

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1811113**

## Data Number

**DLF1811113-14a**

## Test Date

**2018/11/22**

## Issue Date

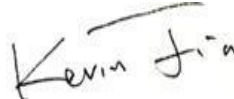
**2018/11/23**

## Prepared By



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## Approved By



Kevin Jia

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## 1.0 Test Summary

DLC Technical Requirements v4.4

Outdoor - High output Outdoor Pole/Arm-Mounted Area and Roadway Luminaires			
Requirement Category	Test Method	Requirements	Test value
Lamp Output (lm)	IES LM-79-2008	10000	11507
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	100	116.0
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	3.41%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	5112
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	75.2
Power Factor	ANSI C82.77:2014	0.873	0.961
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	12.66%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/22	IVAT3-100L750[H, 4]	N1
2	Goniophotometer Test	2018/11/22	IVAT3-100L750[H, 4]	N1
3	THD and PF Test	2018/11/22	IVAT3-100L750[H, 4]	N1

### Remark(If any)

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### 3.0 Production Description

**Luminaire Description:** IVAT3-100L750[H, 4]

**Electrical Specification:** 480V,50/60HZ, 100W

#### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	IVAT3-100L750[H, 4]	Sample ID.	N1
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	480.02	60	0.215	99.1	0.961

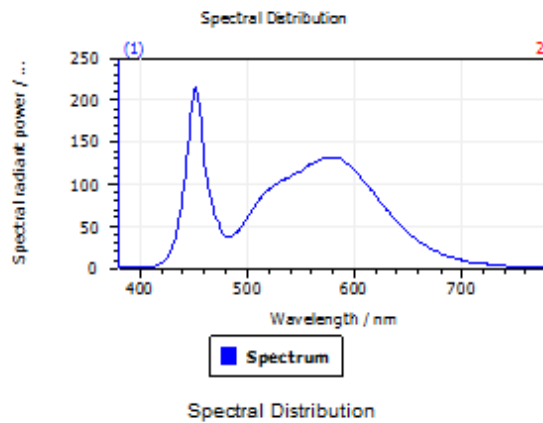
#### Test Result

CCT (K)	CRI (Ra)	Duv
5112	75.2	2.5E-03

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

DominantWavelength	588.53 nm
Purity	0.091
PeakWavelength	451.52 nm
Width50%	20.18 nm

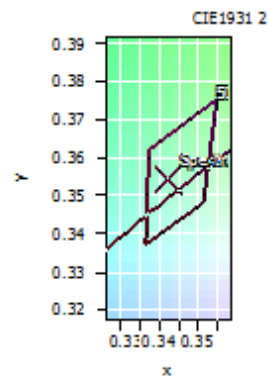
#### Color Coordinates

Correlated Color Temperature 5112 K

x: 0.3424 u: 0.2086 u': 0.2086  
y: 0.3544 v: 0.3238 v': 0.4856

CRI01	71.7	CRI09	-32.1
CRI02	82.4	CRI10	58.4
CRI03	89.7	CRI11	70.9
CRI04	73.5	CRI12	49.9
CRI05	72.9	CRI13	74.2
CRI06	75.2	CRI14	94.5
CRI07	81.8	CRI15	64.3
CRI08	54.3	CRI16	63.6

ResultsCRI 75.2



PlanckDistance 2.5E-003

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVAT3-100L750[H, 4]	Sample ID.	N1
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

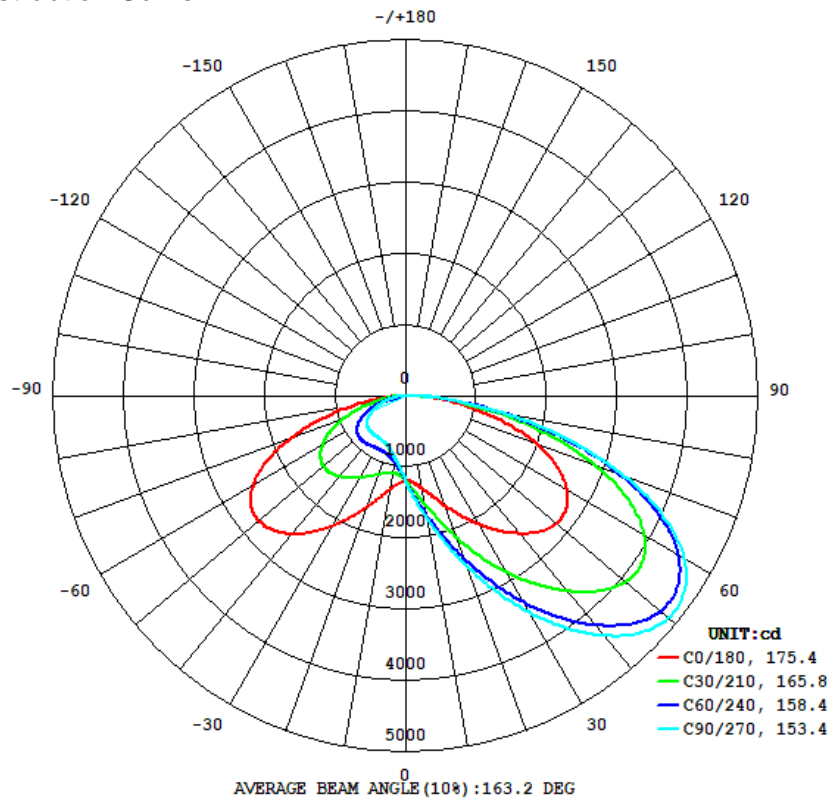
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.93	60	0.215	99.2	0.960	Light Down

#### Test Result

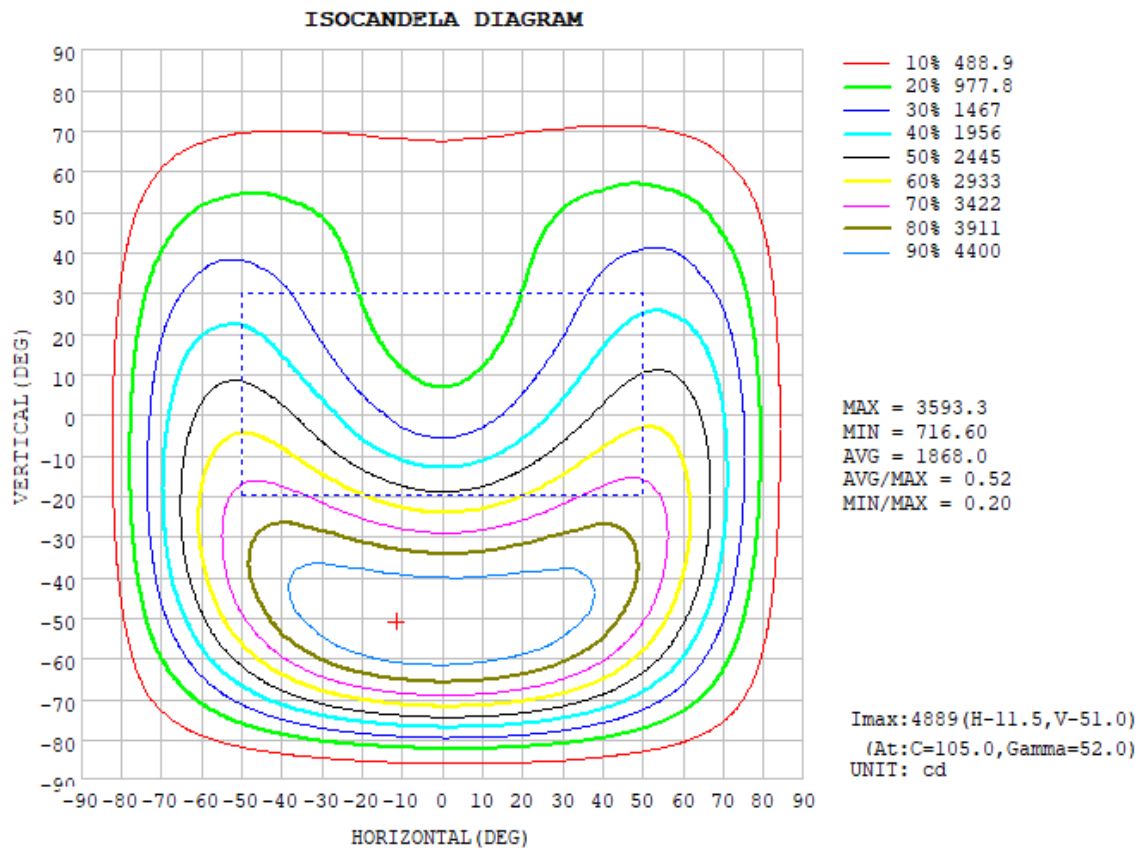
Flux (lm)	Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Zonal Lumen Requirement ( $80^{\circ}$ - $90^{\circ}$ )	Field Angle( $10^{\circ}$ )		Beam Angle( $50^{\circ}$ )		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
11507	100.00%	3.41%	175.4	153.4	163.9	55.8	116.0

### 4.3 Goniophotometer Test

#### Light Distrubtion Curve



#### Isolux Plot



### 4.3 Goniophotometer Test

#### Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd							
	C0	C45	C90	C135	C180	C225	C270	C315
γ								
10	1314	1610	1731	1609	1334	1021	898.2	1027
20	1642	2290	2536	2296	1667	996.4	762.4	1012
30	2085	3129	3506	3156	2111	1047	718.2	1070
40	2530	3946	4396	3995	2535	1124	717.4	1154
50	2790	4464	4860	4532	2731	1141	703.3	1185
60	2649	4275	4562	4238	2502	1011	614.8	1067
70	1976	3106	3296	2992	1746	703.0	426.3	757.2
80	900.0	1324	1412	1212	701.2	282.4	175.2	318.4
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



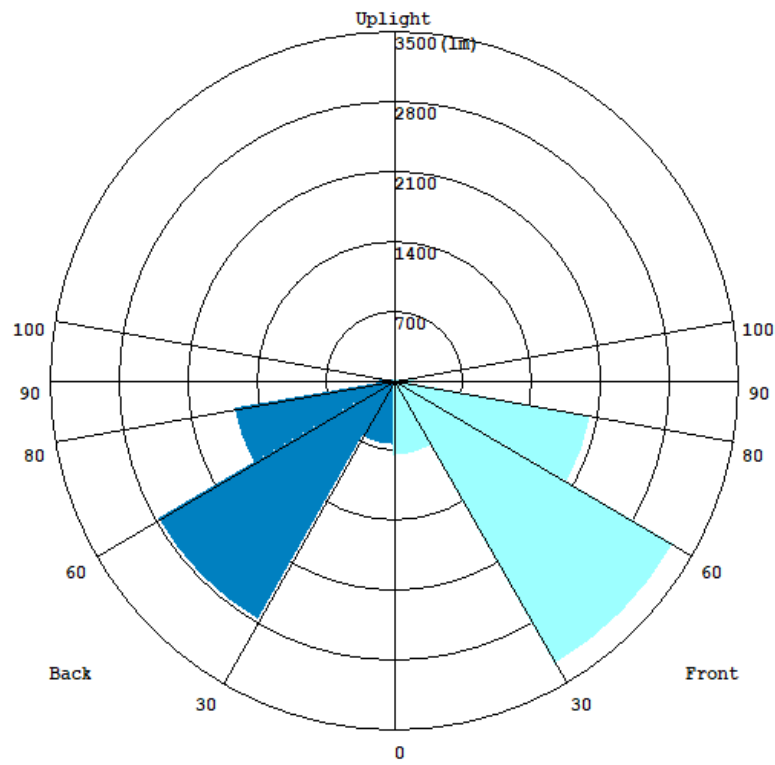
### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	120.03	0 - 10	120.03	1.04%
10-20	421.55	0 - 20	541.58	4.71%
20-30	872.07	0 - 30	1413.65	12.29%
30-40	1469.95	0 - 40	2883.60	25.06%
40-50	2091.05	0 - 50	4974.65	43.23%
50-60	2462.60	0 - 60	7437.25	64.63%
60-70	2260.28	0 - 70	9697.53	84.28%
70-80	1416.30	0 - 80	11113.83	96.59%
80-90	392.86	0 - 90	11506.69	100.00%
90-100	0.00	0 - 100	11506.69	100.00%
100-110	0.00	0 - 110	11506.69	100.00%
110-120	0.00	0 - 120	11506.69	100.00%
120-130	0.00	0 - 130	11506.69	100.00%
130-140	0.00	0 - 140	11506.69	100.00%
140-150	0.00	0 - 150	11506.69	100.00%
150-160	0.00	0 - 160	11506.69	100.00%
160-170	0.00	0 - 170	11506.69	100.00%
170-180	0.00	0 - 180	11506.69	100.00%

### 3.2 Goniophotometer Test

#### LCS Graph



#### BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	766.99	6.7
FM - Front-Medium(30-60)	3277.3	28.4
FH - Front-High(60-80)	2036.7	17.7
FVH - Front-Very High(80-90)	223.58	1.9
Total Forward Light	6304.6	54.7

BL - Back-Low(0-30)	648.16	5.6
BM - Back-Medium(30-60)	2765.1	24.0
BH - Back-High(60-80)	1652	14.3
BVH - Back-Very High(80-90)	161.37	1.4
Total Back Light	5226.6	45.3

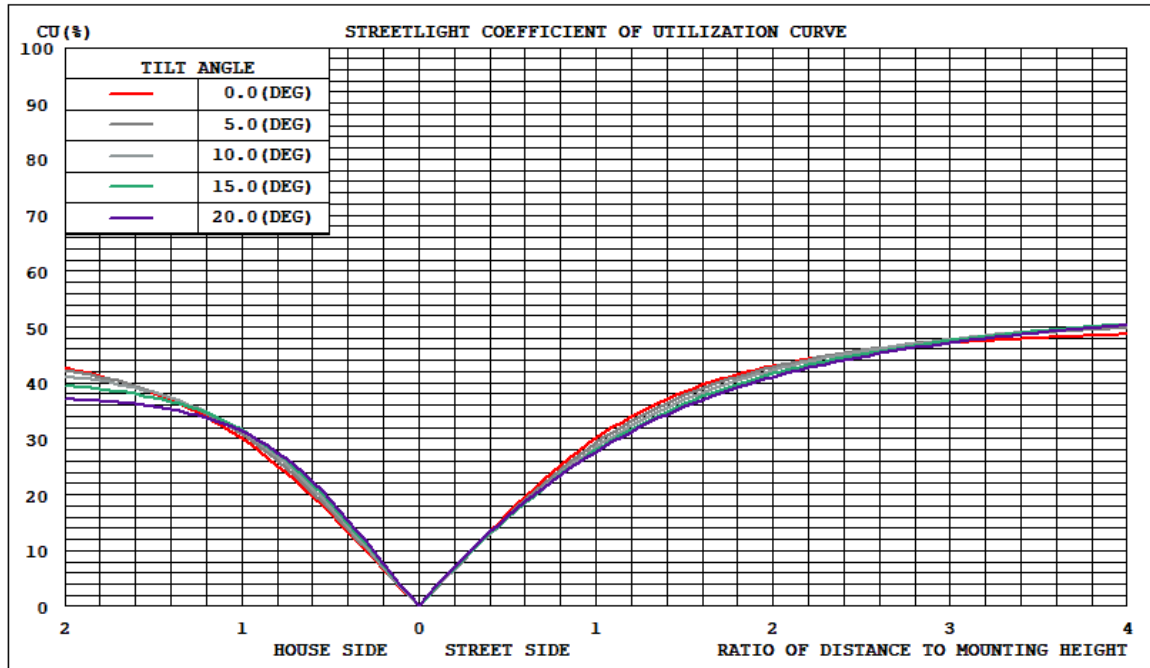
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B3-U0-G3
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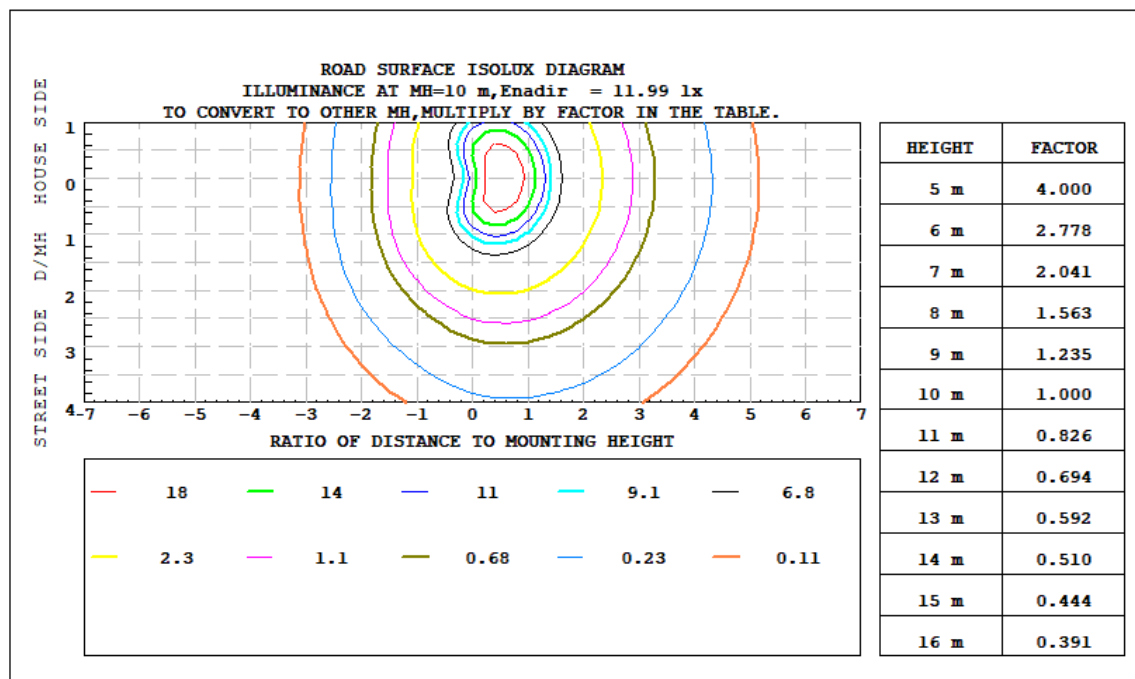
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	5226.6	0	5226.6
Street Side	6304.6	0	6304.6

### 3.2 Goniophotometer Test

#### Coefficients of Utilization

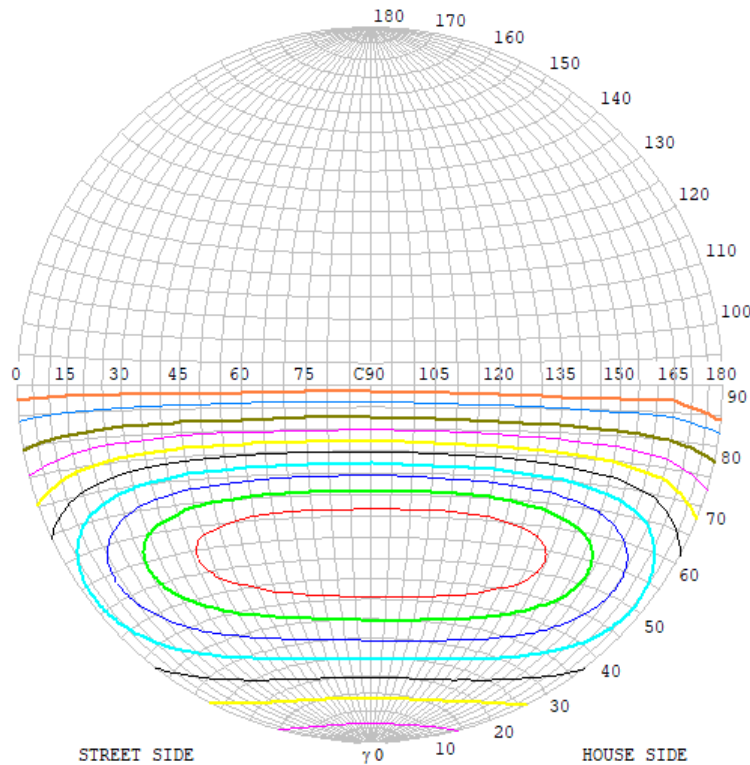


#### Iso-footcandle Lines of Horizontal Illumination



### 3.2 Goniophotometer Test

#### STREETLIGHT ISOCANDELA DIAGRAM

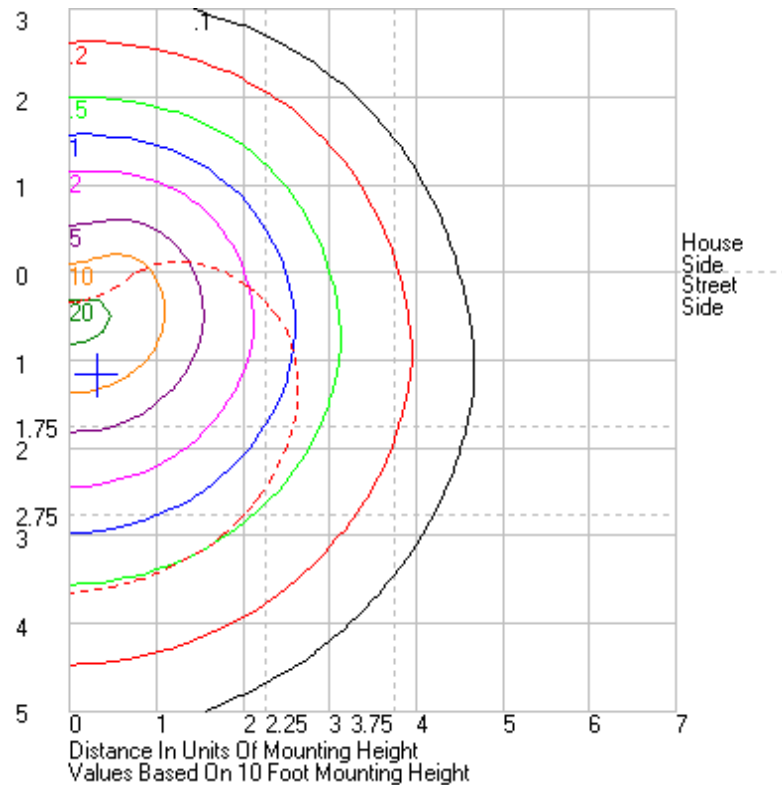


#### Classification:

IES:Type III - Very Short  
CIE:Narrow - Short  
IES:Semi cut-off  
CIE:Non-cut-off  
Max.At80:122.9cd/klm  
Max.At90:0cd/klm  
Max.80-90:122.9cd/klm

ISOCANDELA DIAGRAM	
UNIT	cd
Imax=100%	4897
90%	4408
80%	3918
70%	3428
60%	2938
50%	2449
40%	1959
30%	1469
20%	979
10%	490
5%	245

#### ROAD ISOCANDELA REPORT



## 5.0 THD and PF Test

Model No.	IVAT3-100L750[H, 4]	Sample ID.	N1
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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	480.02	60	0.215	99.1	0.961	12.66%

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