

Photometric Test Report

Relevant Standards

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

Prepared For

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Issue Date

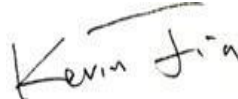
2018/10/31

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Approved By



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1.0 Test Summary

DLC Technical Requirements v4.3

Outdoor - Hight output Outdoor Pole/Arm-Mounted Area and Roadway Luminaires			
Requirement Category	Test Method	Requirements	Test value
Lamp Output (lm)	IES LM-79-2008	10000	14322
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	116.4	122.8
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	3.87%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	4952
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	75
Power Factor	ANSI C82.77:2014	0.873	0.959
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	6.76%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/10/30	IVAT4-130L750U	T1
2	Goniophotometer Test	2018/10/30	IVAT4-130L750U	T1
3	THD and PF Test	2018/10/30	IVAT4-130L750U	T1

Remark(If any)

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3.0 Production Description

Luminaire Description: IVAT4-130L750U

Electrical Specification: 120V-277V,50/60HZ, 130W

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	IVAT4-130L750U	Sample ID.	T1
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	119.97	60	0.998	119.6	0.999

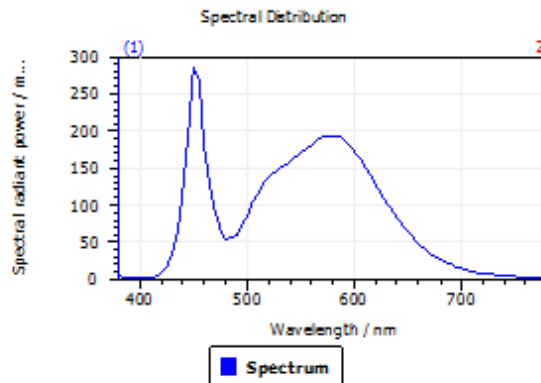
Test Result

CCT (K)	CRI (Ra)	Duv
4952	74.9	3.7E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

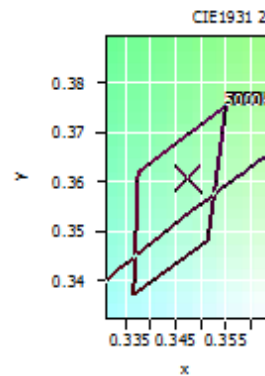
DominantWavelength	570.18 nm
Purity	0.125
PeakWavelength	451.66 nm
Radiant Power	33.16 W
Width50%	22.03 nm

Color Coordinates

Correlated Color Temperatu 4952 K

x: 0.3473 u: 0.2094 u': 0.2094
y: 0.3608 v: 0.3263 v': 0.4894

ResultsCRICRI01	70.9	ResultsCRICRI09	-33.9
ResultsCRICRI02	81.8	ResultsCRICRI10	57.3
ResultsCRICRI03	89.8	ResultsCRICRI11	70.8
ResultsCRICRI04	73.6	ResultsCRICRI12	49.0
ResultsCRICRI05	72.5	ResultsCRICRI13	73.3
ResultsCRICRI06	74.9	ResultsCRICRI14	94.5
ResultsCRICRI07	82.0	ResultsCRICRI15	63.3
ResultsCRICRI08	53.6	ResultsCRICRI16	62.6
ResultsCRI	74.9		



PlankDistance 3.7E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVAT4-130L750U	Sample ID.	T1
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

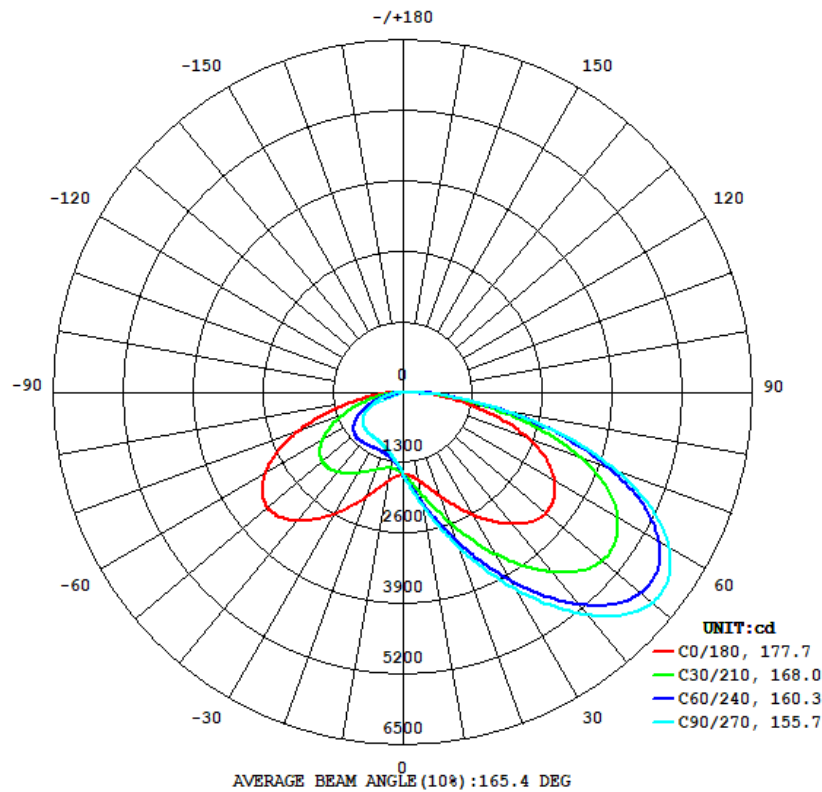
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	119.96	60	0.974	116.6	0.998	Light Down

Test Result

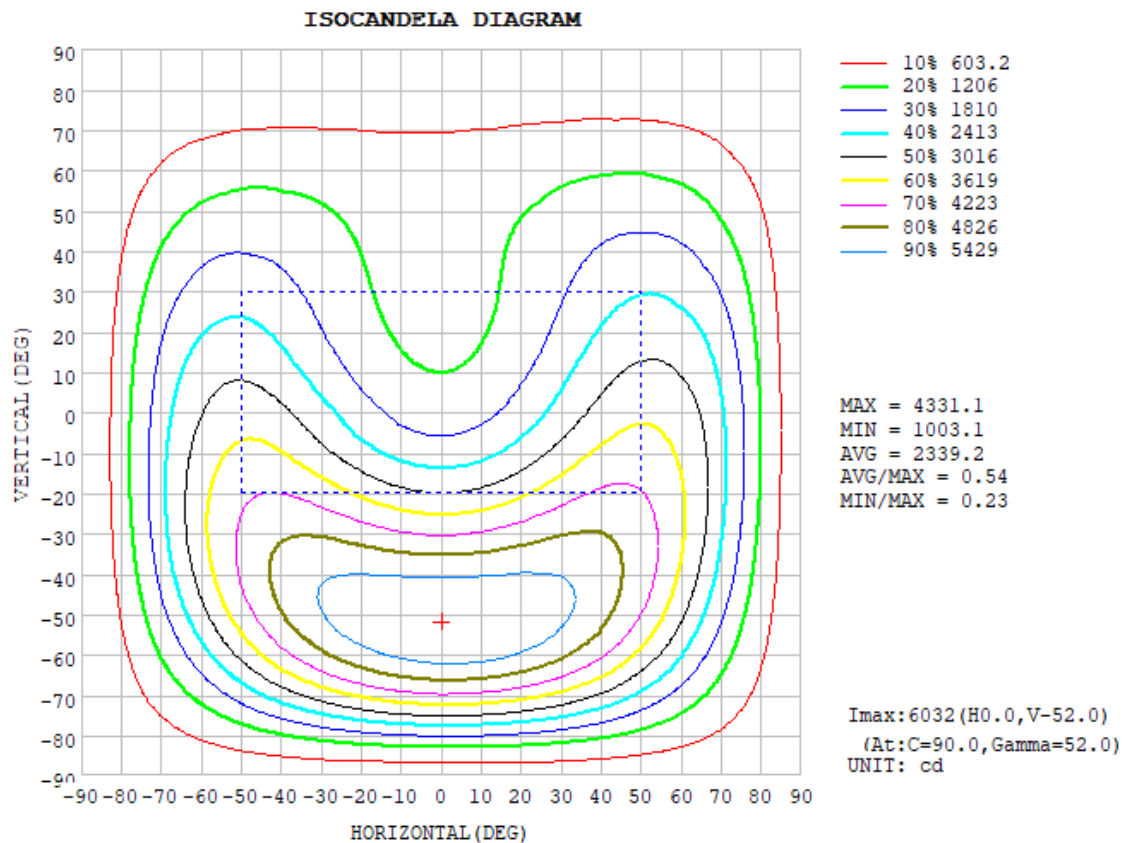
Flux (lm)	Zonal Lumen Requirement (0° - 90°)	Zonal Lumen Requirement (80° - 90°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
14322	100.00%	3.87%	178	155.7	164.6	55.2	122.8

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd									
7	C0	C45	C90	C135	C180	C225	C270	C315		
10	1644	1971	2105	1965	1663	1327	1203	1334		
20	2042	2751	3028	2745	2054	1315	1060	1348		
30	2611	3762	4188	3757	2589	1392	1008	1466		
40	3177	4778	5353	4760	3098	1491	1001	1604		
50	3471	5365	6039	5305	3303	1497	971.7	1640		
60	3263	5135	5715	4930	2958	1308	840.4	1457		
70	2485	3898	4221	3619	2090	905.9	575.8	1029		
80	1193	1803	1884	1619	890.7	380.0	237.0	446.4		
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		

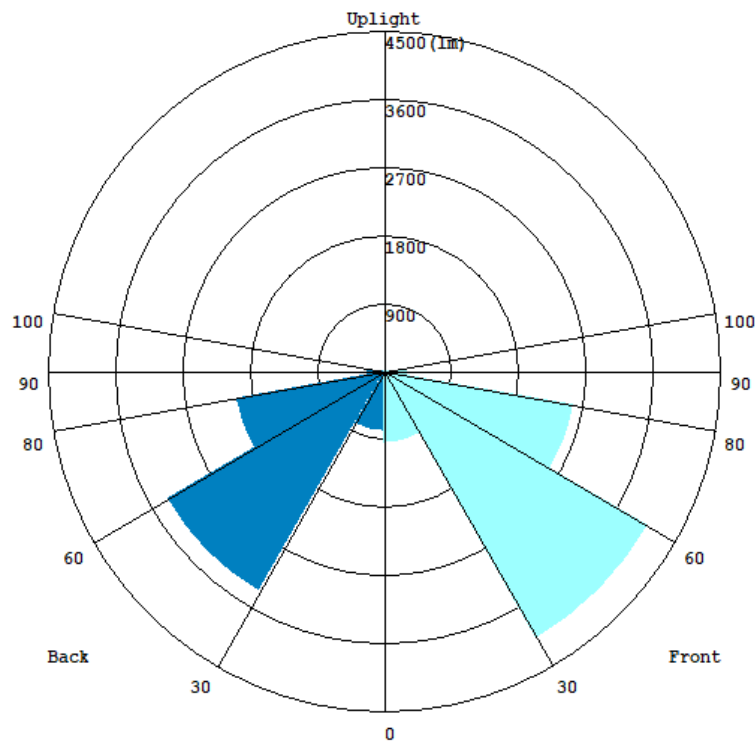
4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	150.92	0 - 10	150.92	1.05%
10-20	524.37	0 - 20	675.29	4.72%
20-30	1077.51	0 - 30	1752.80	12.24%
30-40	1817.65	0 - 40	3570.45	24.93%
40-50	2583.46	0 - 50	6153.91	42.97%
50-60	3017.49	0 - 60	9171.40	64.04%
60-70	2788.35	0 - 70	11959.75	83.51%
70-80	1808.66	0 - 80	13768.41	96.13%
80-90	553.59	0 - 90	14322.00	100.00%
90-100	0.00	0 - 100	14322.00	100.00%
100-110	0.00	0 - 110	14322.00	100.00%
110-120	0.00	0 - 120	14322.00	100.00%
120-130	0.00	0 - 130	14322.00	100.00%
130-140	0.00	0 - 140	14322.00	100.00%
140-150	0.00	0 - 150	14322.00	100.00%
150-160	0.00	0 - 160	14322.00	100.00%
160-170	0.00	0 - 170	14322.00	100.00%
170-180	0.00	0 - 180	14322.00	100.00%

3.2 Goniophotometer Test

LCS Graph



BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	953.83	6.6
FM - Front-Medium(30-60)	4085	28.5
FH - Front-High(60-80)	2586.5	18.0
FVH - Front-Very High(80-90)	321.22	2.2
Total Forward Light	7946.5	55.3

BL - Back-Low(0-30)	800.43	5.6
BM - Back-Medium(30-60)	3355	23.4
BH - Back-High(60-80)	2022.3	14.1
BVH - Back-Very High(80-90)	233.34	1.6
Total Back Light	6411.1	44.7

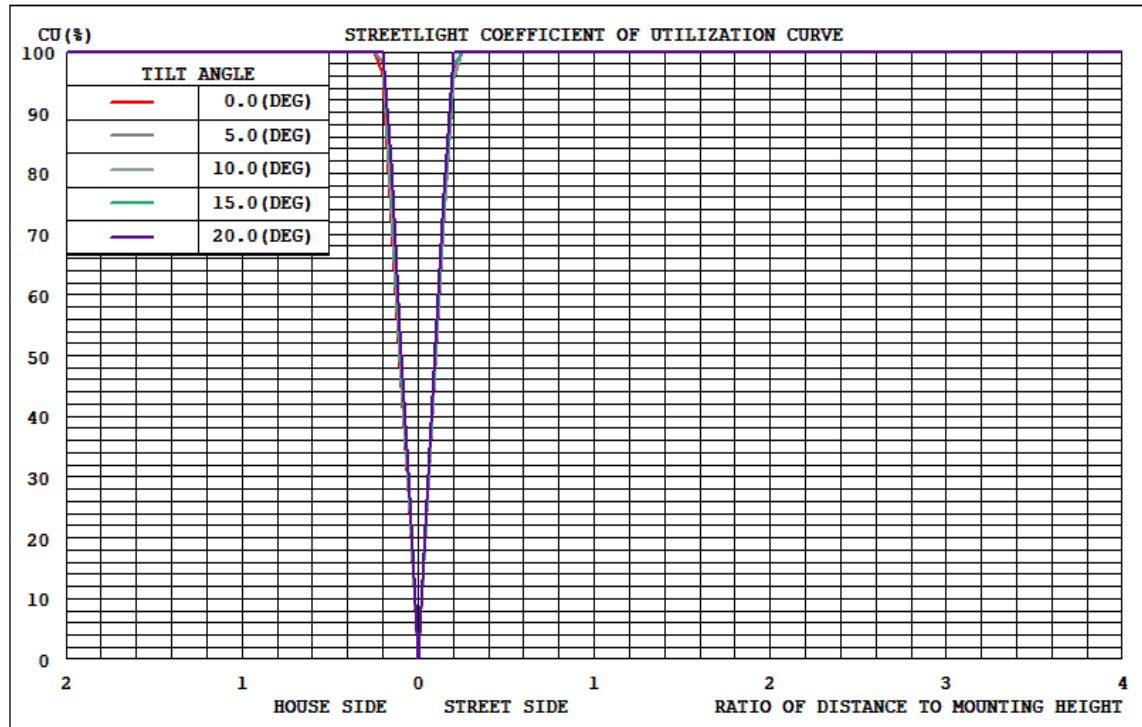
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B3-U0-G3
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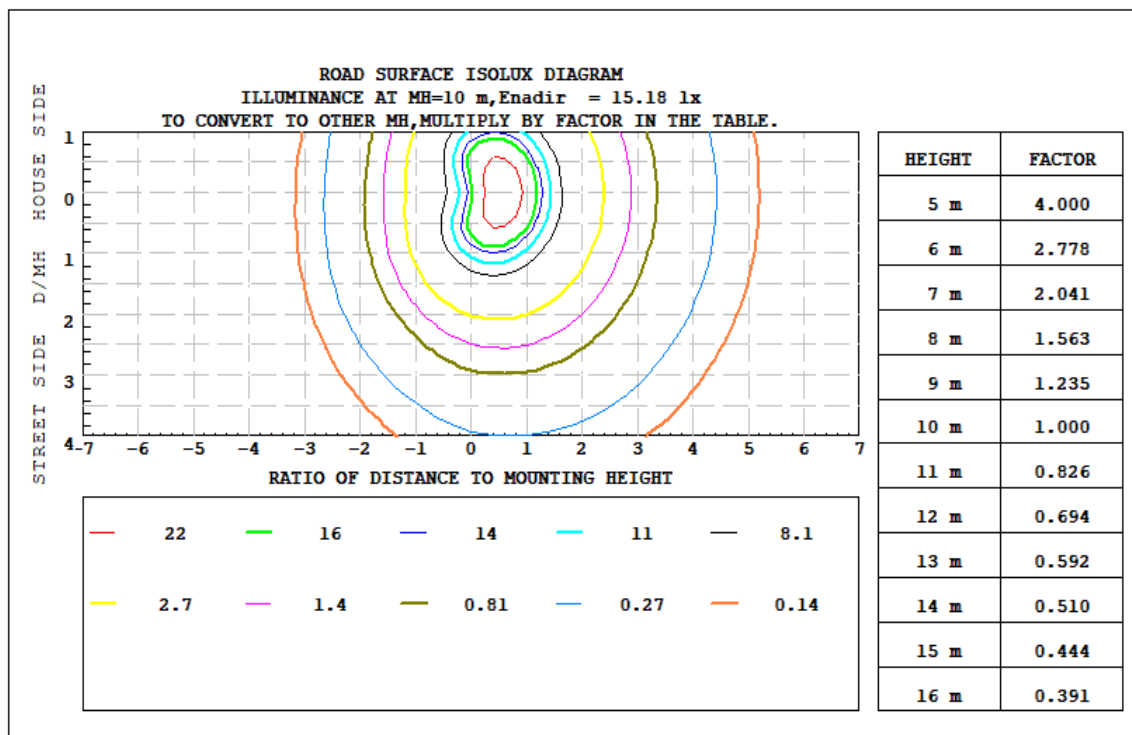
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	6411.1	0	6411.1
Street Side	7946.5	0	7946.5

3.2 Goniophotometer Test

Coefficients of Utilization

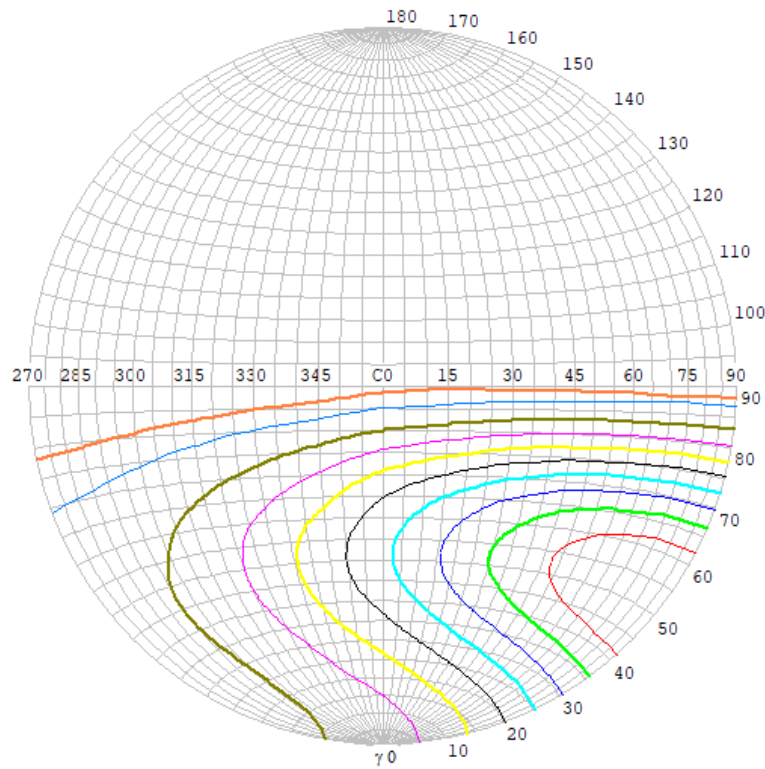


Iso-footcandle Lines of Horizontal Illumination



3.2 Goniophotometer Test

STREETLIGHT ISOCANDELA DIAGRAM

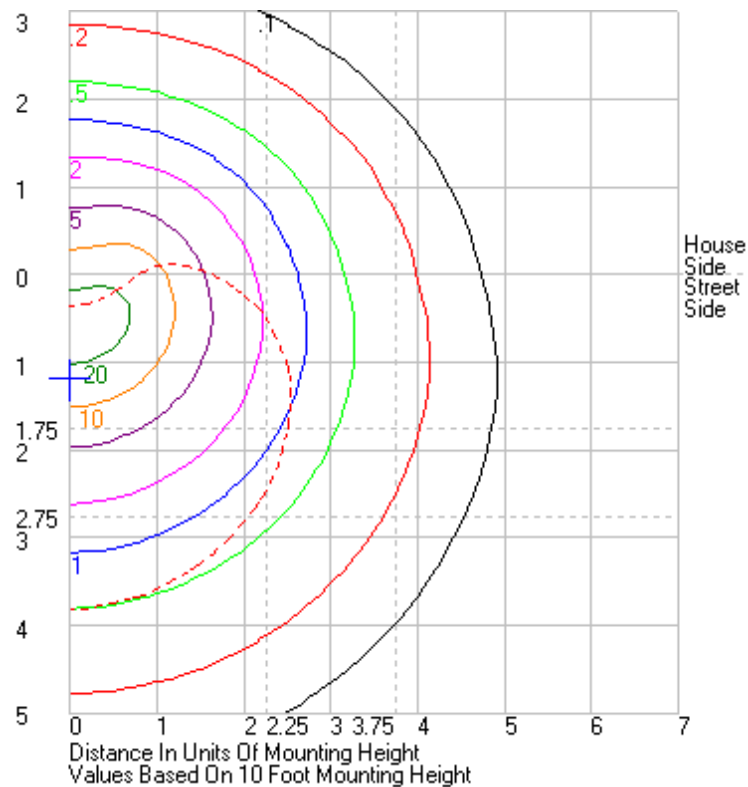


Classification:

IES:Type III - Very Short
CIE:Narrow - Short
IES:None cut-off
CIE:Non-cut-off
Max.At80:1892cd/klm
Max.At90:0cd/klm
Max.80-90:1892cd/klm

ISOCANDELA DIAGRAM	
UNIT	cd
Imax=100%	6062
90%	5456
80%	4850
70%	4243
60%	3637
50%	3031
40%	2425
30%	1819
20%	1212
10%	606
5%	303

ROAD ISOCANDELA REPORT



5.0 THD and PF Test

Model No.	IVAT4-130L750U	Sample ID.	T1
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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	276.98	60	0.429	114.0	0.959	6.76%
25.1	119.97	60	0.998	119.6	0.999	4.36%

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*****