

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1811113**

## Data Number

**DLF1811113-15a**

## Test Date

**2018/11/22**

## Issue Date

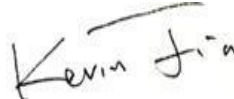
**2018/11/23**

## 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	10521
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	100	107.4
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	3.54%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3966
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	72.5
Power Factor	ANSI C82.77:2014	0.873	0.965
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	10.60%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/22	IVAT3-100L740[H, 4]	O1
2	Goniophotometer Test	2018/11/22	IVAT3-100L740[H, 4]	O1
3	THD and PF Test	2018/11/22	IVAT3-100L740[H, 4]	O1

### Remark(If any)

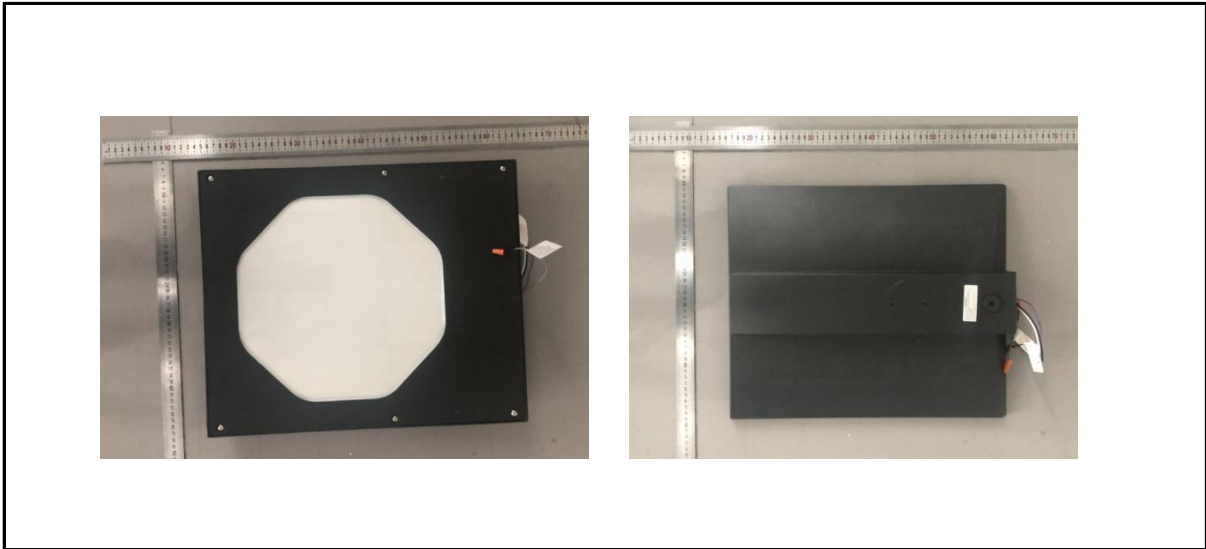
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### 3.0 Production Description

**Luminaire Description:** IVAT3-100L740[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.	IVAT3-100L740[H, 4]	Sample ID.	O1
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	480.05	60	0.212	98.1	0.965

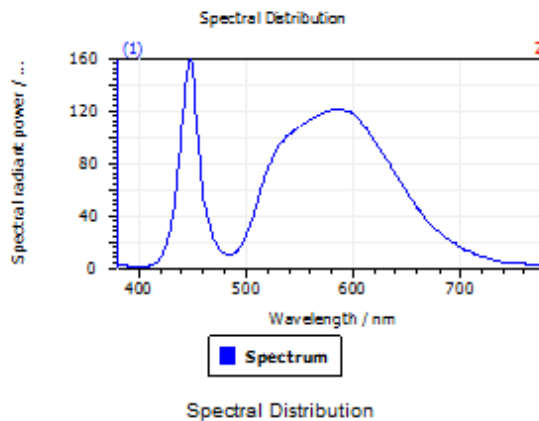
#### Test Result

CCT (K)	CRI (Ra)	Duv
3966	72.5	1.6E-03

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



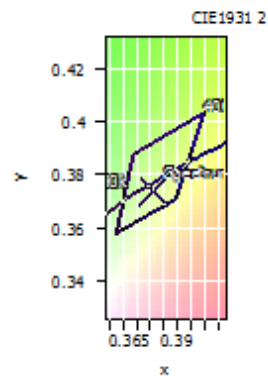
#### Spectral values

DominantWavelength	580.11 nm
Purity	0.264
PeakWavelength	447.59 nm
Width50%	19.65 nm

#### Color Coordinates

Correlated Color Temperature		3966 K	
x: 0.3808	u: 0.2266	u': 0.2266	
y: 0.3736	v: 0.3335	v': 0.5003	
CRI01	71.7	CRI09	-13.1
CRI02	77.4	CRI10	44.5
CRI03	79.9	CRI11	68.8
CRI04	73.3	CRI12	37.4
CRI05	70.2	CRI13	71.8
CRI06	66.8	CRI14	88.1
CRI07	81.3	CRI15	67.2
CRI08	59.3	CRI16	69.9

ResultsCRI 72.5



PlanckDistance 1.6E-003

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVAT3-100L740[H, 4]	Sample ID.	O1
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

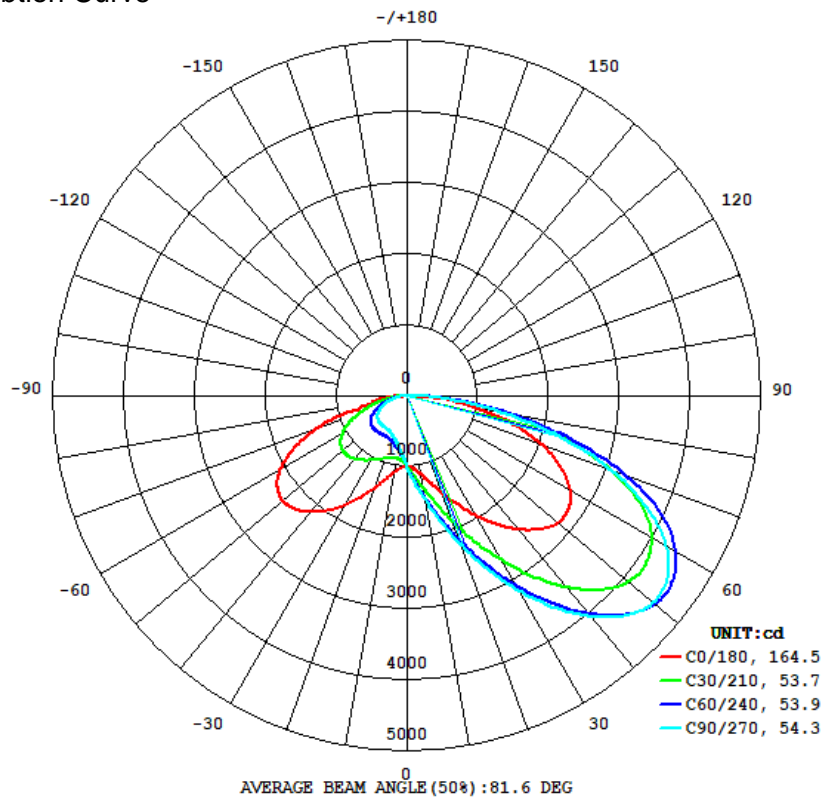
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.02	60	0.211	98.0	0.965	Light Down

#### Test Result

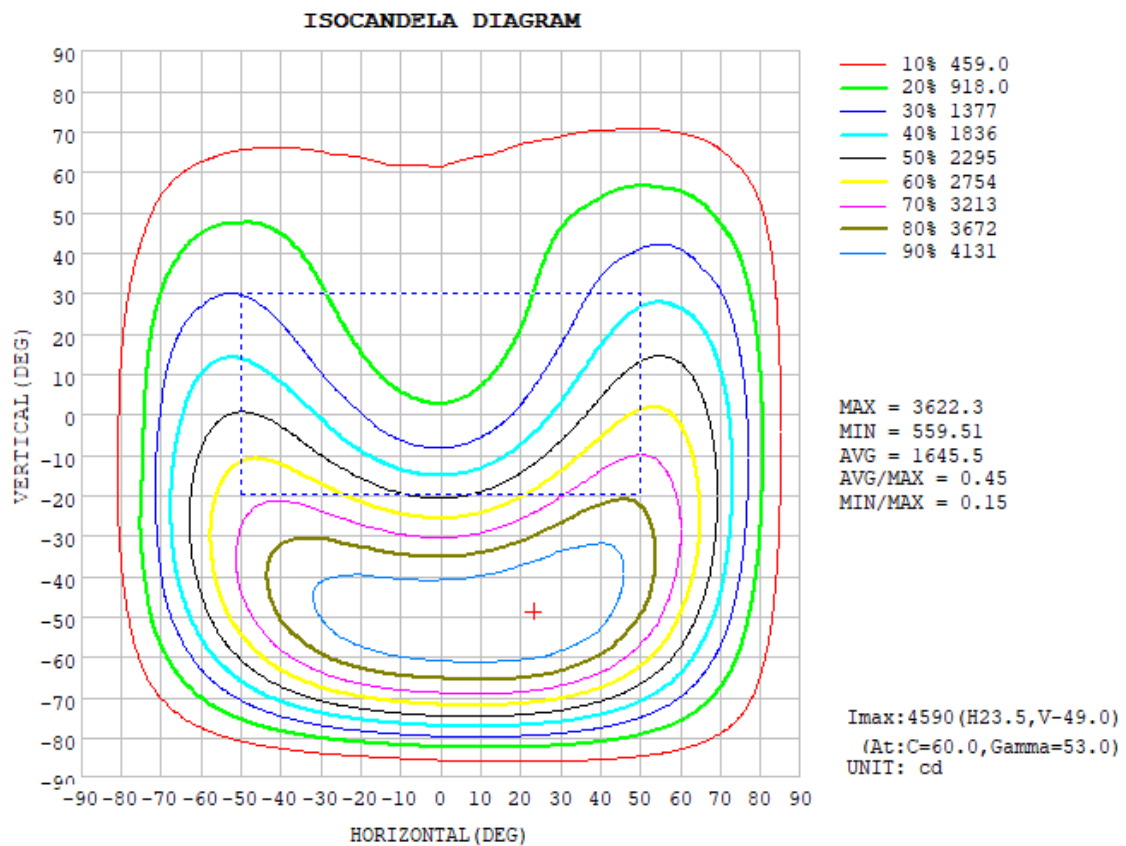
Flux (lm)	Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Zonal Lumen Requirement ( $80^{\circ}$ - $90^{\circ}$ )	Field Angle( $10^{\circ}$ )		Beam Angle( $50^{\circ}$ )		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
10521	100.00%	3.54%	177.1	147.3	164.5	54.3	107.4

### 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	1119	1377	1471	1350	1097	828.2	734.0	856.2		
20	1451	2037	2221	1981	1385	787.9	607.2	847.4		
30	1941	2925	3163	2809	1779	814.3	560.9	918.4		
40	2462	3848	4060	3619	2147	861.4	553.3	1012		
50	2784	4433	4532	4057	2302	867.0	539.4	1047		
60	2670	4326	4230	3808	2072	762.9	471.5	946.0		
70	2041	3272	3077	2723	1388	525.6	327.0	673.3		
80	989.4	1492	1348	1094	492.8	204.0	131.4	285.7		
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		



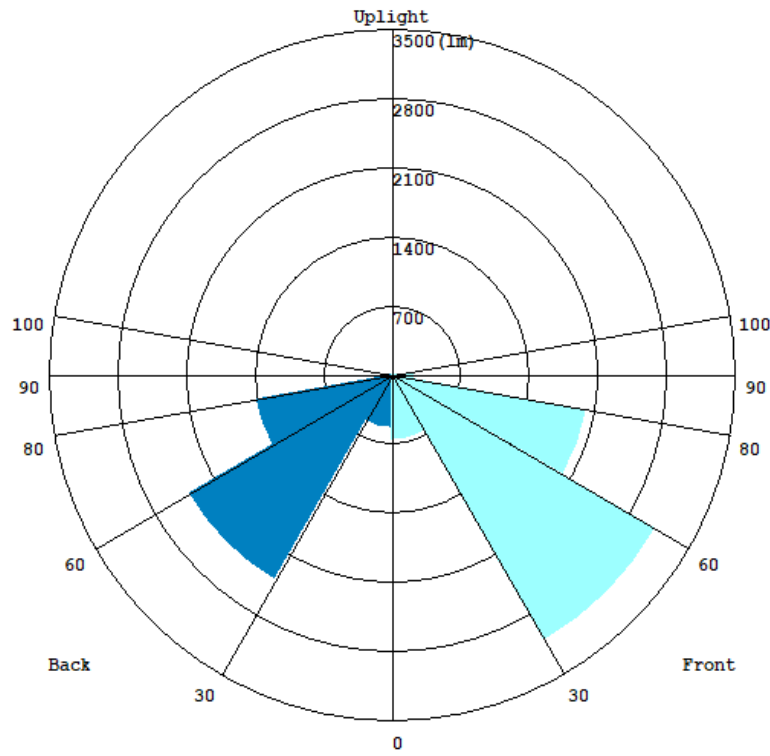
### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	100.38	0 - 10	100.38	0.95%
10-20	357.39	0 - 20	457.77	4.35%
20-30	761.32	0 - 30	1219.09	11.59%
30-40	1322.07	0 - 40	2541.16	24.15%
40-50	1912.31	0 - 50	4453.47	42.33%
50-60	2260.59	0 - 60	6714.06	63.82%
60-70	2099.41	0 - 70	8813.47	83.77%
70-80	1334.92	0 - 80	10148.39	96.46%
80-90	372.57	0 - 90	10520.96	100.00%
90-100	0.00	0 - 100	10520.96	100.00%
100-110	0.00	0 - 110	10520.96	100.00%
110-120	0.00	0 - 120	10520.96	100.00%
120-130	0.00	0 - 130	10520.96	100.00%
130-140	0.00	0 - 140	10520.96	100.00%
140-150	0.00	0 - 150	10520.96	100.00%
150-160	0.00	0 - 160	10520.96	100.00%
160-170	0.00	0 - 170	10520.96	100.00%
170-180	0.00	0 - 180	10520.96	100.00%

### 3.2 Goniophotometer Test

#### LCS Graph



#### BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	672.85	6.4
FM - Front-Medium(30-60)	3114.8	29.5
FH - Front-High(60-80)	2024.1	19.2
FVH - Front-Very High(80-90)	238.15	2.3
Total Forward Light	6049.9	57.4

BL - Back-Low(0-30)	547.35	5.2
BM - Back-Medium(30-60)	2397.1	22.7
BH - Back-High(60-80)	1421.1	13.5
BVH - Back-Very High(80-90)	127.97	1.2
Total Back Light	4493.5	42.6

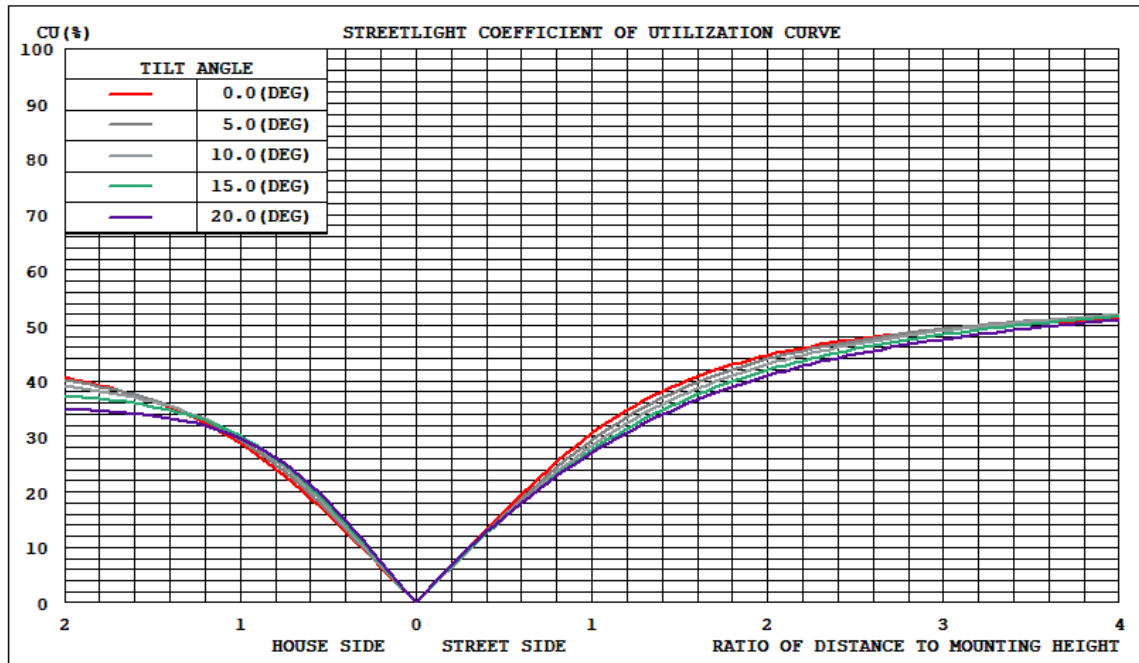
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B3-U0-G3
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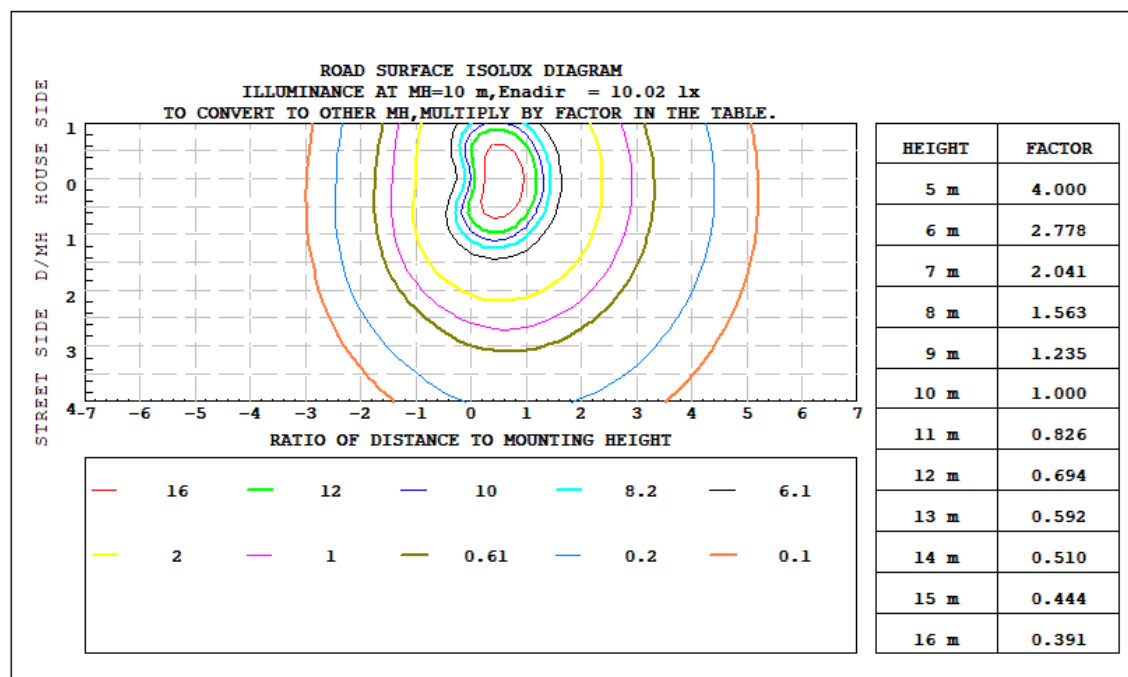
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	4493.5	0	4493.5
Street Side	6049.9	0	6049.9

### 3.2 Goniophotometer Test

#### Coefficients of Utilization

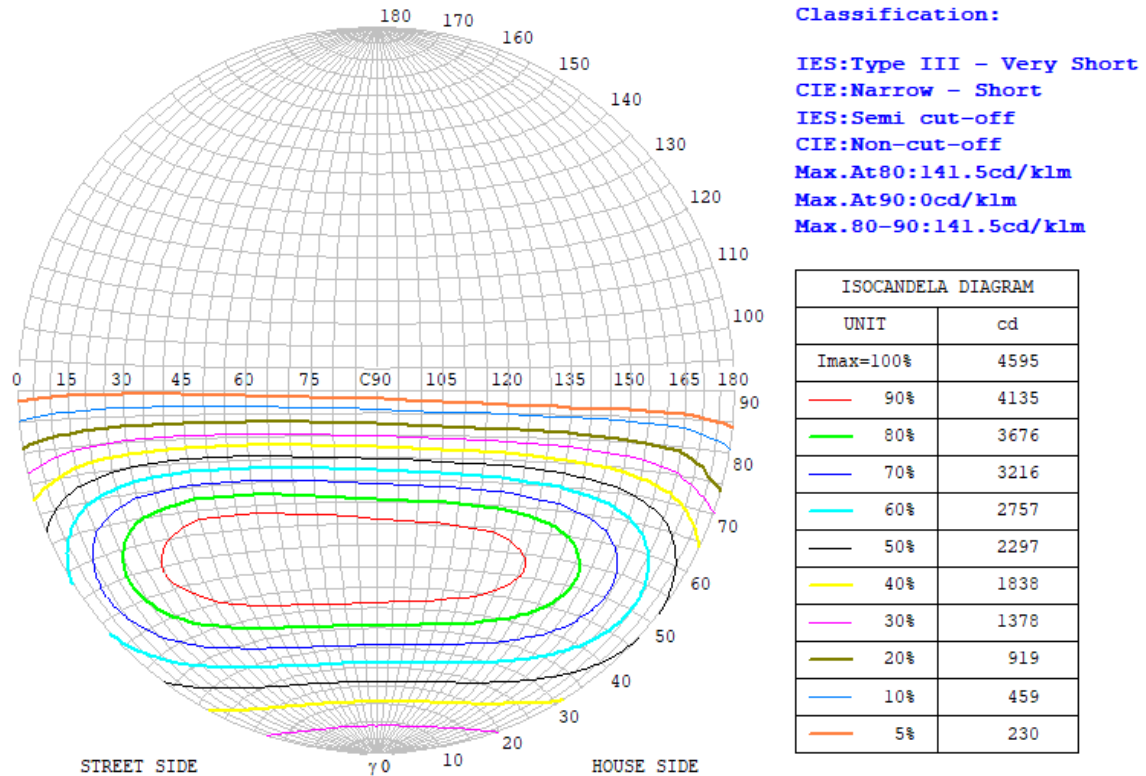


#### Iso-footcandle Lines of Horizontal Illumination

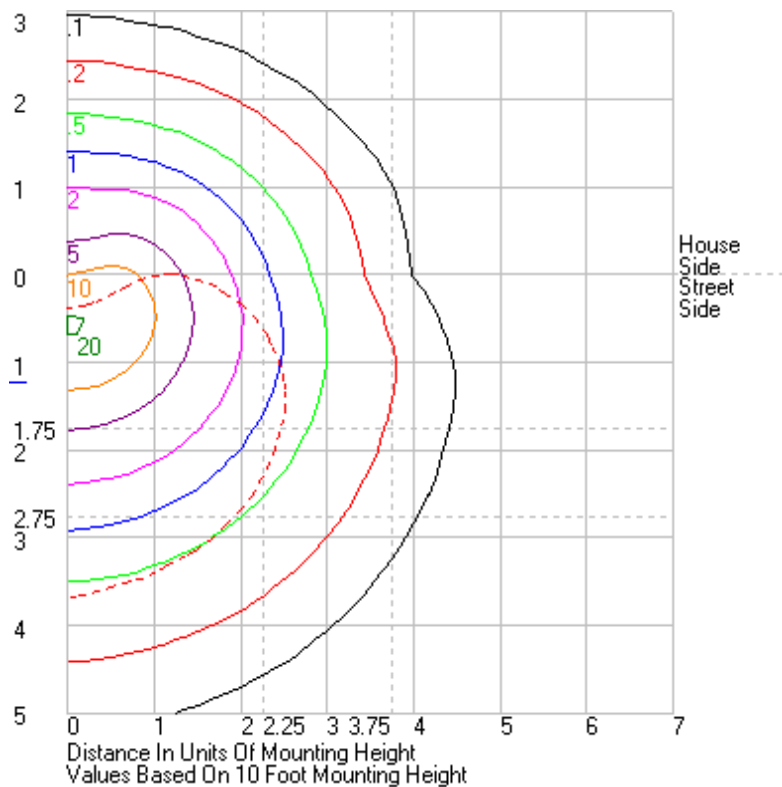


### 3.2 Goniophotometer Test

#### STREETLIGHT ISOCANDELA DIAGRAM



#### ROAD ISOCANDELA REPORT



## 5.0 THD and PF Test

Model No.	IVAT3-100L740[H, 4]	Sample ID.	O1
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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	480.05	60	0.212	98.1	0.965	10.60%

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