

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1810114**

## Data Number

**DLF1810114-8a**

## Test Date

**2018/11/1**

## Issue Date

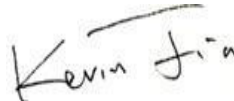
**2018/11/2**

## Prepared By



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## Approved By



Kevin Jia

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## 1.0 Test Summary

DLC Technical Requirements v4.3

<b>Outdoor - Mid output</b> <b>Outdoor Pole/Arm-Mounted Area and Roadway Luminaires</b>			
Requirement Category	Test Method	Requirements	Test value
Lamp Output (lm)	IES LM-79-2008	5000	6864
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	111.6	103.6
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	4.18%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	2986
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	80
Power Factor	ANSI C82.77:2014	0.873	0.932
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	14.23%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/1	IVAT4-75L730U	H1
2	Goniophotometer Test	2018/11/1	IVAT4-75L730U	H1
3	THD and PF Test	2018/11/1	IVAT4-75L730U	H1

### Remark(If any)

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### 3.0 Production Description

**Luminaire Description:** IVAT4-75L730U

**Electrical Specification:** 120V-277V,50/60HZ, 75W

#### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	IVAT4-75L730U	Sample ID.	H1
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  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  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	119.95	60	0.563	66.7	0.988

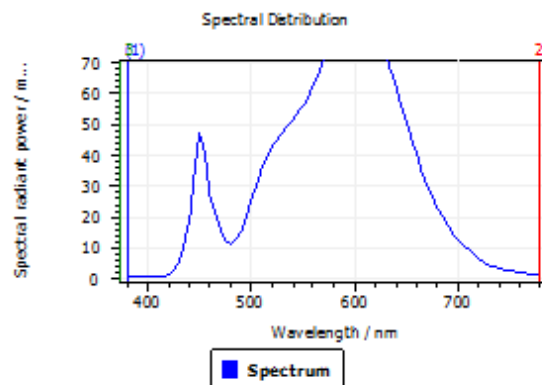
#### Test Result

CCT (K)	CRI (Ra)	Duv
2986	80.3	2.5E-03

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

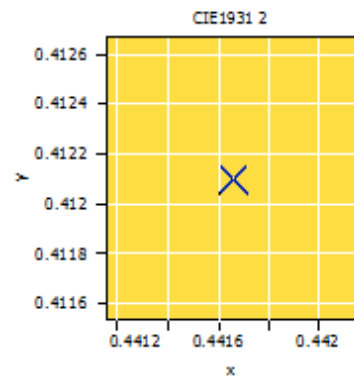
DominantWavelength	582.04 nm
Purity	0.563
PeakWavelength	601.35 nm
Radiant Power	13.09 W
Width50%	130.22 nm

#### Color Coordinates

Correlated Color Temperature 2986 K

x: 0.4417 u: 0.2502 u': 0.2502  
y: 0.4121 v: 0.3501 v': 0.5252

ResultsCRICRI01	77.7	ResultsCRICRI09	-1.9
ResultsCRICRI02	87.2	ResultsCRICRI10	70.8
ResultsCRICRI03	96.2	ResultsCRICRI11	78.1
ResultsCRICRI04	79.3	ResultsCRICRI12	61.4
ResultsCRICRI05	77.7	ResultsCRICRI13	79.6
ResultsCRICRI06	83.9	ResultsCRICRI14	97.7
ResultsCRICRI07	83.4	ResultsCRICRI15	69.7
ResultsCRICRI08	56.7	ResultsCRICRI16	67.9
ResultsCRI	80.3		



PlanckDistance 2.5E-003

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVAT4-75L730U	Sample ID.	H1
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  $\pm 0.2$  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  $0.5^{\circ}$  vertical intervals and  $10^{\circ}$  horizontal intervals.

#### Test Conditions

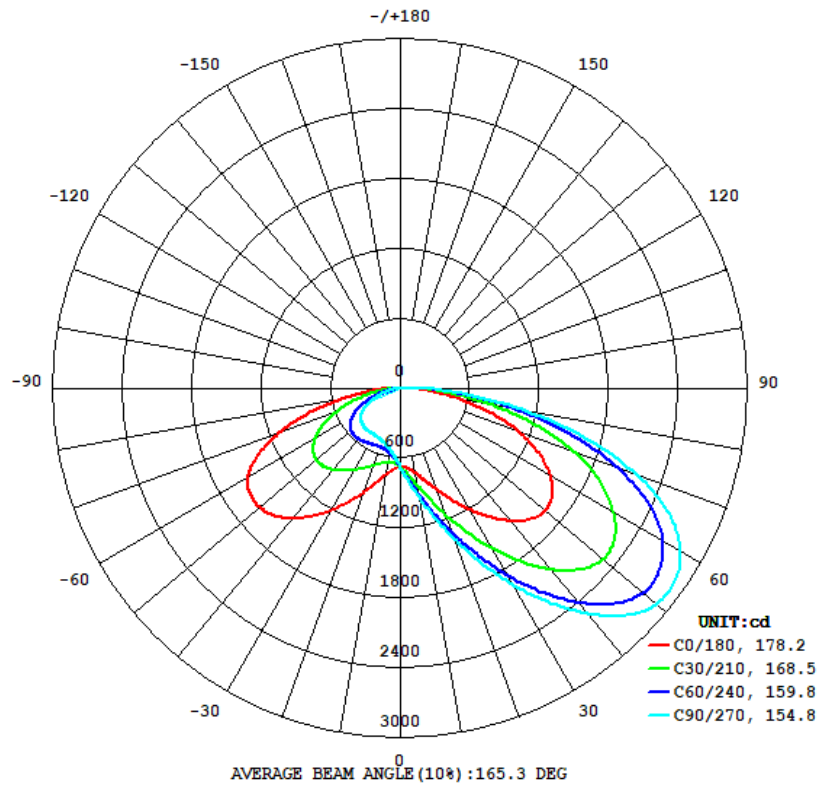
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	119.97	60	0.559	66.3	0.987	Light Down

#### Test Result

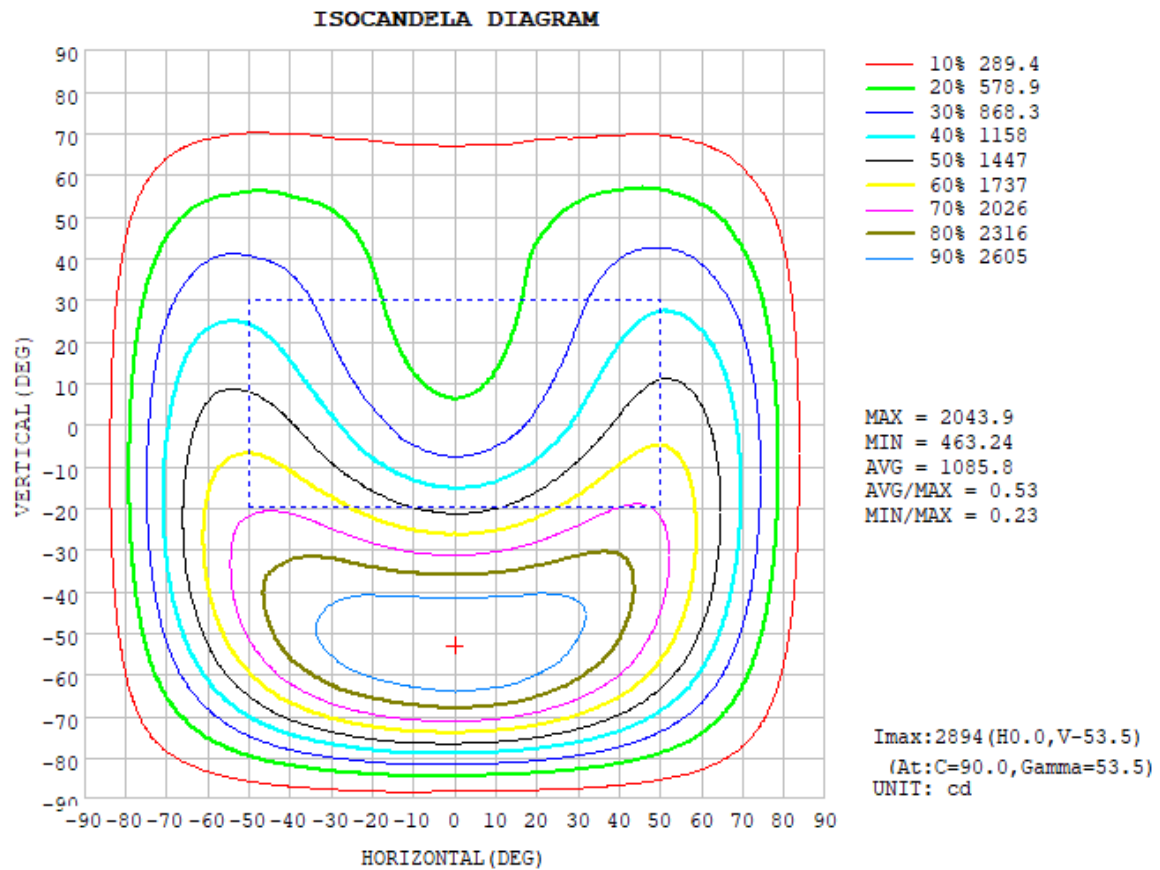
Flux (lm)	Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Zonal Lumen Requirement ( $80^{\circ}$ - $90^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
6864	100.00%	4.18%	178.9	153.2	165.6	53.6	103.6

### 4.3 Goniophotometer Test

#### Light Distrubtion Curve



#### Isolux Plot



### 4.3 Goniophotometer Test

#### Zonal Lumen Summary

°	C0	C45	C90	C135	C180	C225	C270	C315
10	737.6	882.6	943.6	888.8	754.9	601.7	538.4	601.4
20	928.0	1244	1374	1256	949.9	611.5	481.0	616.4
30	1203	1737	1947	1735	1208	660.9	464.4	678.4
40	1487	2249	2524	2220	1462	715.1	463.7	747.9
50	1636	2541	2883	2533	1592	723.2	444.8	761.0
60	1502	2409	2797	2521	1524	629.8	374.3	661.8
70	1087	1832	2172	1946	1121	428.5	225.5	438.5
80	495.1	888.7	1072	953.5	494.5	168.1	74.89	164.3
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							



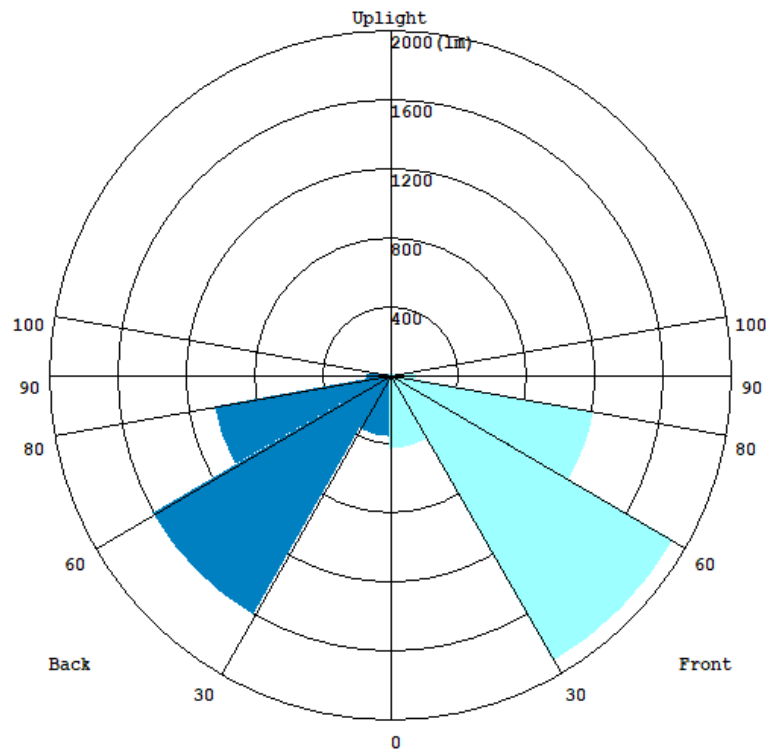
### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	67.73	0 - 10	67.73	0.99%
10-20	238.03	0 - 20	305.76	4.45%
20-30	496.01	0 - 30	801.77	11.68%
30-40	848.66	0 - 40	1650.43	24.04%
40-50	1221.23	0 - 50	2871.66	41.83%
50-60	1445.79	0 - 60	4317.45	62.90%
60-70	1360.25	0 - 70	5677.70	82.71%
70-80	899.53	0 - 80	6577.23	95.82%
80-90	287.20	0 - 90	6864.43	100.00%
90-100	0.00	0 - 100	6864.43	100.00%
100-110	0.00	0 - 110	6864.43	100.00%
110-120	0.00	0 - 120	6864.43	100.00%
120-130	0.00	0 - 130	6864.43	100.00%
130-140	0.00	0 - 140	6864.43	100.00%
140-150	0.00	0 - 150	6864.43	100.00%
150-160	0.00	0 - 160	6864.43	100.00%
160-170	0.00	0 - 170	6864.43	100.00%
170-180	0.00	0 - 180	6864.43	100.00%

### 3.2 Goniophotometer Test

#### LCS Graph



#### BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	434.25	6.3
FM - Front-Medium(30-60)	1920.5	27.9
FH - Front-High(60-80)	1213.5	17.6
FVH - Front-Very High(80-90)	157.11	2.3
Total Forward Light	3725.3	54.1

BL - Back-Low(0-30)	368.15	5.3
BM - Back-Medium(30-60)	1605.4	23.3
BH - Back-High(60-80)	1053.3	15.3
BVH - Back-Very High(80-90)	139.6	2.0
Total Back Light	3166.5	45.9

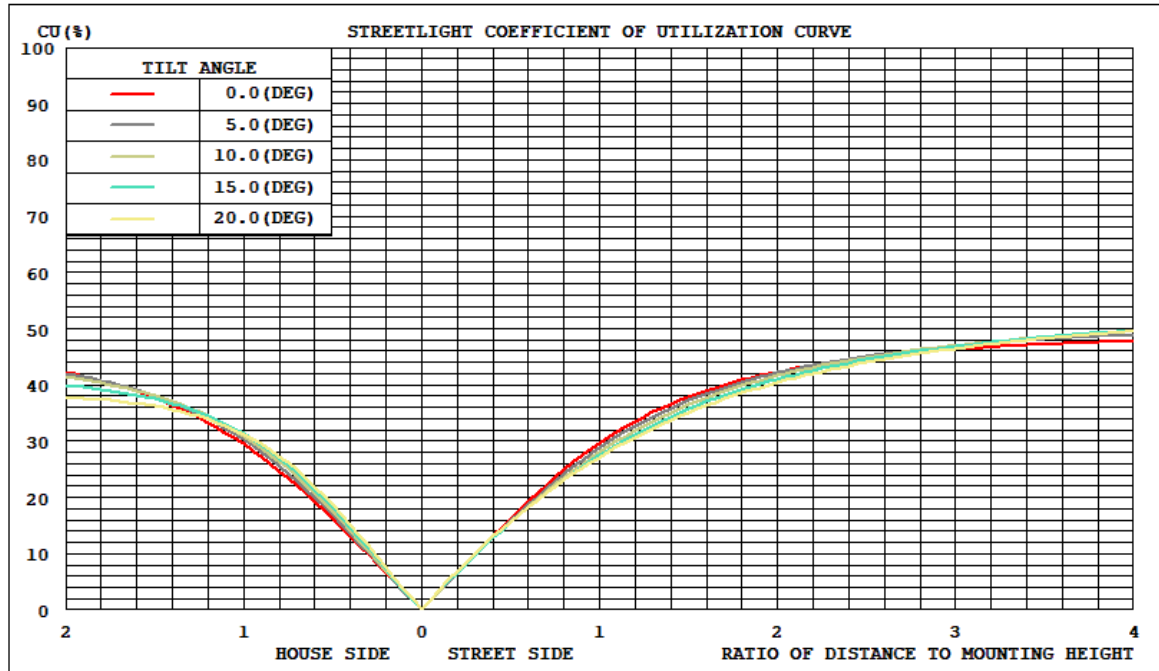
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B3-U0-G3
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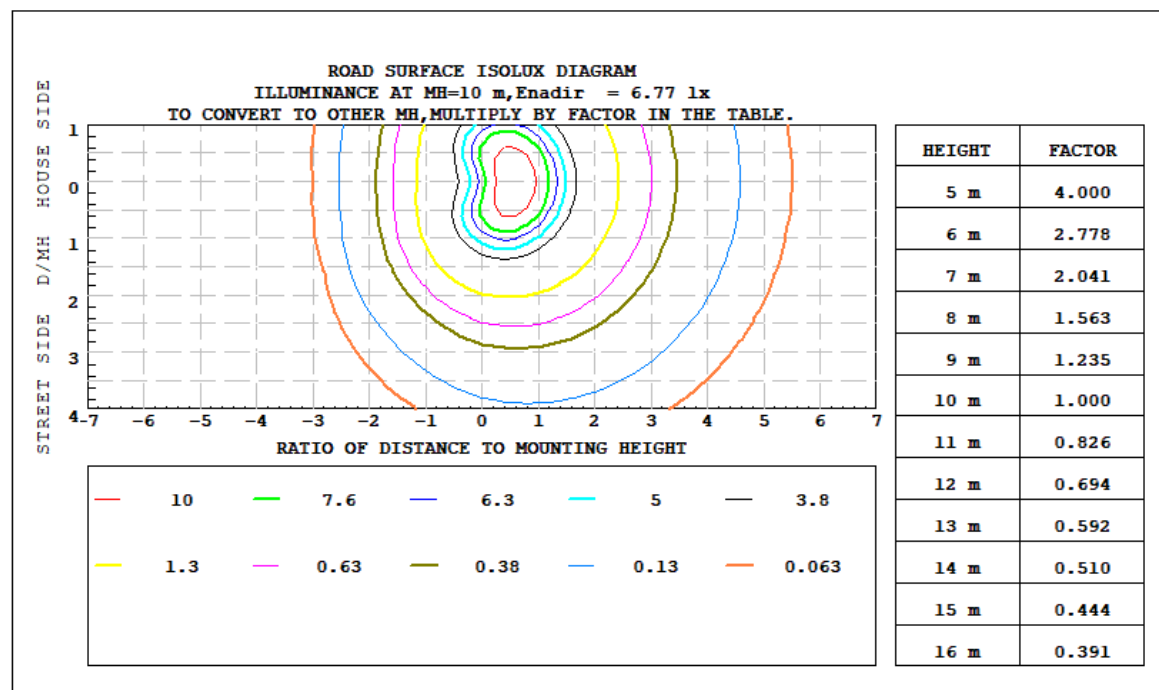
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	3166.5	0	3166.5
Street Side	3725.3	0	3725.3

### 3.2 Goniophotometer Test

#### Coefficients of Utilization

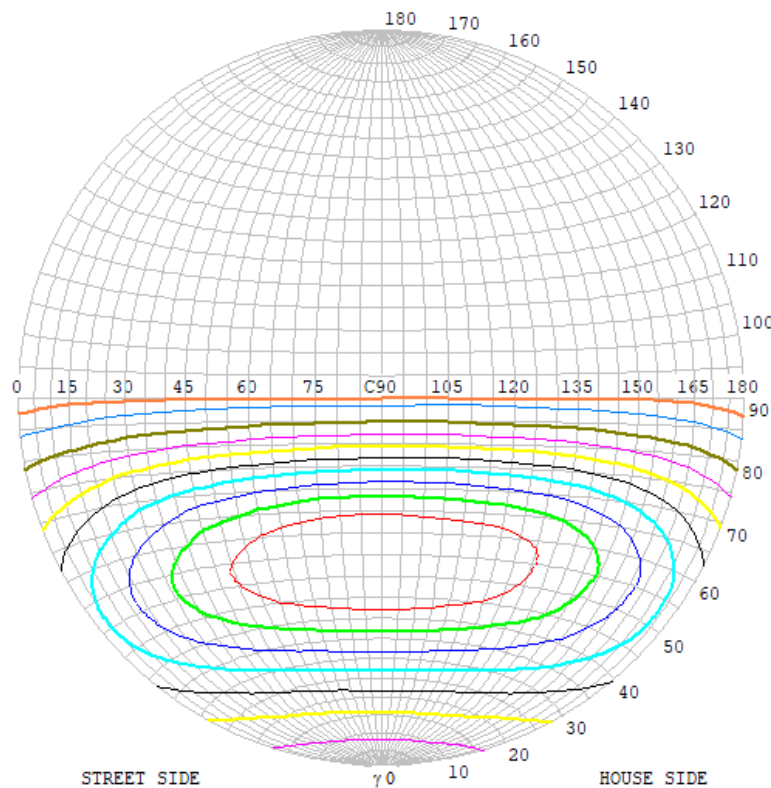


#### Iso-footcandle Lines of Horizontal Illumination



### 3.2 Goniophotometer Test

#### STREETLIGHT ISOCANDELA DIAGRAM

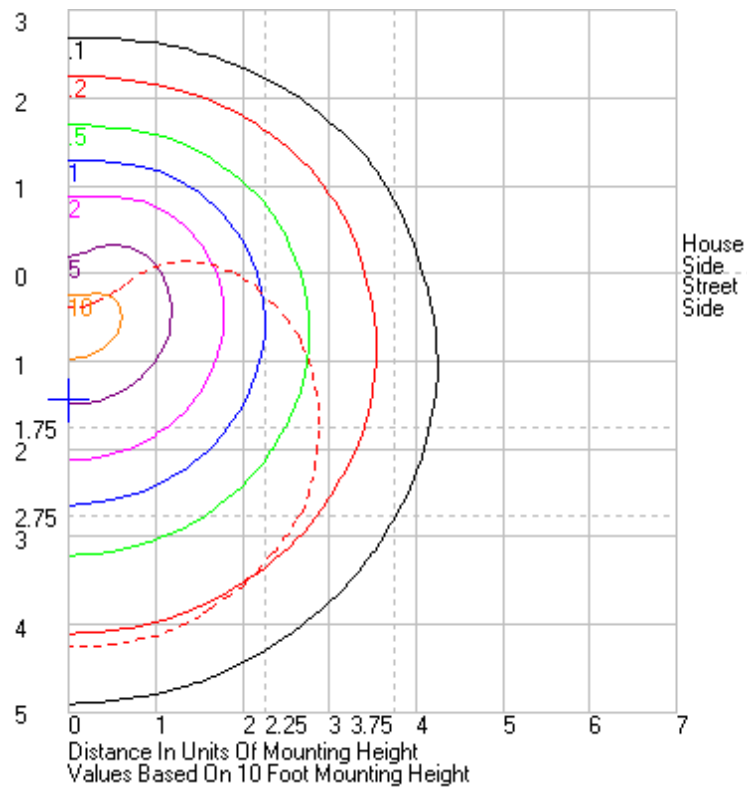


#### Classification:

**IES:Type III - Very Short**  
**CIE:Narrow - Short**  
**IES:Semi cut-off**  
**CIE:Non-cut-off**  
**Max.At80:156.3cd/klm**  
**Max.At90:0cd/klm**  
**Max.80-90:156.3cd/klm**

ISOCANDELA DIAGRAM	
UNIT	cd
Imax=100%	2901
90%	2611
80%	2321
70%	2031
60%	1741
50%	1450
40%	1160
30%	870
20%	580
10%	290
5%	145

#### ROAD ISOCANDELA REPORT



## 5.0 THD and PF Test

Model No.	IVAT4-75L730U	Sample ID.	H1
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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	277.04	60	0.255	65.9	0.932	14.23%
25.1	119.95	60	0.563	66.7	0.988	12.89%

## 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\*\*\*\*\*