Photometric Test Report

Relevant Standards

☑IES LM-79-2008
☑ANSI C82.77:2014

Prepared For

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1.0 Test Summary

DLC Technical Requirements v4.4

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	4599
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	108.8
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	⩾99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	⩽10%	3.74%
Alowable CCTs* (K)	IES LM-79-2008	⩽5700	2974
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	⩾65	79.9
Power Factor	ANSI C82.77:2014	0.873	0.974
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	10.69%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/22	IVAT4-45L730[H, 4]	C1
2	Goniophotometer Test	2018/11/22	IVAT4-45L730[H, 4]	C1
3	THD and PF Test	2018/11/22	IVAT4-45L730[H, 4]	C1

Remark(If any)
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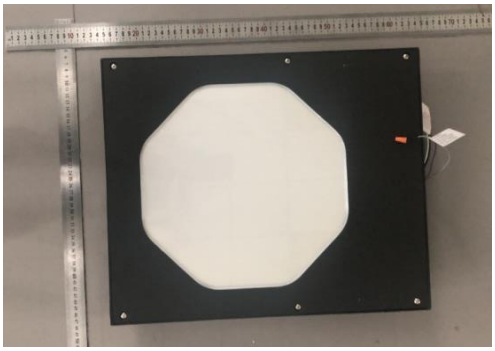
2、The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

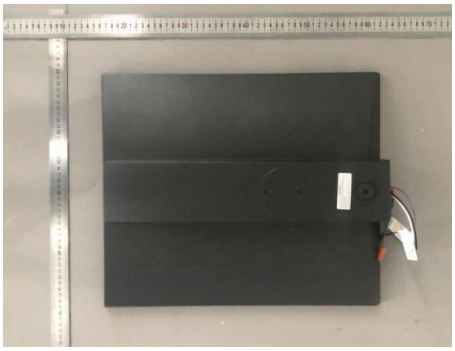
3.0 Production Description

Luminaire Description: IVAT4-45L730[H, 4]

Electrical Specification: 480V,50/60HZ, 45W

Photos of Luminaire Characteristics





4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	IVAT4-45L730[H, 4]	Sample ID.	C1
Opreate time (Min.)	90	Stabilization time (Min.)	45

Test Method
The samples were tested according to the IES LM-79-2008. Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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 (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
25.3	480.07	60	0.090	42.3	0.974

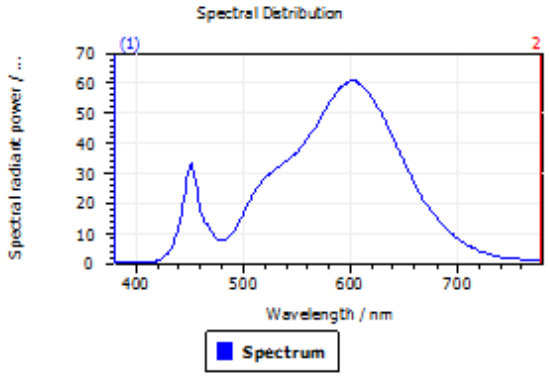
Test Result

CCT (K)	CRI (Ra)	Duv
2974	79.9	2.3E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral Distribution

Spectral values

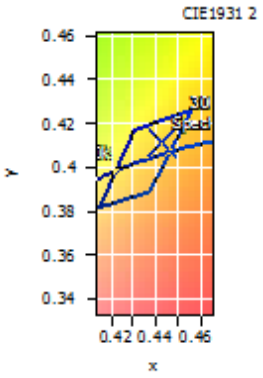
DominantWavelength	582.18 nm
Purity	0.563
PeakWavelength	601.62 nm
Width50%:	129.41 nm

Color Coordinates

Correlated Color Temperatu		2974 K			
x:	0.4422	u:	0.2507	u':	0.2507
y:	0.4116	v:	0.3501	v':	0.5251

CRI01	77.5	CRI09	-4.2
CRI02	87.7	CRI10	72.3
CRI03	96.6	CRI11	77.3
CRI04	78.3	CRI12	62.8
CRI05	77.2	CRI13	79.8
CRI06	84.8	CRI14	98.3
CRI07	82.1	CRI15	68.8
CRI08	54.8	CRI16	66.7

ResultsCRI 79.9



PlanckDistance 2.3E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVAT4-45L730[H, 4]	Sample ID.	C1
Opreate time (Min.)	90	Stabilization time (Min.	45

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using a type C goniophotometer and software.
The ambient temperature shall be maintained at 25° C ± 1° 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^{o} vertical intervals and 10^{o} horizontal intervals.

Test Conditions

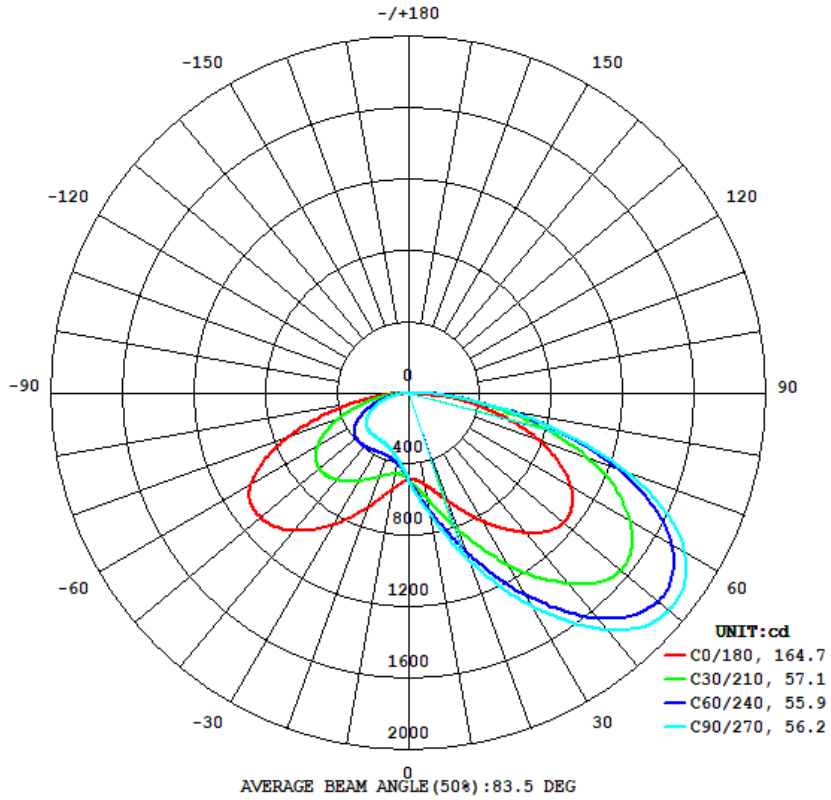
Temperature (° C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.99	60	0.091	42.3	0.972	Light Down

Test Result

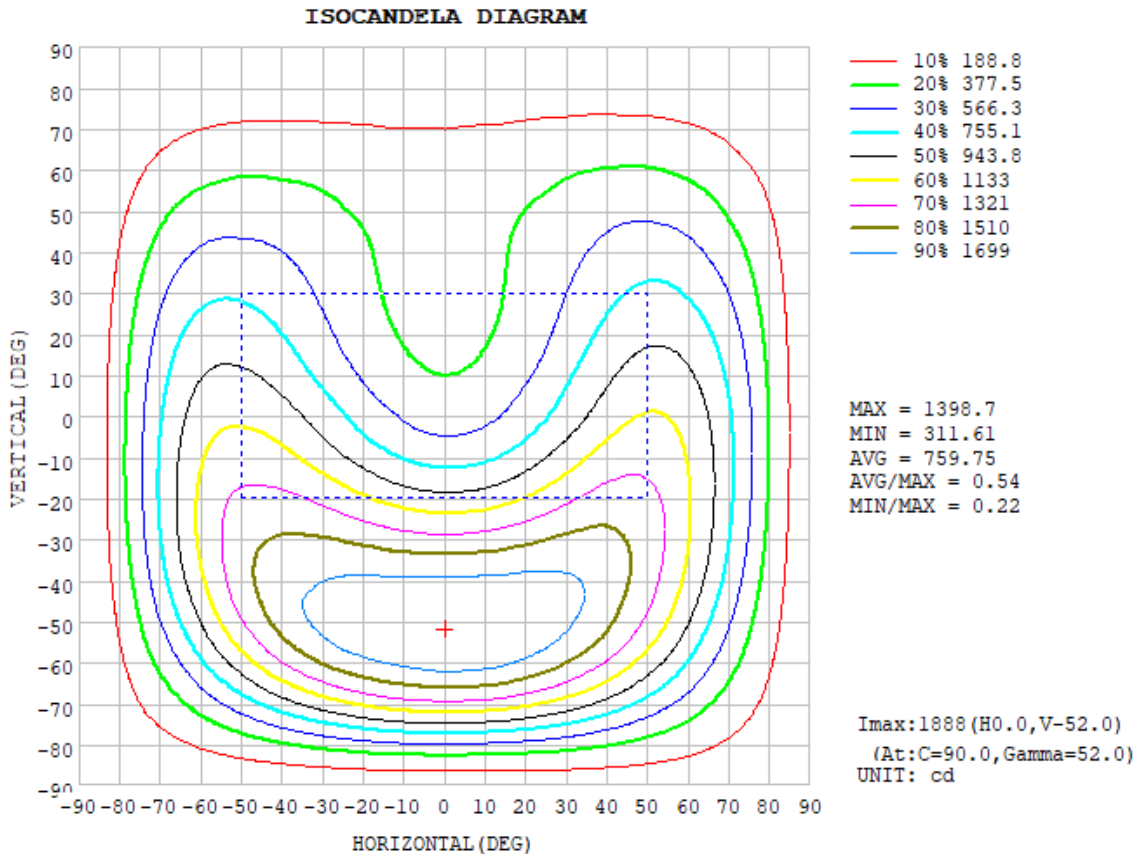
Flux (lm)	Zonal Lumen Requirement (0°-90°)	Zonal Lumen Requirement (80°-90°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
4599	100.00%	3.74%	178.2	156.2	164.7	56.2	108.8

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	521.5	632.8	684.7	646.0	546.0	428.2	377.4	421.4
20	645.3	887.0	997.4	909.2	680.0	429.4	329.2	424.1
30	830.5	1223	1375	1233	851.8	459.4	313.5	463.9
40	1024	1543	1733	1527	1011	494.9	313.1	515.3
50	1131	1708	1896	1684	1086	501.7	307.0	536.7
60	1052	1593	1784	1624	1020	443.0	269.3	484.5
70	777.3	1172	1298	1180	722.0	309.1	188.4	343.5
80	373.6	541.0	564.7	514.1	299.2	130.7	78.86	148.8
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
DEG	LUMINOUS INTENSITY:cd							

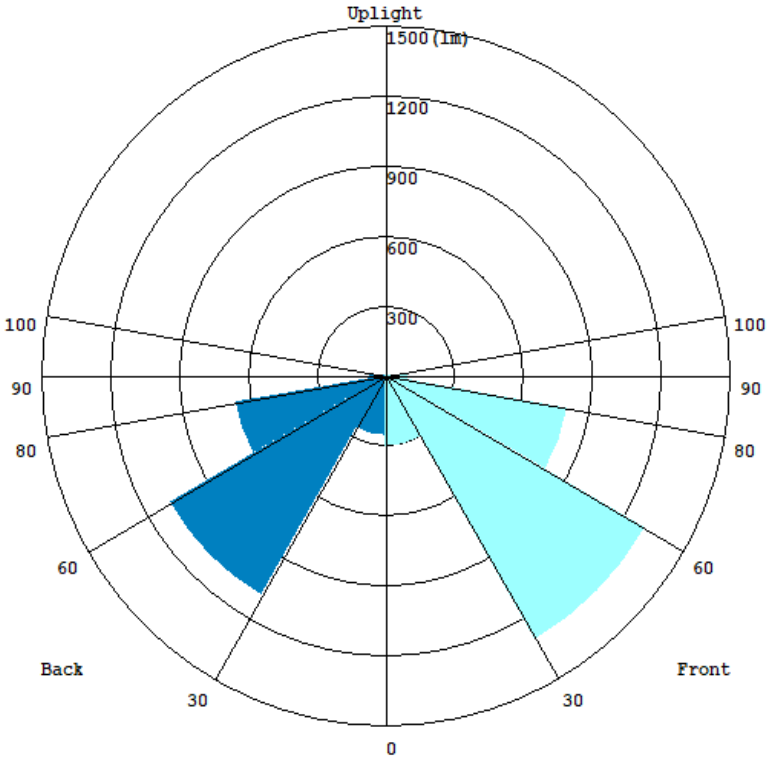
4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	48.56	0 - 10	48.56	1.06%
10-20	169.59	0 - 20	218.15	4.74%
20-30	349.93	0 - 30	568.08	12.35%
30-40	588.64	0 - 40	1156.72	25.15%
40-50	831.41	0 - 50	1988.13	43.23%
50-60	970.15	0 - 60	2958.28	64.33%
60-70	894.22	0 - 70	3852.50	83.77%
70-80	573.95	0 - 80	4426.45	96.26%
80-90	172.20	0 - 90	4598.65	100.00%
90-100	0.00	0 - 100	4598.65	100.00%
100-110	0.00	0 - 110	4598.65	100.00%
110-120	0.00	0 - 120	4598.65	100.00%
120-130	0.00	0 - 130	4598.65	100.00%
130-140	0.00	0 - 140	4598.65	100.00%
140-150	0.00	0 - 150	4598.65	100.00%
150-160	0.00	0 - 160	4598.65	100.00%
160-170	0.00	0 - 170	4598.65	100.00%
170-180	0.00	0 - 180	4598.65	100.00%

3.2 Goniophotometer Test

LCS Graph



BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	305.95	6.6
FM - Front-Medium(30-60)	1307.6	28.4
FH - Front-High(60-80)	805.29	17.5
FVH - Front-Very High(80-90)	98.378	2.1
Total Forward Light	2517.2	54.6

BL - Back-Low(0-30)	262.81	5.7
BM - Back-Medium(30-60)	1089.6	23.6
BH - Back-High(60-80)	667.35	14.5
BVH - Back-Very High(80-90)	75.165	1.6
Total Back Light	2095	45.4

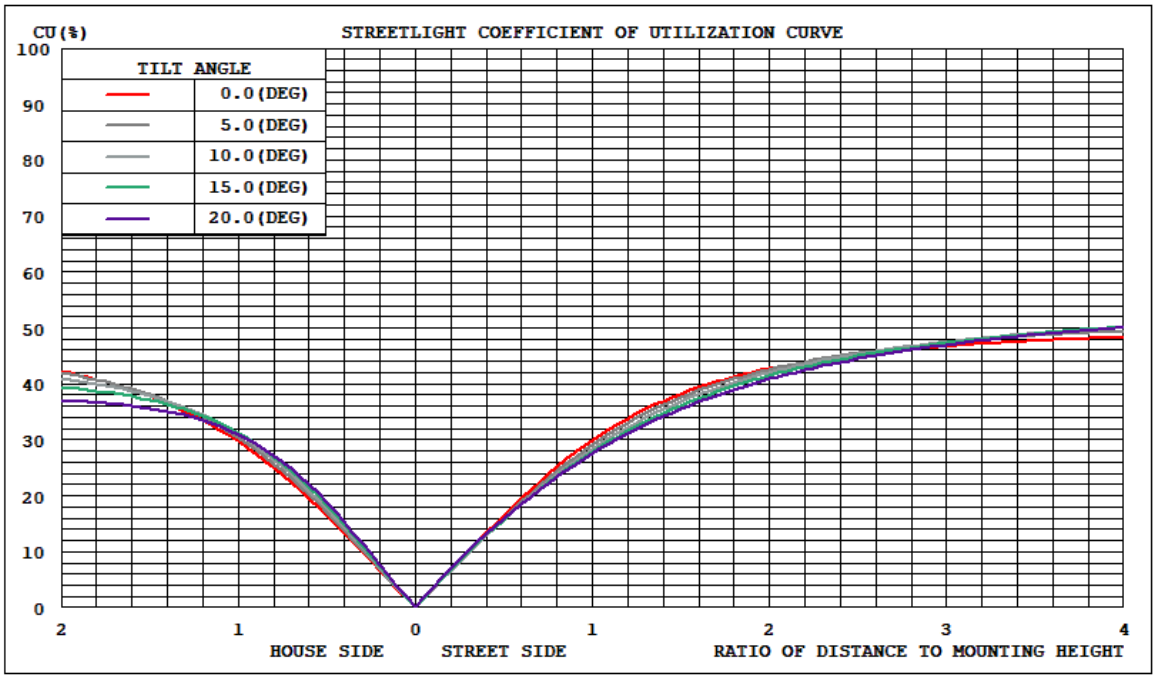
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B2-U0-G2

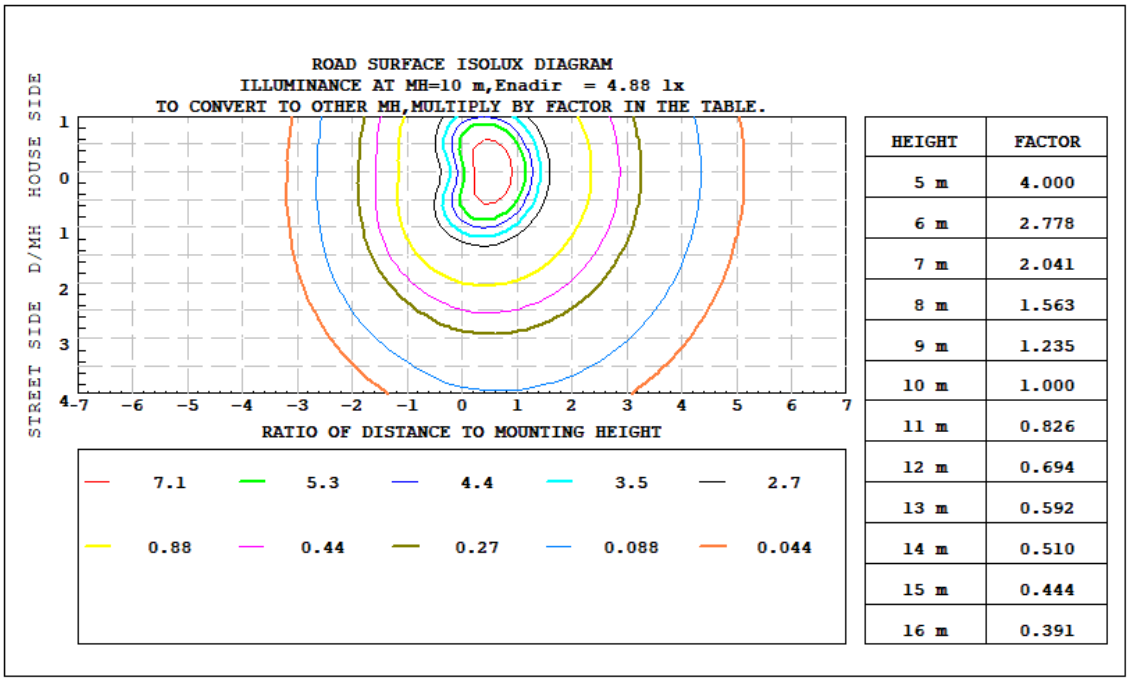
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	2095	0	2095
Street Side	2517.2	0	2517.2

3.2 Goniophotometer Test

Coefficients of Utilization



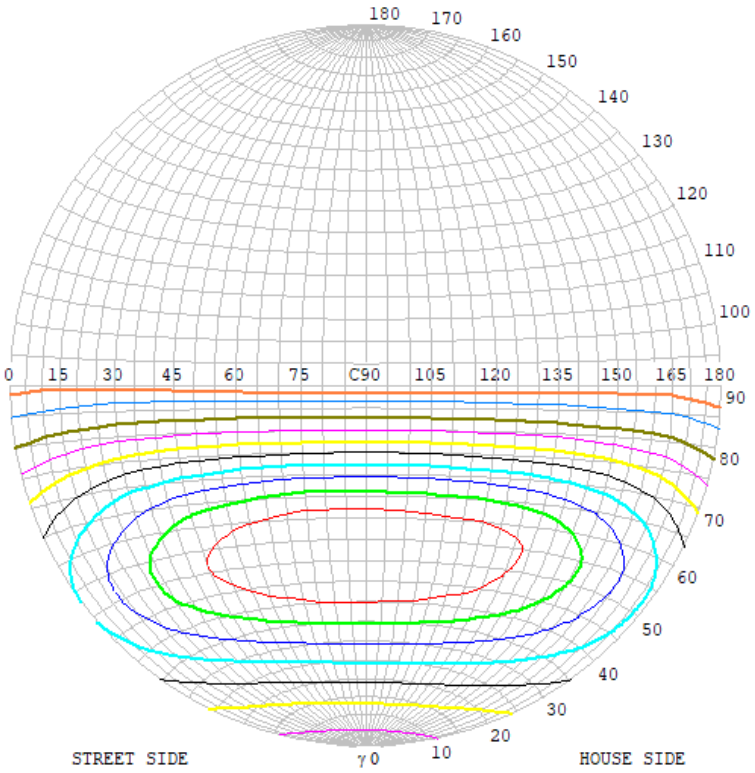
Iso-footcandle Lines of Horizontal Illumination



HEIGHT	FACTOR
5 m	4.000
6 m	2.778
7 m	2.041
8 m	1.563
9 m	1.235
10 m	1.000
11 m	0.826
12 m	0.694
13 m	0.592
14 m	0.510
15 m	0.444
16 m	0.391

3.2 Goniophotometer Test

STREETLIGHT ISOCANDELA DIAGRAM

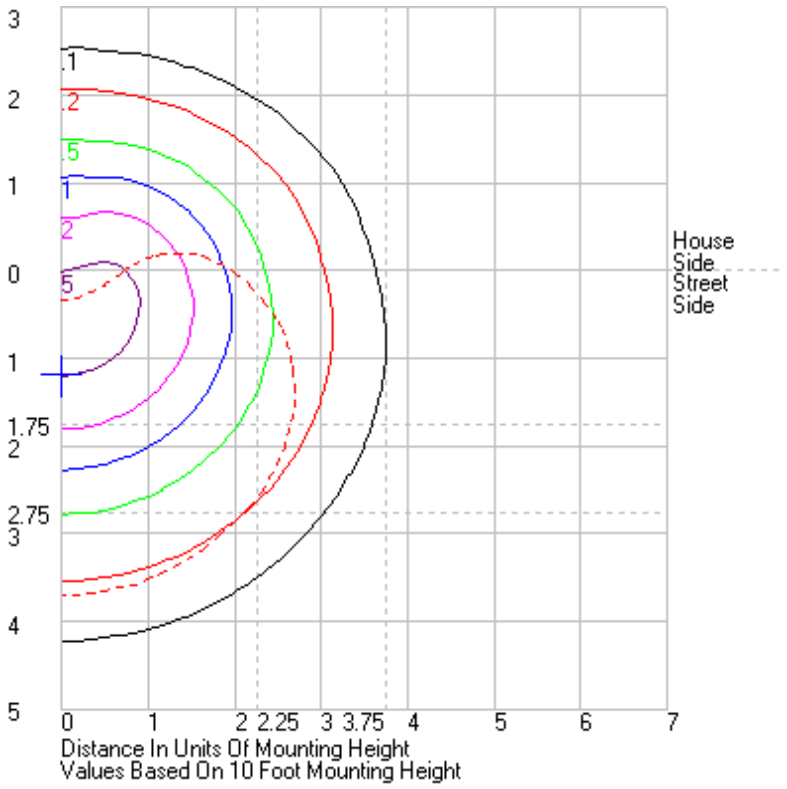


Classification:

IES:Type III - Very Short
CIE:Narrow - Short
IES:Semi cut-off
CIE:Non-cut-off
Max.At80:122.3cd/klm
Max.At90:0cd/klm
Max.80-90:122.3cd/klm

ISOCANDELA DIAGRAM	
UNIT	cd
Imax=100%	1899
90%	1709
80%	1519
70%	1329
60%	1139
50%	950
40%	760
30%	570
20%	380
10%	190
5%	95

ROAD ISOCANDELA REPORT



5.0 THD and PF Test

Model No.	IVAT4-45L730[H, 4]	Sample ID.	C1

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 25º C ± 1º 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	480.07	60	0.090	42.3	0.974	10.69%

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-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**********