniophotometer Test	2018/10/30	IVAT2-45L730U	A1
3	THD and PF Test	2018/10/30	IVAT2-45L730U	A1

Remark(If any)

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3.0 Production Description

Luminaire Description: IVAT2-45L730U

Electrical Specification: 120V-277V,50/60HZ, 45W

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	IVAT2-45L730U	Sample ID.	A1
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	120.03	60	0.316	37.5	0.990

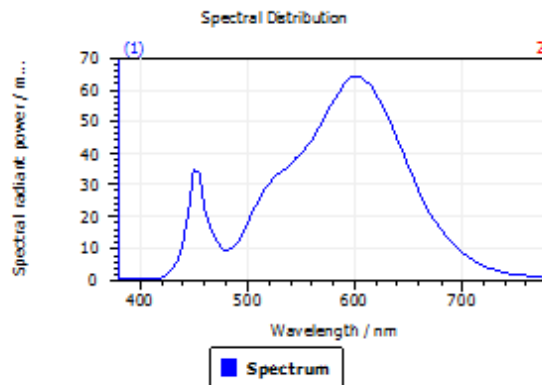
Test Result

CCT (K)	CRI (Ra)	Duv
3013	80.5	1.9E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

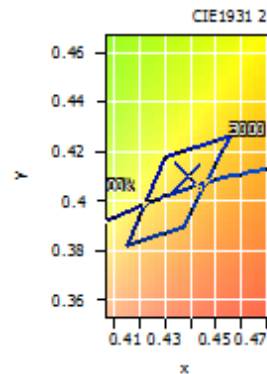
DominantWavelength	582.11 nm
Purity	0.547
PeakWavelength	601.53 nm
Radiant Power	9.34 W
Width50%	130.67 nm

Color Coordinates

Correlated Color Temperature 3013 K

x: 0.4388 u: 0.2494 u': 0.2494
y: 0.4095 v: 0.3492 v': 0.5238

ResultsCRICRI01	78.2	ResultsCRICRI09	-1.5
ResultsCRICRI02	88.4	ResultsCRICRI10	73.5
ResultsCRICRI03	96.7	ResultsCRICRI11	77.6
ResultsCRICRI04	78.7	ResultsCRICRI12	63.1
ResultsCRICRI05	78.1	ResultsCRICRI13	80.5
ResultsCRICRI06	85.6	ResultsCRICRI14	98.4
ResultsCRICRI07	82.5	ResultsCRICRI15	69.9
ResultsCRICRI08	56.0	ResultsCRICRI16	67.7
ResultsCRI	80.5		



PlanckDistance 1.9E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVAT2-45L730U	Sample ID.	A1
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

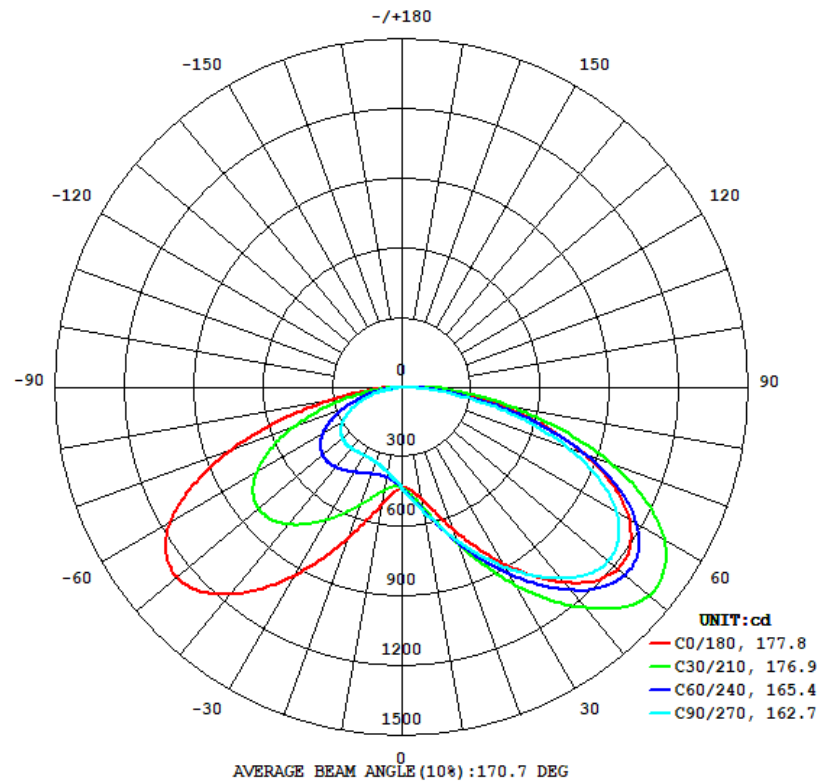
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	119.96	60	0.316	37.5	0.989	Light Down

Test Result

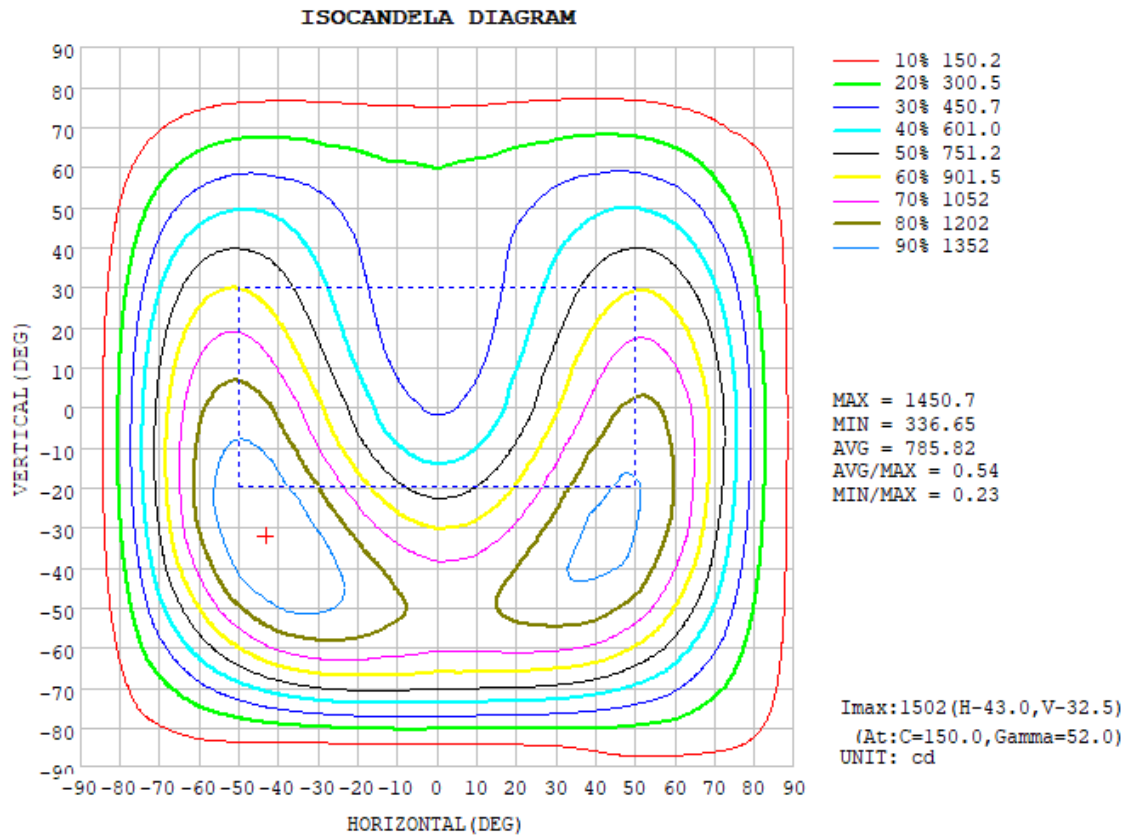
Flux (lm)	Zonal Lumen Requirement (0° - 90°)	Zonal Lumen Requirement (80° - 90°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
4109	100.00%	3.60%	178.4	162.7	167.6	61.4	109.7

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	486.8	532.3	541.6	537.9	509.6	419.8	373.2	417.9		
20	649.8	720.0	700.2	745.6	689.8	460.6	344.4	462.6		
30	874.9	965.2	895.1	1027	933.6	526.8	338.3	534.4		
40	1098	1207	1076	1297	1166	587.3	344.8	596.9		
50	1219	1353	1165	1455	1272	601.8	339.8	611.5		
60	1140	1270	1075	1360	1159	531.8	297.6	542.6		
70	839.7	926.9	769.8	959.2	788.4	369.4	207.2	379.7		
80	408.8	429.8	324.3	404.0	307.1	154.1	85.34	162.6		
90	0	0	0	0	0	0	0	0		
100	0	0	0	0	0	0	0	0		
110	0	0	0	0	0	0	0	0		
120	0	0	0	0	0	0	0	0		
130	0	0	0	0	0	0	0	0		
140	0	0	0	0	0	0	0	0		
150	0	0	0	0	0	0	0	0		
160	0	0	0	0	0	0	0	0		
170	0	0	0	0	0	0	0	0		
180	0	0	0	0	0	0	0	0		

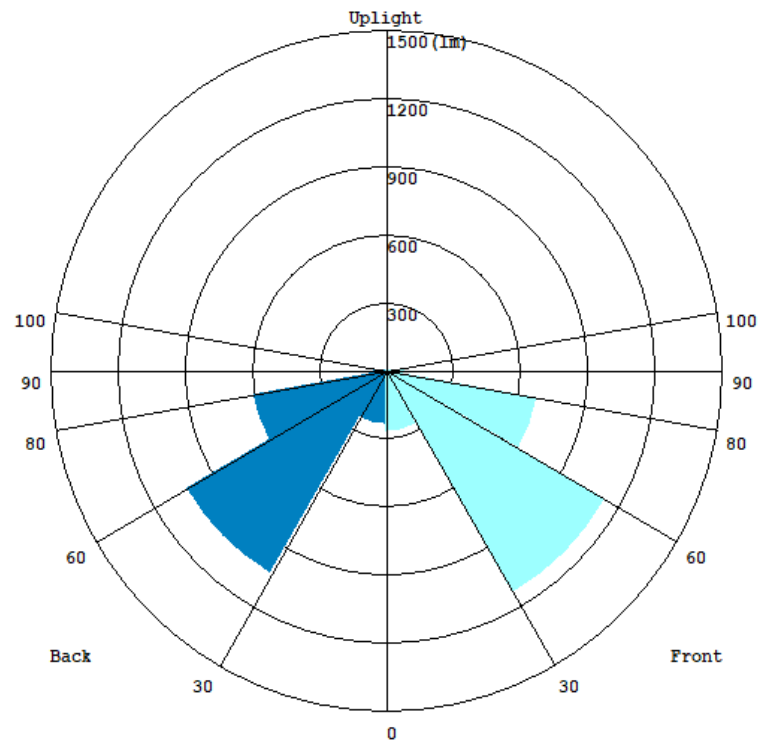
4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	43.51	0 - 10	43.51	1.06%
10-20	152.46	0 - 20	195.97	4.77%
20-30	315.74	0 - 30	511.71	12.45%
30-40	532.28	0 - 40	1043.99	25.41%
40-50	752.13	0 - 50	1796.12	43.72%
50-60	873.77	0 - 60	2669.89	64.98%
60-70	792.57	0 - 70	3462.46	84.27%
70-80	498.40	0 - 80	3960.86	96.40%
80-90	147.73	0 - 90	4108.59	100.00%
90-100	0.00	0 - 100	4108.59	100.00%
100-110	0.00	0 - 110	4108.59	100.00%
110-120	0.00	0 - 120	4108.59	100.00%
120-130	0.00	0 - 130	4108.59	100.00%
130-140	0.00	0 - 140	4108.59	100.00%
140-150	0.00	0 - 150	4108.59	100.00%
150-160	0.00	0 - 160	4108.59	100.00%
160-170	0.00	0 - 170	4108.59	100.00%
170-180	0.00	0 - 180	4108.59	100.00%

3.2 Goniophotometer Test

LCS Graph



BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	271.8	6.6
FM - Front-Medium(30-60)	1130.9	27.4
FH - Front-High(60-80)	685.69	16.6
FVH - Front-Very High(80-90)	86.355	2.1
Total Forward Light	2174.8	52.8

BL - Back-Low(0-30)	240.57	5.8
BM - Back-Medium(30-60)	1035	25.1
BH - Back-High(60-80)	608.98	14.8
BVH - Back-Very High(80-90)	62.538	1.5
Total Back Light	1947.1	47.2

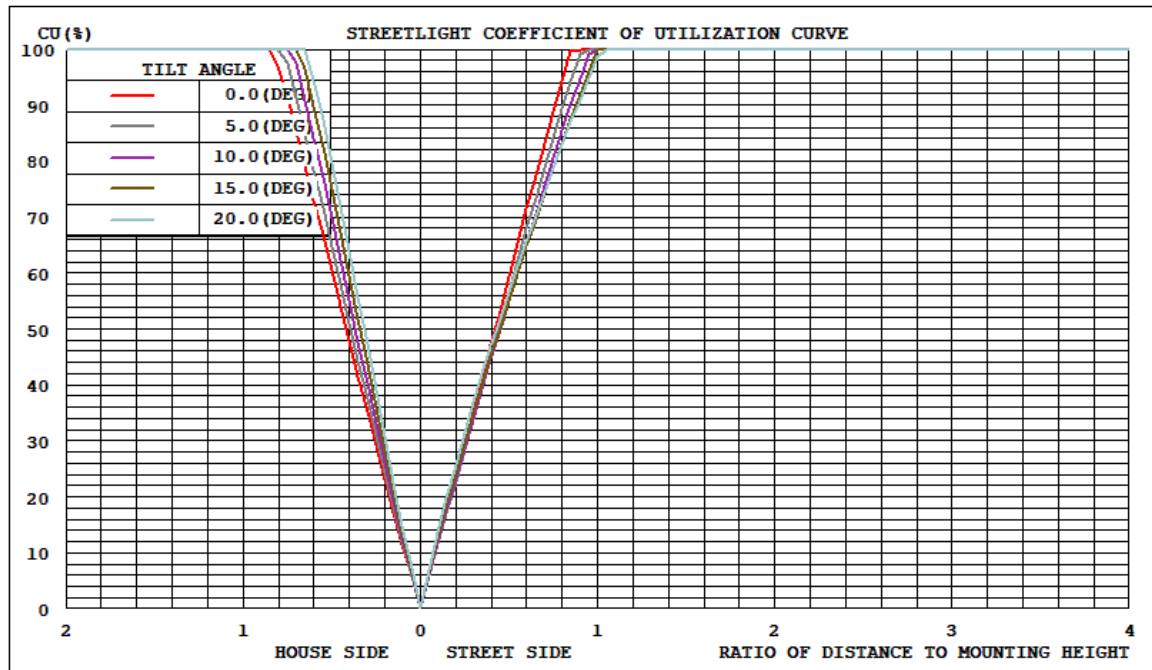
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B2-U0-G2
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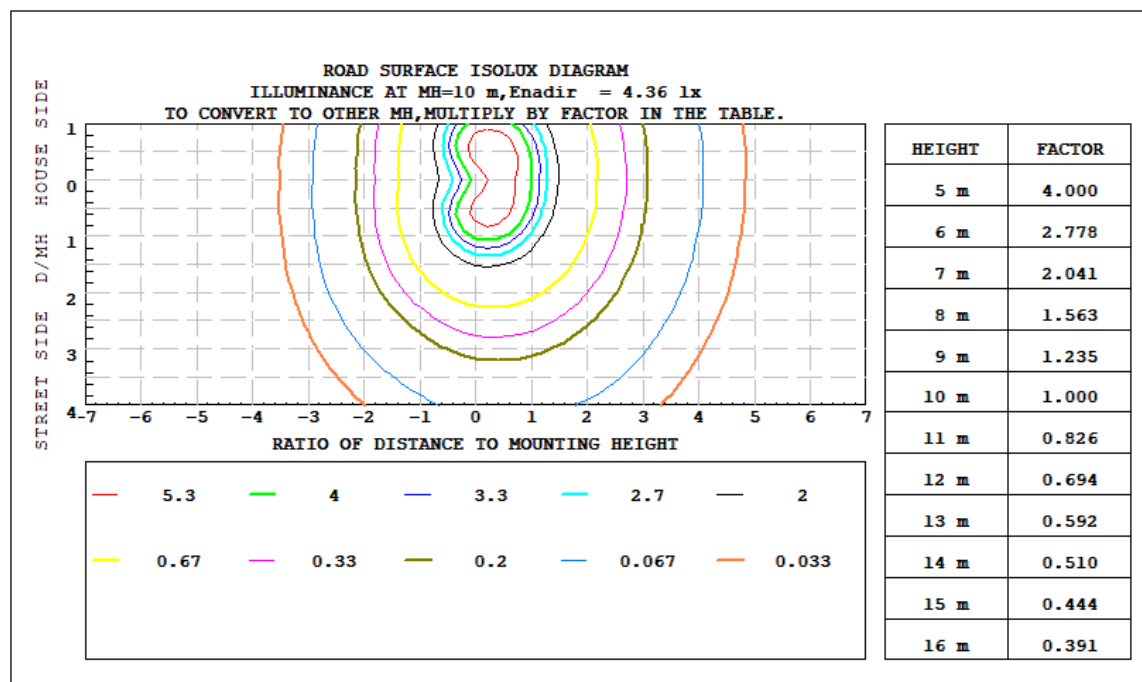
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	1947.1	0	1947.1
Street Side	2174.8	0	2174.8

3.2 Goniophotometer Test

Coefficients of Utilization

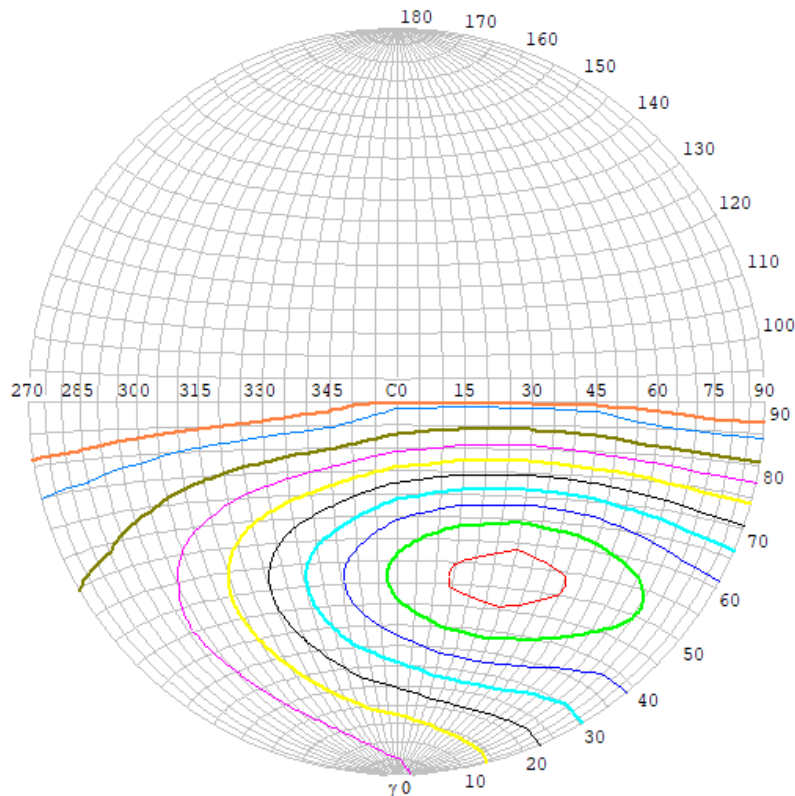


Iso-footcandle Lines of Horizontal Illumination



3.2 Goniophotometer Test

STREETLIGHT ISOCANDELA DIAGRAM

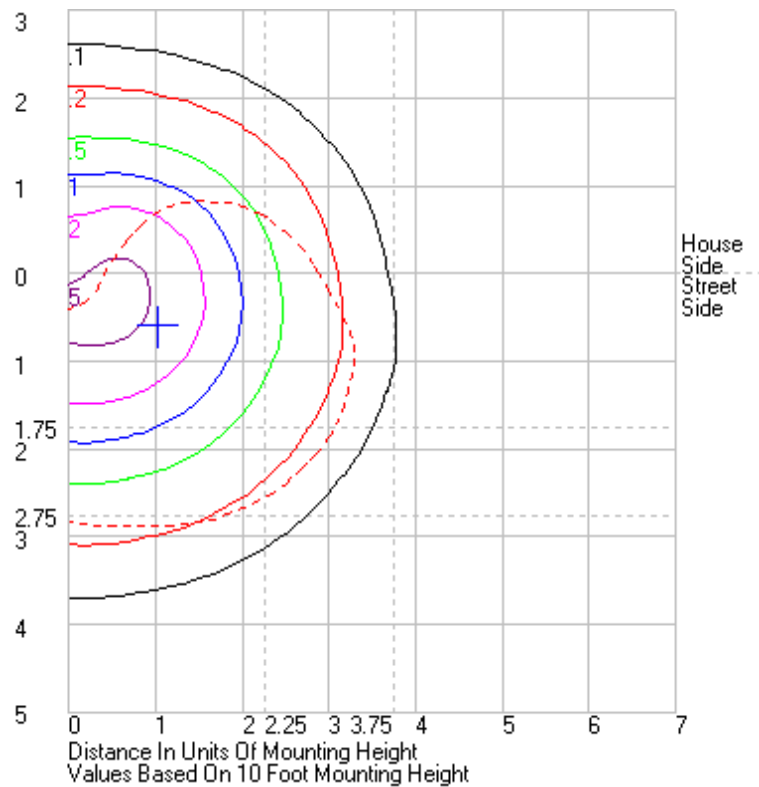


Classification:

IES:Type IV - Short
CIE:Average - Short
IES:None cut-off
CIE:Non-cut-off
Max.At80:481.9cd/klm
Max.At90:0cd/klm
Max.80-90:481.9cd/klm

ISOCANDELA DIAGRAM	
UNIT	cd
Imax=100%	1499
90%	1349
80%	1199
70%	1049
60%	900
50%	750
40%	600
30%	450
20%	300
10%	150
5%	75

ROAD ISOCANDELA REPORT



5.0 THD and PF Test

Model No.	IVAT2-45L730U	Sample ID.	A1
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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	277	60	0.148	37.2	0.910	17.36%
25.1	120.03	60	0.316	37.5	0.990	8.57%

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*****