

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1810114**

## Data Number

**DLF1810114-6a**

## 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

<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	7537
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	111.6	112.3
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	3.79%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3007
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	80
Power Factor	ANSI C82.77:2014	0.873	0.934
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	13.68%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/10/30	IVAT2-75L730U	F1
2	Goniophotometer Test	2018/10/30	IVAT2-75L730U	F1
3	THD and PF Test	2018/10/30	IVAT2-75L730U	F1

### Remark(If any)

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### 3.0 Production Description

**Luminaire Description:** IVAT2-75L730U

**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.	IVAT2-75L730U	Sample ID.	F1
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	119.94	60	0.571	67.7	0.988

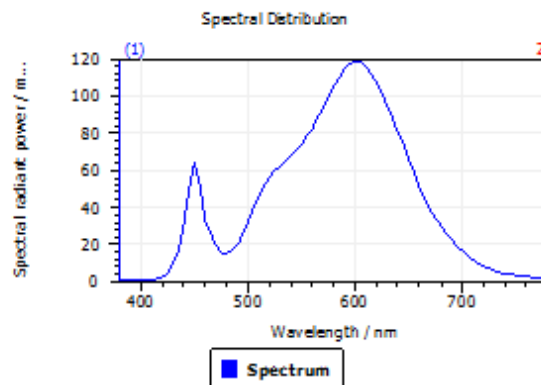
#### Test Result

CCT (K)	CRI (Ra)	Duv
3007	79.6	2.1E-03

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

DominantWavelength	582.09 nm
Purity	0.550
PeakWavelength	600.83 nm
Radiant Power	17.2 W
Width50%	130.31 nm

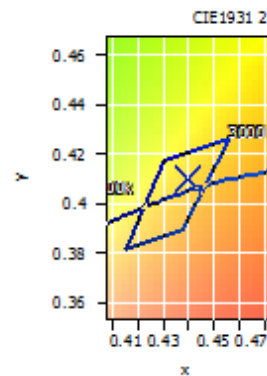
#### Color Coordinates

Correlated Color Temperature 3007 K

x: 0.4394 u: 0.2496 u': 0.2496  
y: 0.4101 v: 0.3494 v': 0.5241

ResultsCRICRI01	77.0	ResultsCRICRI09	-4.3
ResultsCRICRI02	86.9	ResultsCRICRI10	70.3
ResultsCRICRI03	96.0	ResultsCRICRI11	77.0
ResultsCRICRI04	78.3	ResultsCRICRI12	61.9
ResultsCRICRI05	76.9	ResultsCRICRI13	79.0
ResultsCRICRI06	83.6	ResultsCRICRI14	97.8
ResultsCRICRI07	82.5	ResultsCRICRI15	68.8
ResultsCRICRI08	55.4	ResultsCRICRI16	67.1

ResultsCRI 79.6



PlanckDistance 2.1E-003

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVAT2-75L730U	Sample ID.	F1
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

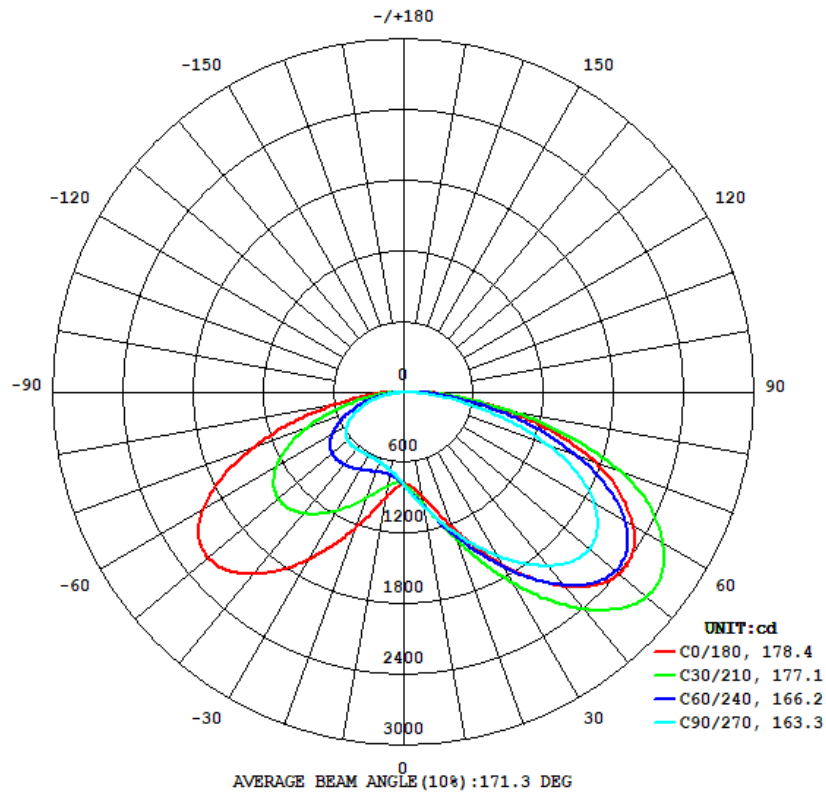
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	120.07	60	0.566	67.1	0.987	Light Down

#### Test Result

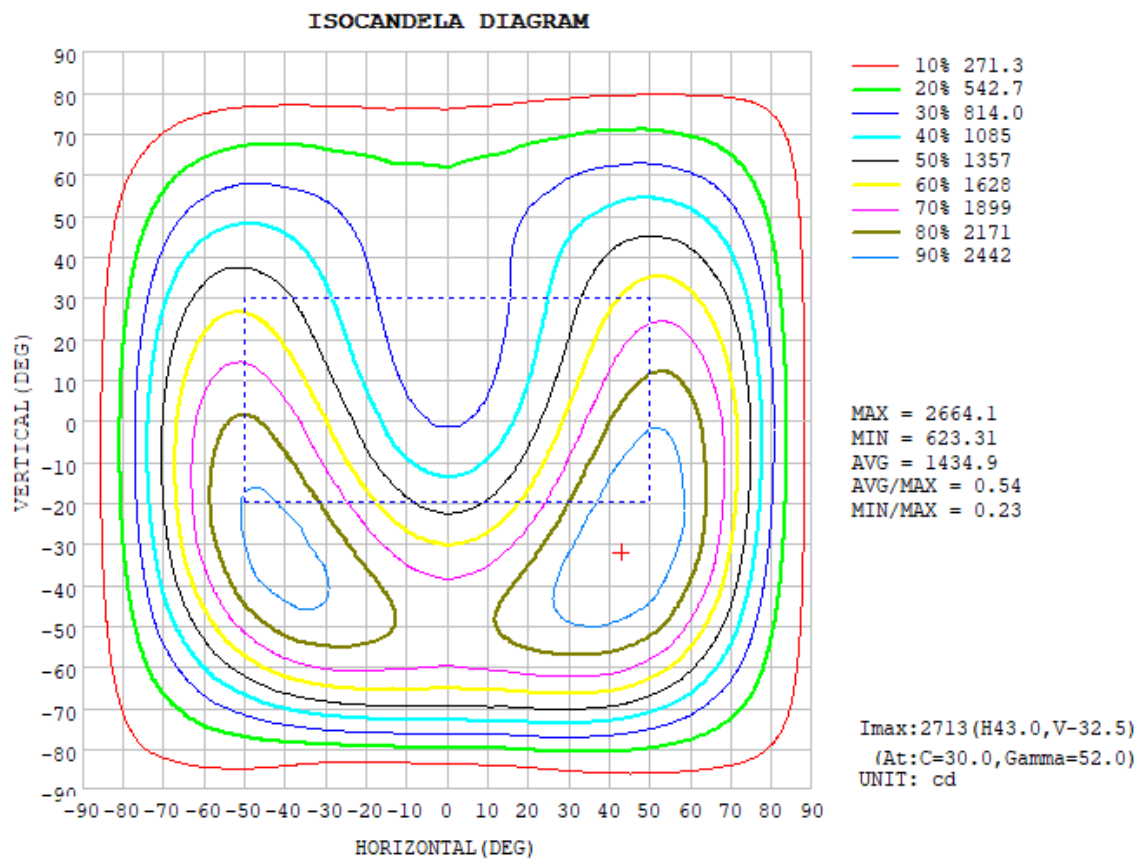
Flux (lm)	Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Zonal Lumen Requirement ( $80^{\circ}$ - $90^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7537	100.00%	3.79%	178.6	163.3	168.9	61.4	112.3

### 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	892.3	970.2	982.1	979.5	906.9	756.7	680.7	754.6		
20	1219	1322	1263	1340	1227	826.2	633.7	838.3		
30	1693	1807	1605	1818	1639	937.3	623.8	988.7		
40	2156	2300	1927	2273	2019	1035	635.4	1138		
50	2404	2575	2075	2498	2188	1056	631.0	1200		
60	2269	2417	1886	2290	1987	933.9	561.0	1092		
70	1752	1825	1317	1581	1368	657.2	397.9	790.4		
80	871.7	840.8	532.1	663.1	580.5	286.5	173.9	366.8		
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		



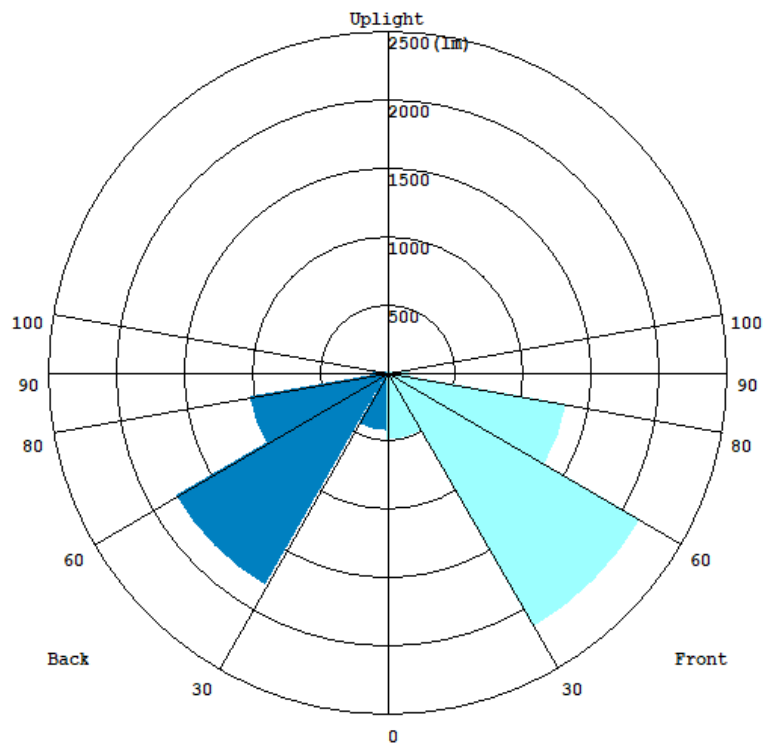
### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	78.84	0 - 10	78.84	1.05%
10-20	276.77	0 - 20	355.61	4.72%
20-30	574.84	0 - 30	930.45	12.34%
30-40	972.32	0 - 40	1902.77	25.25%
40-50	1374.96	0 - 50	3277.73	43.49%
50-60	1593.83	0 - 60	4871.56	64.63%
60-70	1451.59	0 - 70	6323.15	83.89%
70-80	928.42	0 - 80	7251.57	96.21%
80-90	285.54	0 - 90	7537.11	100.00%
90-100	0.00	0 - 100	7537.11	100.00%
100-110	0.00	0 - 110	7537.11	100.00%
110-120	0.00	0 - 120	7537.11	100.00%
120-130	0.00	0 - 130	7537.11	100.00%
130-140	0.00	0 - 140	7537.11	100.00%
140-150	0.00	0 - 150	7537.11	100.00%
150-160	0.00	0 - 160	7537.11	100.00%
160-170	0.00	0 - 170	7537.11	100.00%
170-180	0.00	0 - 180	7537.11	100.00%

### 3.2 Goniophotometer Test

#### LCS Graph



#### BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	500.34	6.6
FM - Front-Medium(30-60)	2153.7	28.5
FH - Front-High(60-80)	1347.7	17.8
FVH - Front-Very High(80-90)	170.81	2.3
Total Forward Light	4172.5	55.2

BL - Back-Low(0-30)	430.97	5.7
BM - Back-Medium(30-60)	1798.8	23.8
BH - Back-High(60-80)	1037.5	13.7
BVH - Back-Very High(80-90)	114.42	1.5
Total Back Light	3381.7	44.8

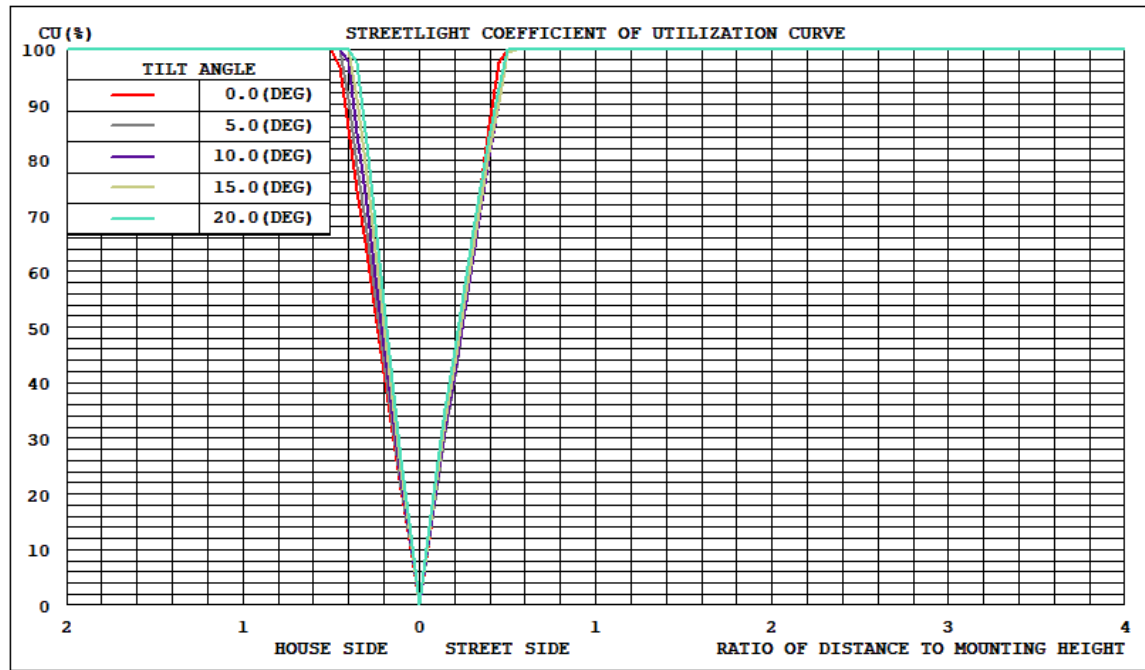
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B3-U0-G3
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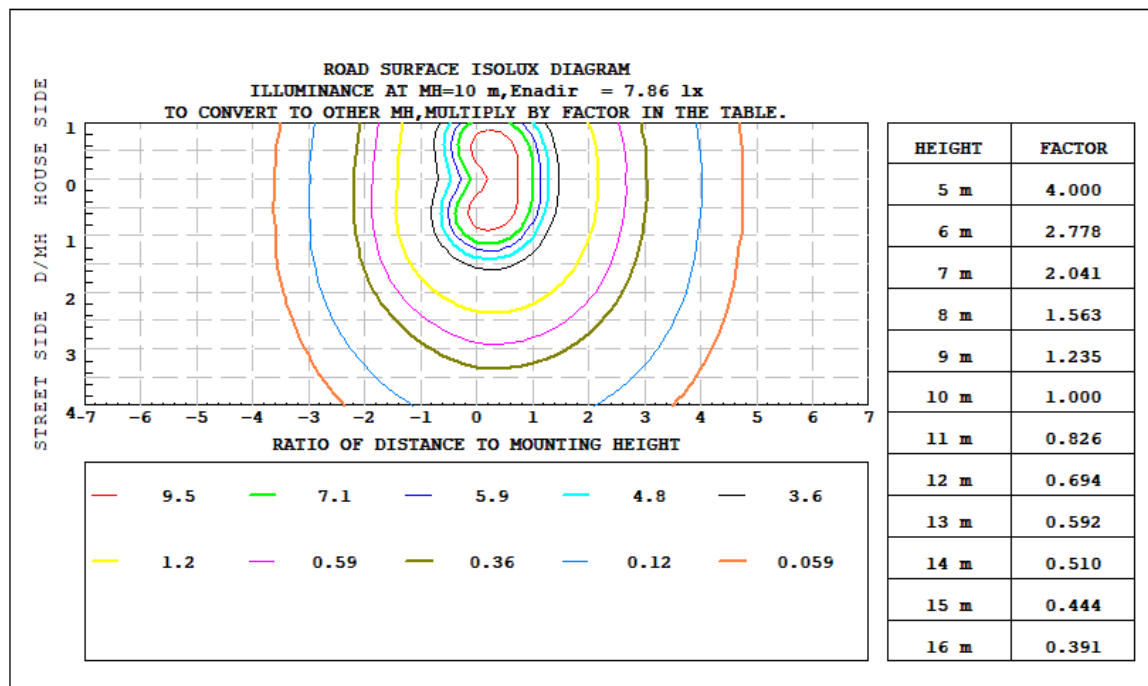
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	3381.7	0	3381.7
Street Side	4172.5	0	4172.5

### 3.2 Goniophotometer Test

#### Coefficients of Utilization

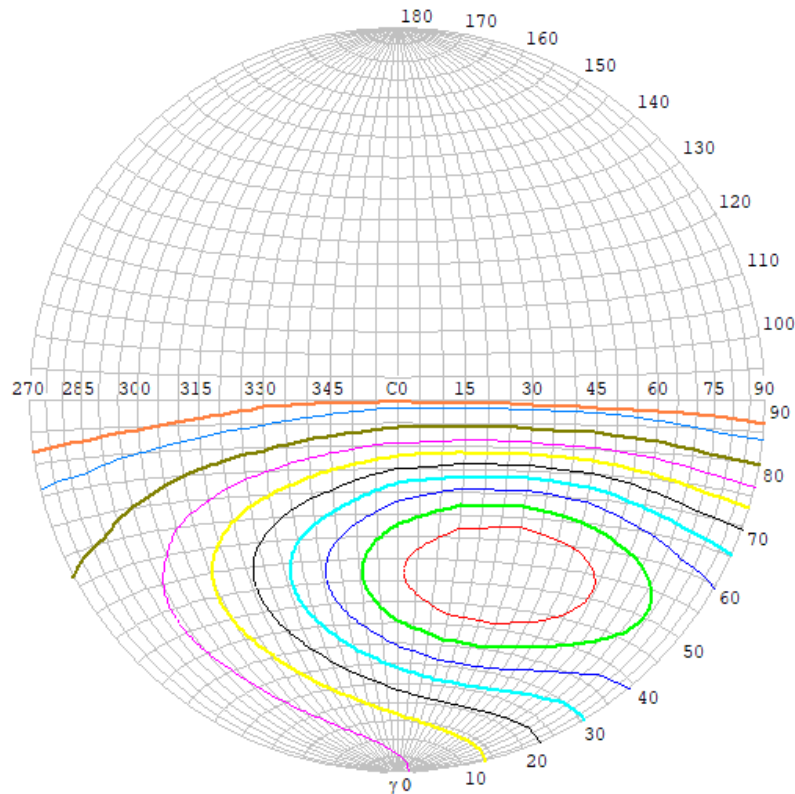


#### Iso-footcandle Lines of Horizontal Illumination



### 3.2 Goniophotometer Test

#### STREETLIGHT ISOCANDELA DIAGRAM

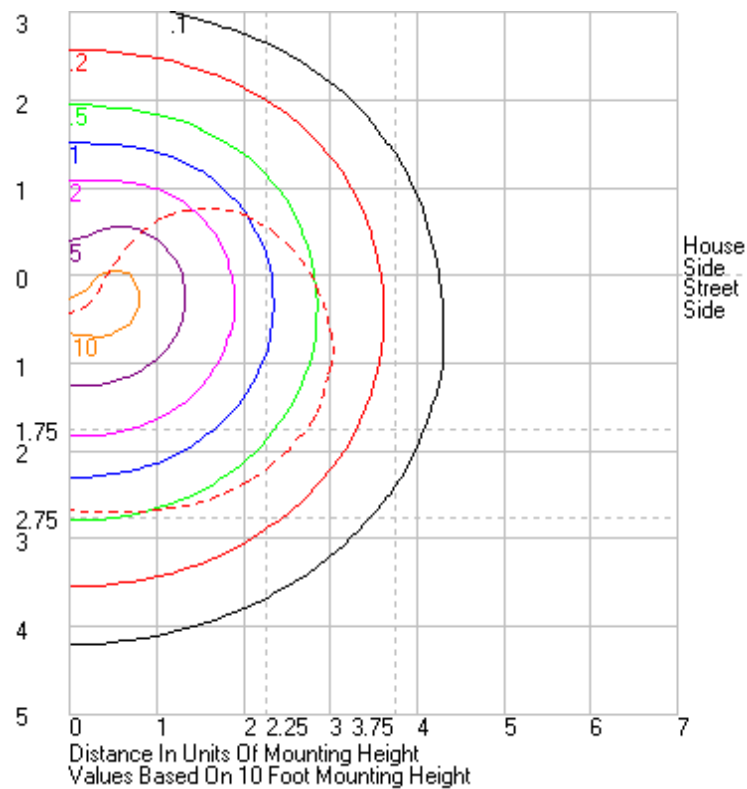


#### Classification:

IES:Type IV - Short  
CIE:Broad - Short  
IES:None cut-off  
CIE:Non-cut-off  
Max.At80:934.2cd/klm  
Max.At90:0cd/klm  
Max.80-90:934.2cd/klm

ISOCANDELA DIAGRAM	
UNIT	cd
I <sub>max</sub> =100%	2718
90%	2446
80%	2175
70%	1903
60%	1631
50%	1359
40%	1087
30%	815
20%	544
10%	272
5%	136

#### ROAD ISOCANDELA REPORT



## 5.0 THD and PF Test

Model No.	IVAT2-75L730U	Sample ID.	F1
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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	0.255	66.1	0.934	13.68%
25.1	119.94	60	0.571	67.7	0.988	12.82%

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