

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

Room 6A33, No.1388, Wuzhong road, Shanghai, China

Xiao Xiang, 15921313292, gary.xiao@rabweb.com

Prepared By

Deliver Co., Ltd.

Block 11, 78 Keling Road, SSTP, Suzhou, China

0512-66801950, kevin.jia@szdeliver.com

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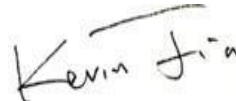
2018/11/2

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	4533
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	121.3
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	4.46%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	2959
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	80
Power Factor	ANSI C82.77:2014	0.873	0.908
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	17.92%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/1	IVAT4-45L730U	C1
2	Goniophotometer Test	2018/11/1	IVAT4-45L730U	C1
3	THD and PF Test	2018/11/1	IVAT4-45L730U	C1

Remark(If any)

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3.0 Production Description

Luminaire Description: IVAT4-45L730U

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.	IVAT4-45L730U	Sample ID.	C1
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	120.00	60	0.315	37.3	0.989

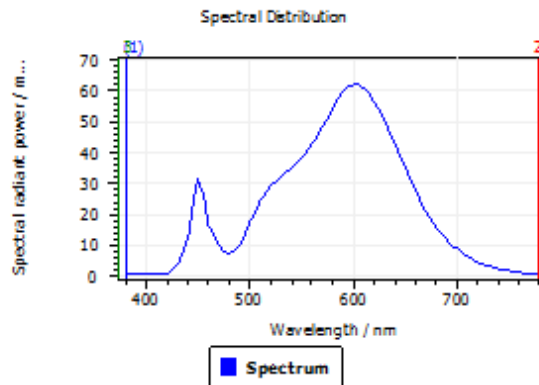
Test Result

CCT (K)	CRI (Ra)	Duv
2959	79.9	3.2E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

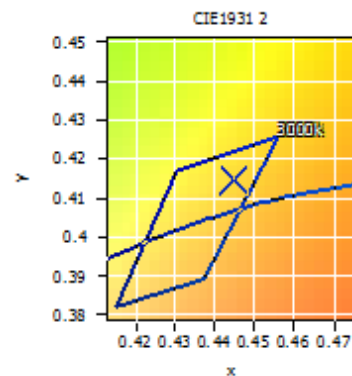
DominantWavelength	581.96 nm
Purity	0.580
PeakWavelength	601.69 nm
Radiant Power	8.933 W
Width50%:	129.85 nm

Color Coordinates

Correlated Color Temperatu 2959 K

x: 0.4447 u: 0.2510 u': 0.2510
y: 0.4148 v: 0.3511 v': 0.5267

ResultsCRICRI01	77.3	ResultsCRICRI09	-4.0
ResultsCRICRI02	87.1	ResultsCRICRI10	71.0
ResultsCRICRI03	96.6	ResultsCRICRI11	77.5
ResultsCRICRI04	78.6	ResultsCRICRI12	61.7
ResultsCRICRI05	77.0	ResultsCRICRI13	79.3
ResultsCRICRI06	84.0	ResultsCRICRI14	98.1
ResultsCRICRI07	82.9	ResultsCRICRI15	68.6
ResultsCRICRI08	55.4	ResultsCRICRI16	66.8
ResultsCRI	79.9		



PlanckDistance 3.2E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVAT4-45L730U	Sample ID.	C1
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

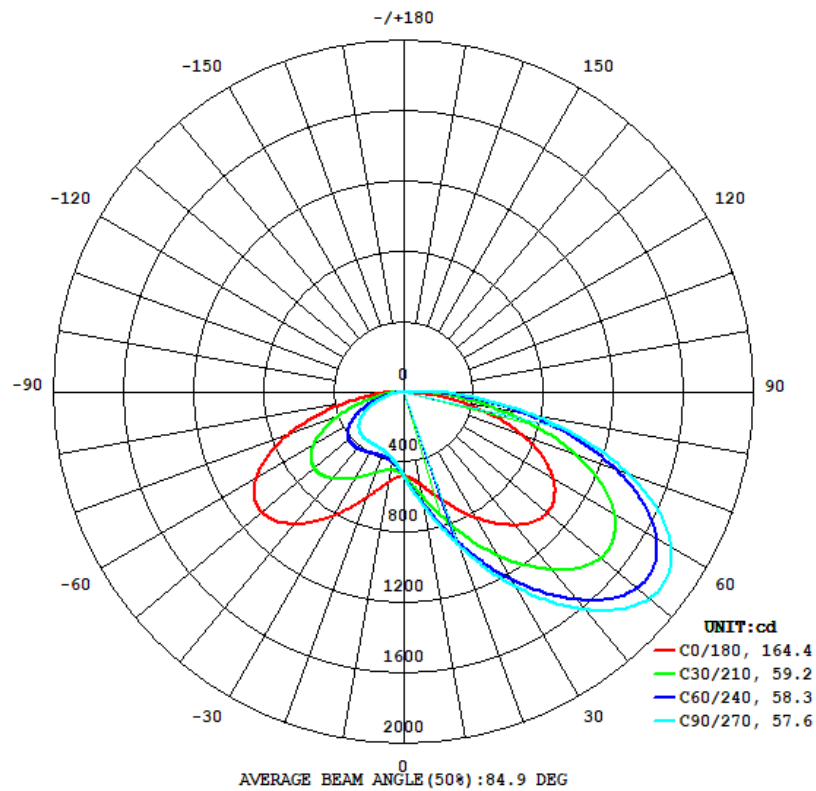
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	120.01	60	0.315	37.4	0.988	Light Down

Test Result

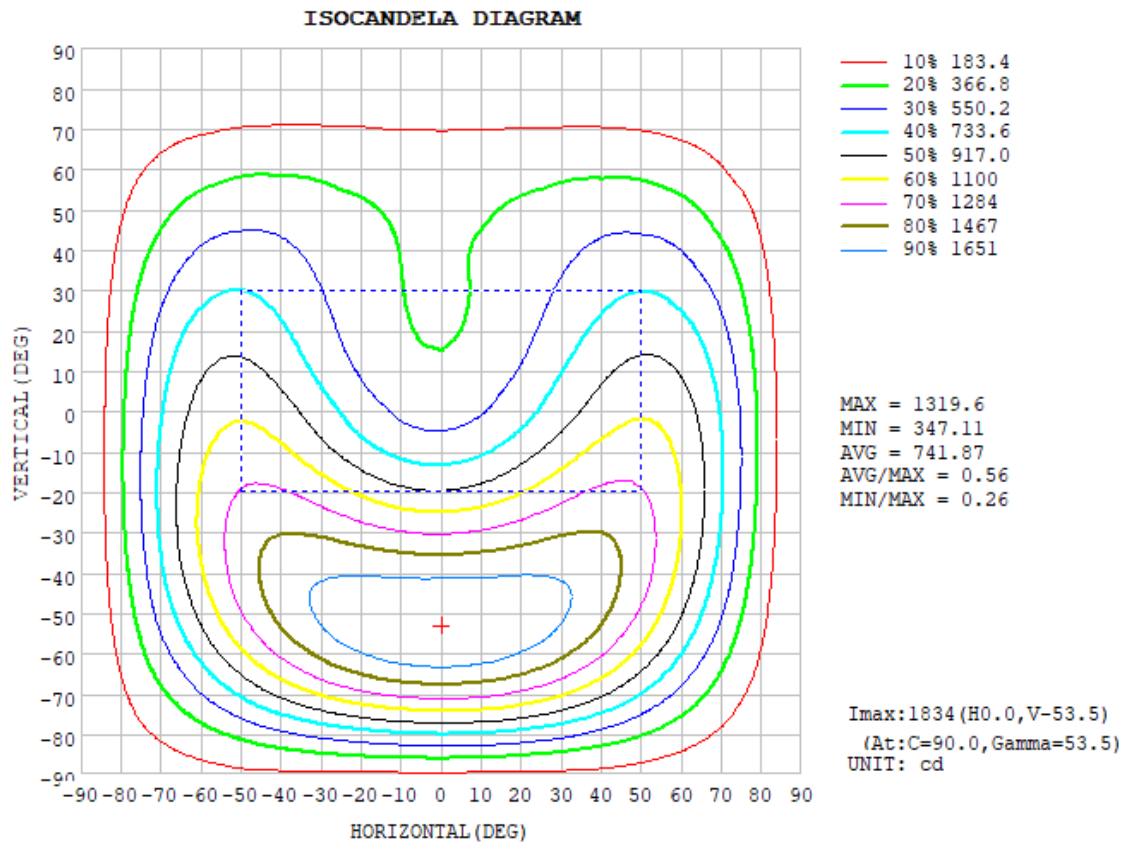
Flux (lm)	Zonal Lumen Requirement (0° - 90°)	Zonal Lumen Requirement (80° - 90°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
4533	100.00%	4.46%	177.9	159.9	164.4	57.6	121.3

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	532.3	624.1	653.4	605.1	519.7	425.1	390.6	439.1
20	660.0	865.4	930.1	833.1	640.6	432.3	356.0	453.5
30	828.9	1167	1275	1139	811.5	470.3	348.8	493.7
40	990.4	1448	1616	1432	981.7	512.9	350.2	530.5
50	1071	1624	1828	1616	1063	521.2	335.6	525.8
60	989.7	1553	1766	1555	976.5	453.9	279.9	448.0
70	721.8	1188	1369	1200	708.2	301.1	176.1	290.2
80	327.4	623.2	747.3	645.4	323.7	107.1	53.83	98.97
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	47.87	0 - 10	47.87	1.06%
10-20	166.00	0 - 20	213.87	4.72%
20-30	339.73	0 - 30	553.60	12.21%
30-40	567.87	0 - 40	1121.47	24.74%
40-50	802.63	0 - 50	1924.10	42.44%
50-60	940.85	0 - 60	2864.95	63.20%
60-70	876.19	0 - 70	3741.14	82.53%
70-80	590.08	0 - 80	4331.22	95.54%
80-90	202.01	0 - 90	4533.23	100.00%
90-100	0.00	0 - 100	4533.23	100.00%
100-110	0.00	0 - 110	4533.23	100.00%
110-120	0.00	0 - 120	4533.23	100.00%
120-130	0.00	0 - 130	4533.23	100.00%
130-140	0.00	0 - 140	4533.23	100.00%
140-150	0.00	0 - 150	4533.23	100.00%
150-160	0.00	0 - 160	4533.23	100.00%
160-170	0.00	0 - 170	4533.23	100.00%
170-180	0.00	0 - 180	4533.23	100.00%

3.2 Goniophotometer Test

LCS Graph



BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	304.14	6.7
FM - Front-Medium(30-60)	1259.9	27.7
FH - Front-High(60-80)	793.54	17.4
FVH - Front-Very High(80-90)	113.32	2.5
Total Forward Light	2470.9	54.2

BL - Back-Low(0-30)	250.04	5.5
BM - Back-Medium(30-60)	1057.8	23.2
BH - Back-High(60-80)	676.34	14.8
BVH - Back-Very High(80-90)	100.78	2.2
Total Back Light	2085	45.8

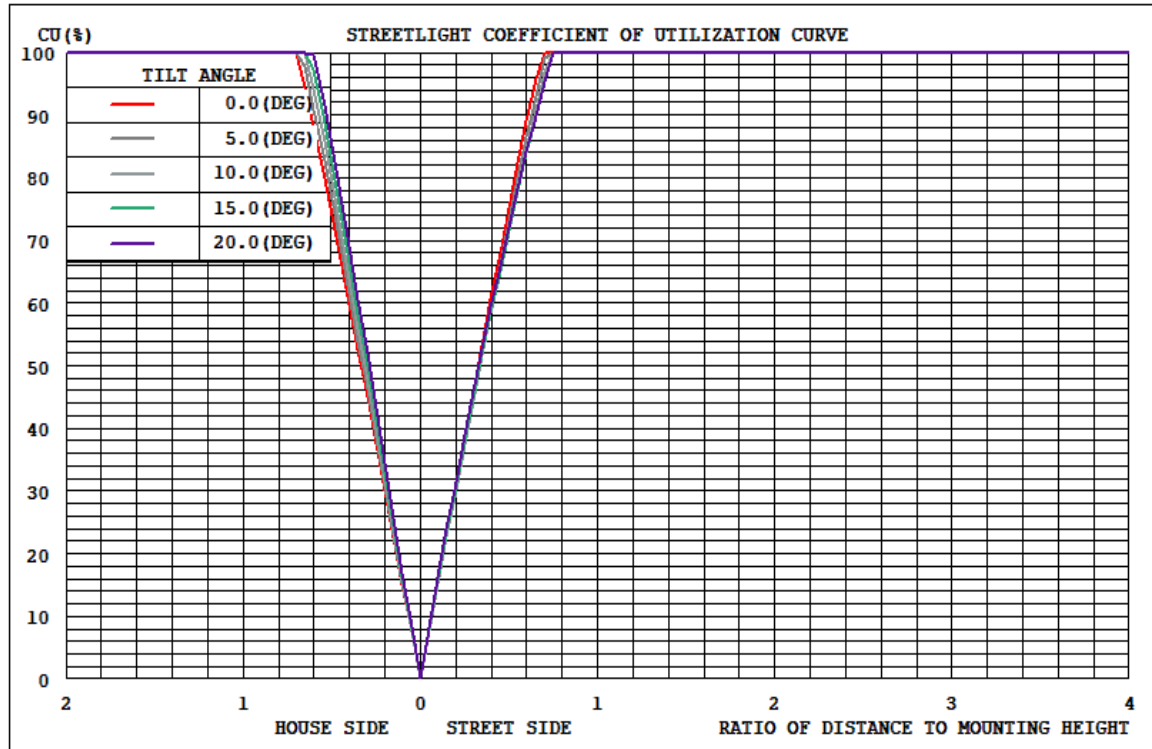
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B2-U0-G2
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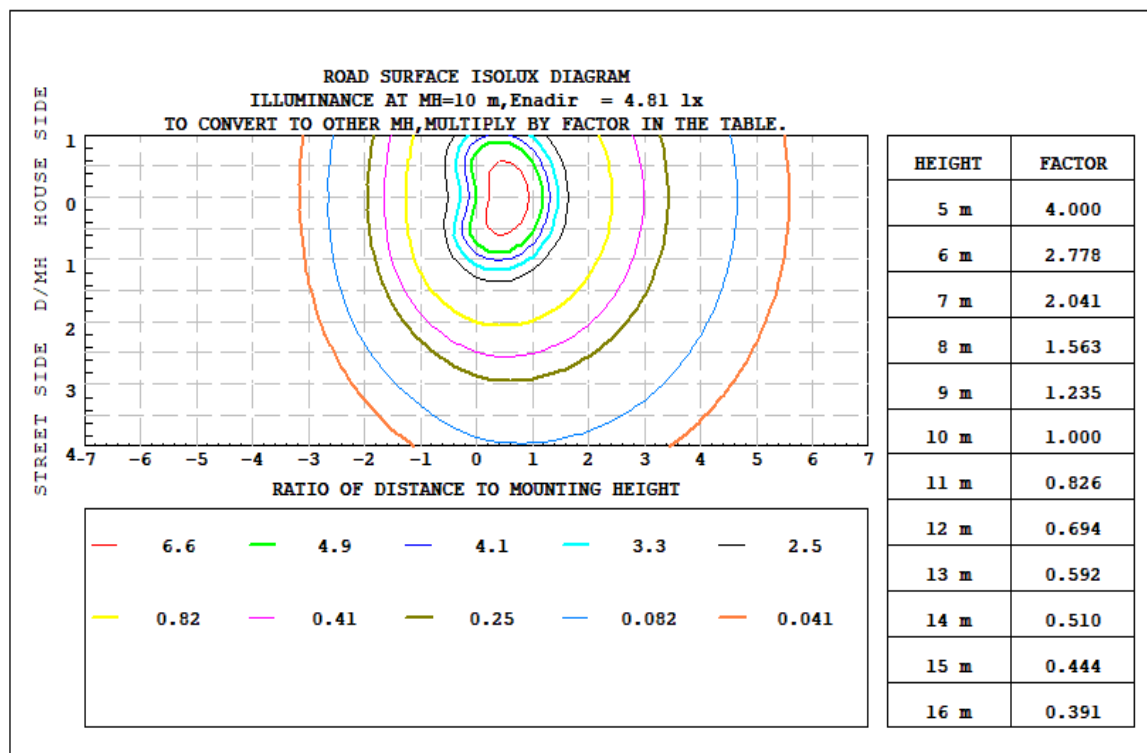
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	2085	0	2085
Street Side	2470.9	0	2470.9

3.2 Goniophotometer Test

Coefficients of Utilization

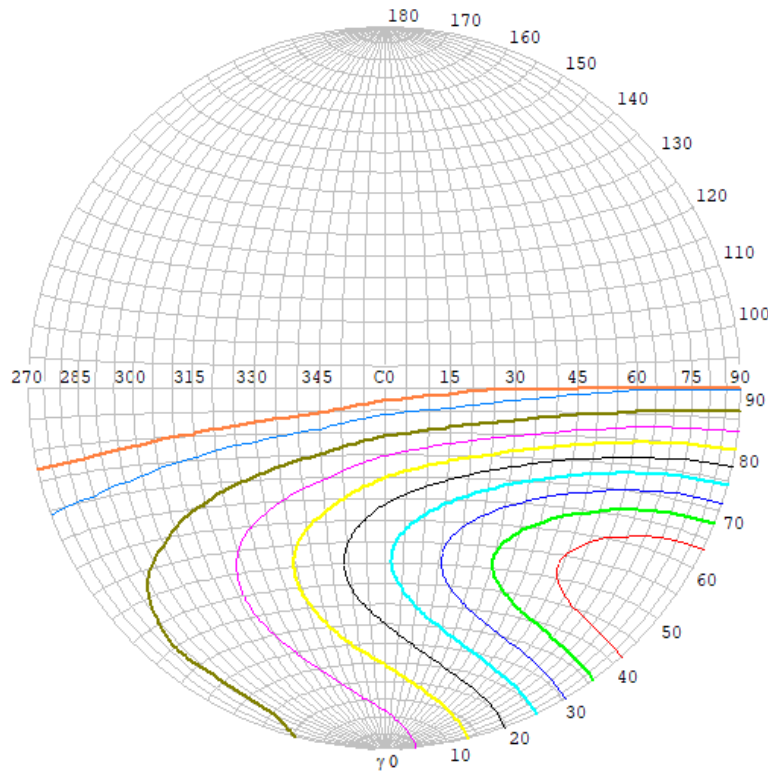


Iso-footcandle Lines of Horizontal Illumination



3.2 Goniophotometer Test

STREETLIGHT ISOCANDELA DIAGRAM



Classification:

IES:Type III - Very Short

CIE:Narrow - Short

IES:None cut-off

CIE:Non-cut-off

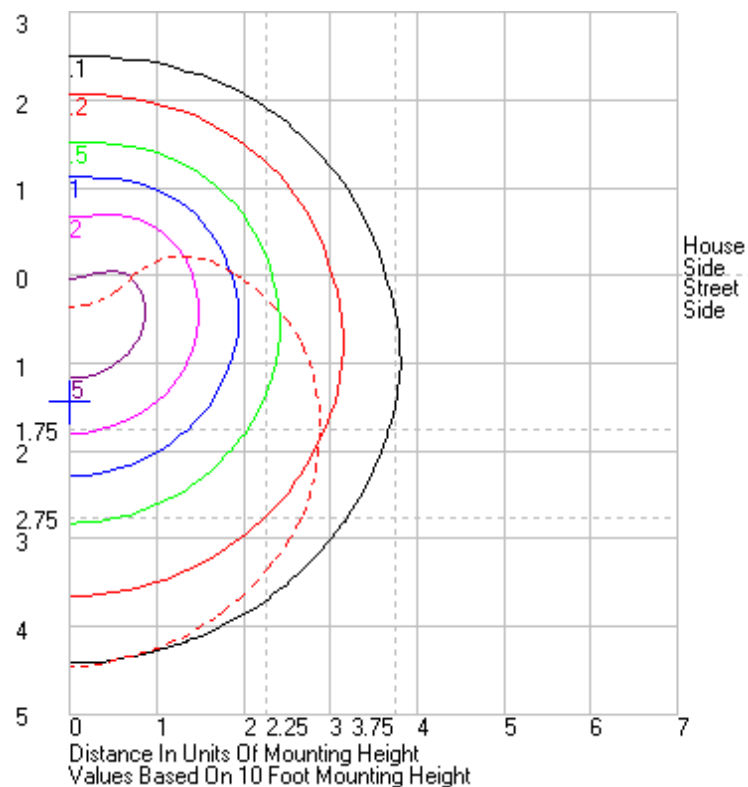
Max.At80:747.3cd/klm

Max.At90:0cd/klm

Max.80-90:747.3cd/klm

ISOCANDELA DIAGRAM	
UNIT	cd
Imax=100%	1843
90%	1659
80%	1474
70%	1290
60%	1106
50%	921
40%	737
30%	553
20%	369
10%	184
5%	92

ROAD ISOCANDELA REPORT



5.0 THD and PF Test

Model No.	IVAT4-45L730U	Sample ID.	C1
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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	276.94	60	0.147	37.0	0.908	17.92%
25.1	120.00	60	0.315	37.3	0.989	8.75%

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*****