

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1811113**

## Data Number

**DLF1811113-12a**

## Test Date

**2018/11/22**

## Issue Date

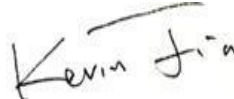
**2018/11/23**

## Prepared By



Wangzun Zhu

## 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	10667
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	100	107.0
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	3.52%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	4061
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	73.1
Power Factor	ANSI C82.77:2014	0.873	0.962
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	12.72%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/22	IVAT2-100L730[H, 4]	L1
2	Goniophotometer Test	2018/11/22	IVAT2-100L730[H, 4]	L1
3	THD and PF Test	2018/11/22	IVAT2-100L730[H, 4]	L1

### Remark(If any)

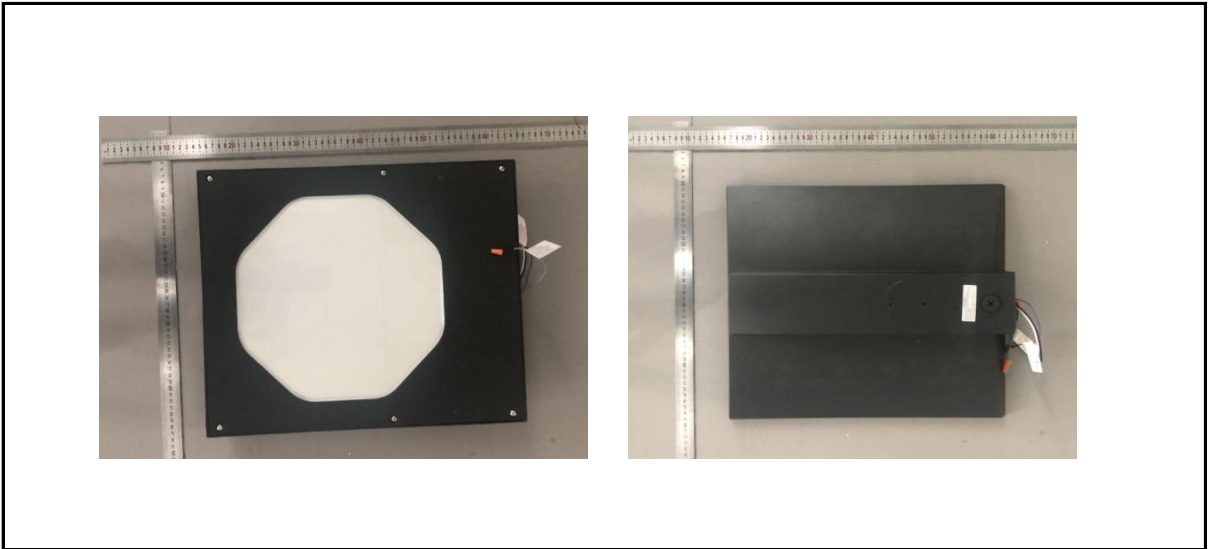
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### 3.0 Production Description

**Luminaire Description:** IVAT2-100L730[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.	IVAT2-100L730[H, 4]	Sample ID.	L1
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	480.00	60	0.216	99.9	0.962

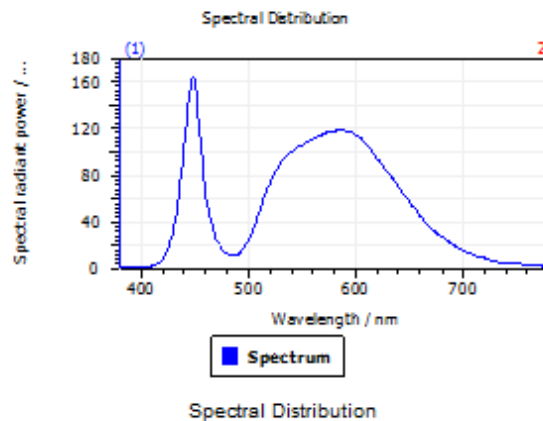
#### Test Result

CCT (K)	CRI (Ra)	Duv
4061	73.1	3.3E-03

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results

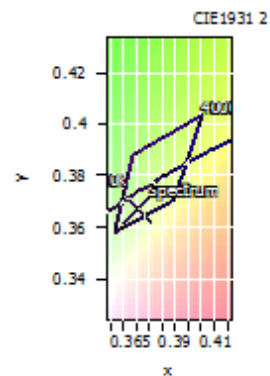


#### Spectral values

DominantWavelength	580.97 nm
Purity	0.228
PeakWavelength	448.00 nm
Width50%:	20.10 nm

#### Color Coordinates

Correlated Color Temperature		4061 K	
x: 0.3757	u: 0.2259	u': 0.2259	
y: 0.3669	v: 0.3310	v': 0.4964	
CRI01	72.5	CRI09	-10.1
CRI02	78.0	CRI10	45.5
CRI03	79.9	CRI11	69.3
CRI04	74.0	CRI12	38.4
CRI05	71.2	CRI13	72.6
CRI06	67.5	CRI14	88.0
CRI07	81.4	CRI15	68.6
CRI08	60.4	CRI16	71.2
ResultsCRI	73.1		



PlanckDistance 3.3E-003

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVAT2-100L730[H, 4]	Sample ID.	L1
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

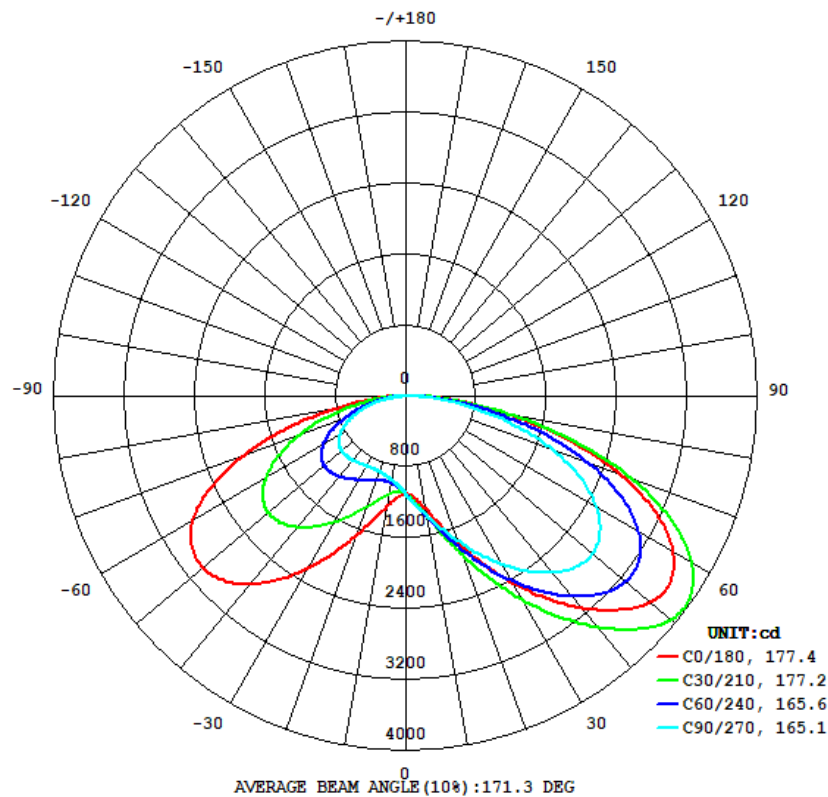
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.94	60	0.216	99.7	0.962	Light Down

#### Test Result

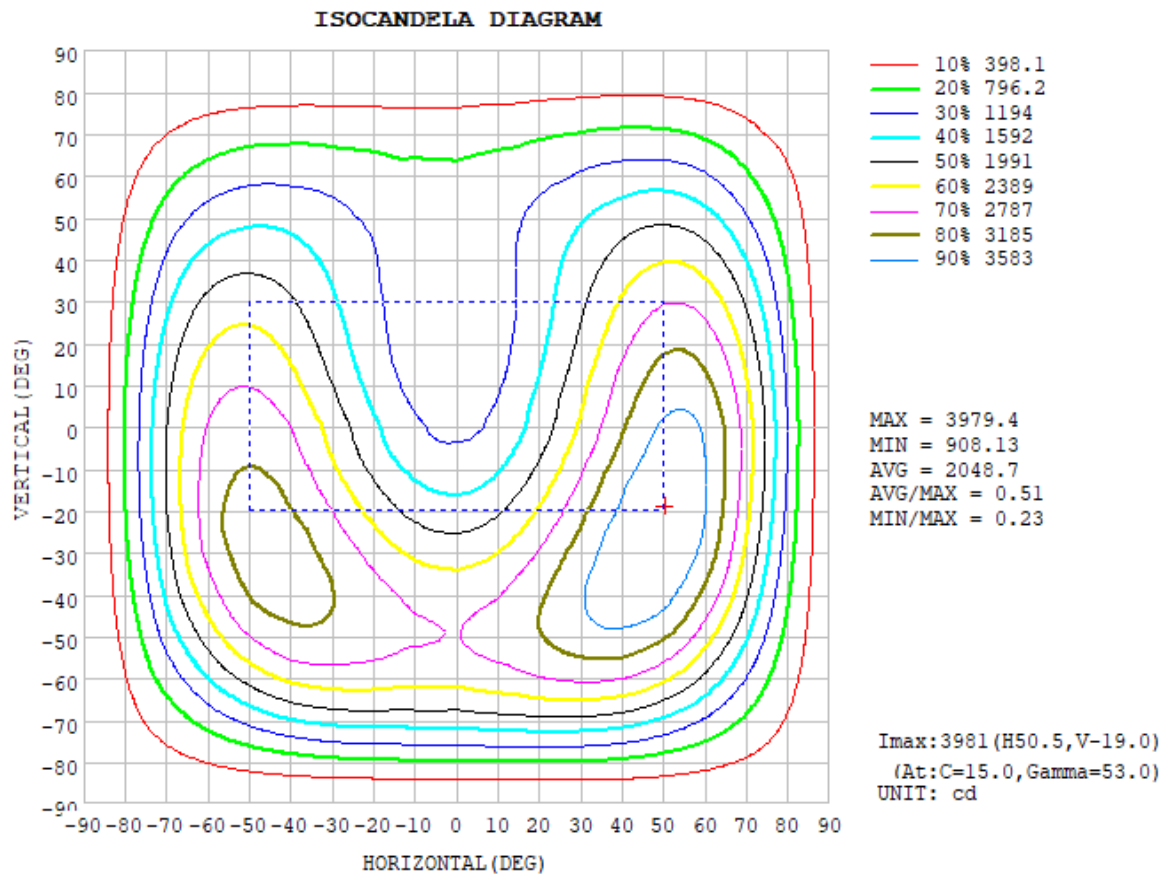
Flux (lm)	Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Zonal Lumen Requirement ( $80^{\circ}$ - $90^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
10667	100.00%	3.52%	177.5	165.1	167	63.4	107.0

### 4.3 Goniophotometer Test

#### Light Distrubtion Curve



#### Isolux Plot



### 4.3 Goniophotometer Test

#### Zonal Lumen Summary

DEG	C0	C45	C90	C135	C180	C225	C270	C315
7	1287	1382	1363	1339	1262	1056	965.8	1104
10	1768	1893	1740	1790	1678	1157	911.9	1261
20	2432	2564	2196	2385	2244	1340	916.7	1504
30	3124	3236	2604	2974	2776	1519	952.4	1746
40	3622	3667	2772	3271	3014	1576	961.7	1858
50	3512	3484	2509	3085	2793	1403	863.1	1703
60	2599	2523	1782	2230	1968	987.1	612.2	1235
70	1171	1088	779.4	942.0	788.9	417.6	256.2	545.2
80	0	0	0	0	0	0	0	0
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

LUMINOUS INTENSITY:cd



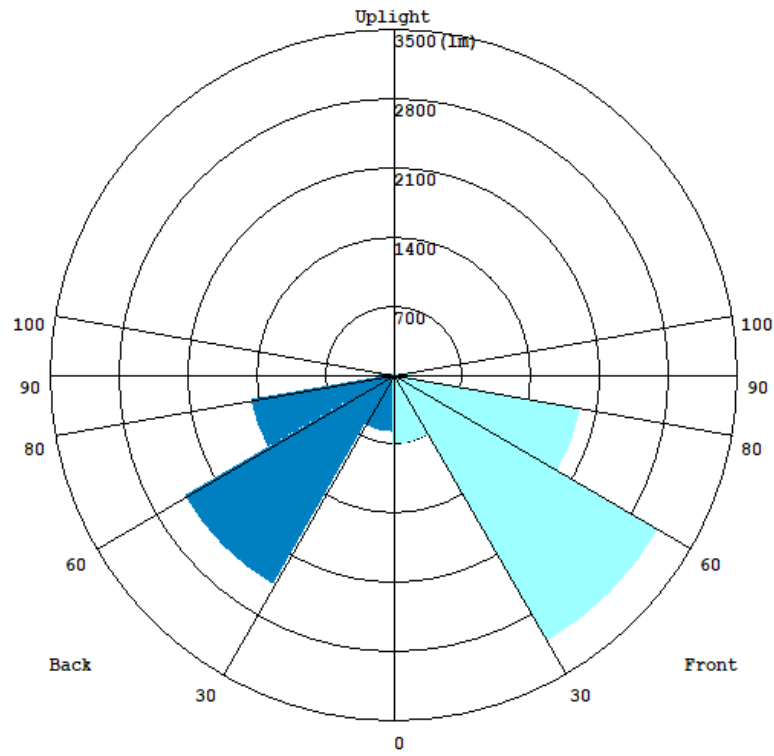
### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	111.21	0 - 10	111.21	1.04%
10-20	389.50	0 - 20	500.71	4.69%
20-30	806.22	0 - 30	1306.93	12.25%
30-40	1362.47	0 - 40	2669.40	25.02%
40-50	1937.49	0 - 50	4606.89	43.19%
50-60	2274.88	0 - 60	6881.77	64.51%
60-70	2090.37	0 - 70	8972.14	84.11%
70-80	1320.03	0 - 80	10292.17	96.48%
80-90	375.06	0 - 90	10667.23	100.00%
90-100	0.00	0 - 100	10667.23	100.00%
100-110	0.00	0 - 110	10667.23	100.00%
110-120	0.00	0 - 120	10667.23	100.00%
120-130	0.00	0 - 130	10667.23	100.00%
130-140	0.00	0 - 140	10667.23	100.00%
140-150	0.00	0 - 150	10667.23	100.00%
150-160	0.00	0 - 160	10667.23	100.00%
160-170	0.00	0 - 170	10667.23	100.00%
170-180	0.00	0 - 180	10667.23	100.00%

### 3.2 Goniophotometer Test

#### LCS Graph



#### BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	720.62	6.7
FM - Front-Medium(30-60)	3131.5	29.3
FH - Front-High(60-80)	1946.5	18.2
FVH - Front-Very High(80-90)	214.43	2.0
Total Forward Light	6013	56.2

BL - Back-Low(0-30)	587.72	5.5
BM - Back-Medium(30-60)	2461.3	23.0
BH - Back-High(60-80)	1474.9	13.8
BVH - Back-Very High(80-90)	152.9	1.4
Total Back Light	4676.8	43.8

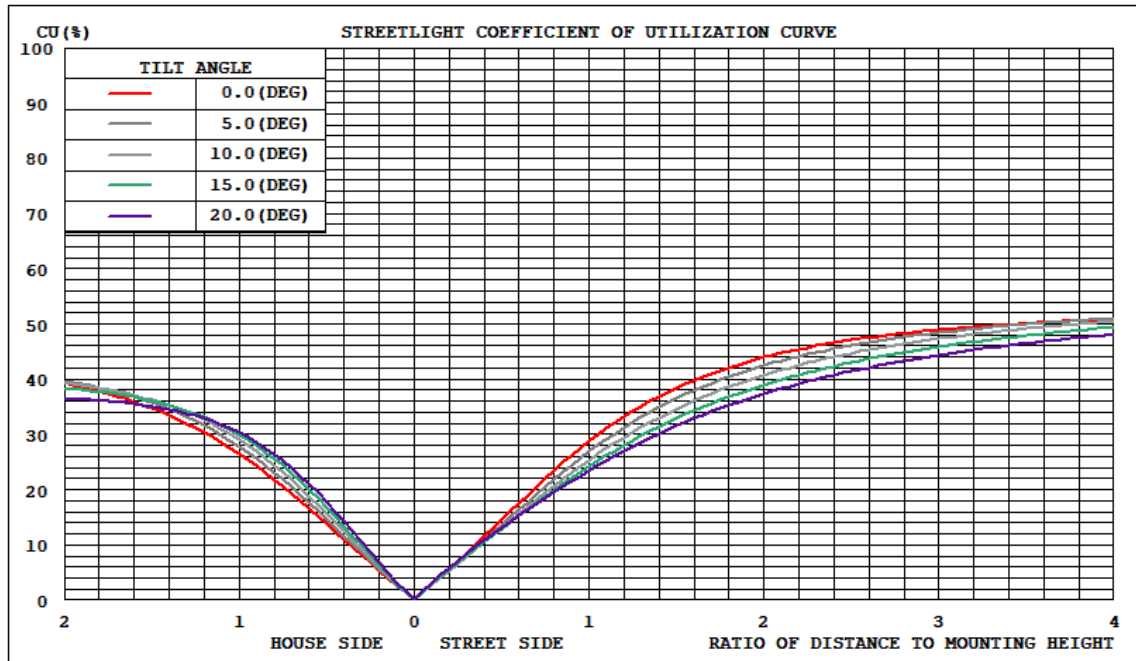
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B3-U0-G3
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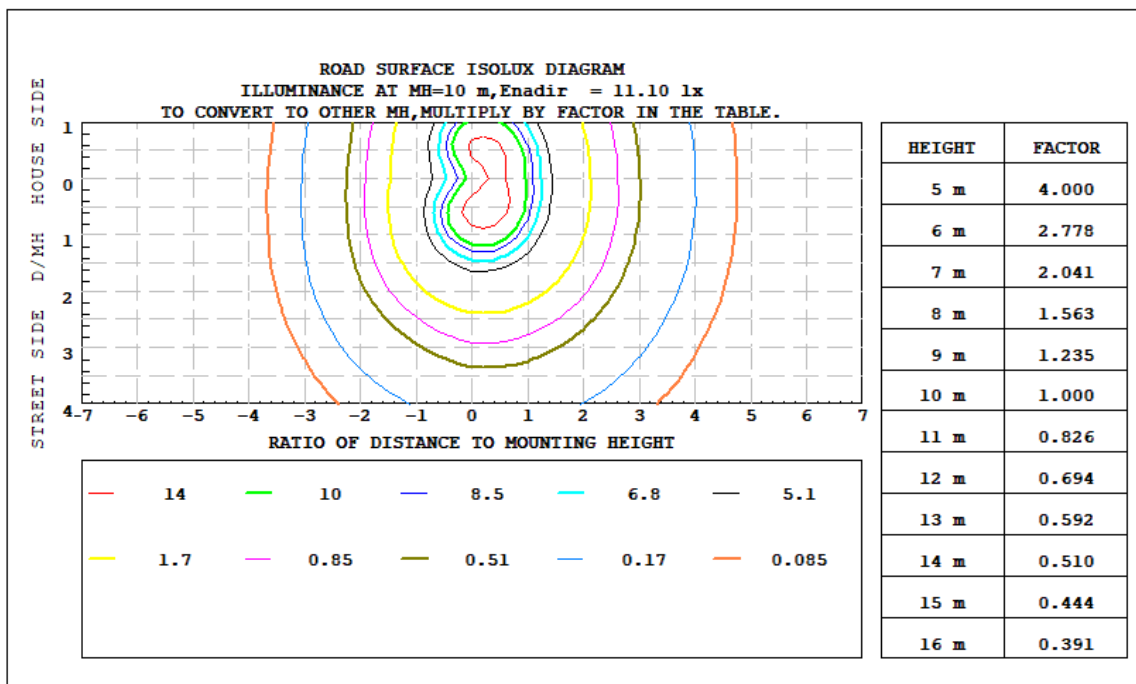
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	4676.8	0	4676.8
Street Side	6013	0	6013

### 3.2 Goniophotometer Test

#### Coefficients of Utilization

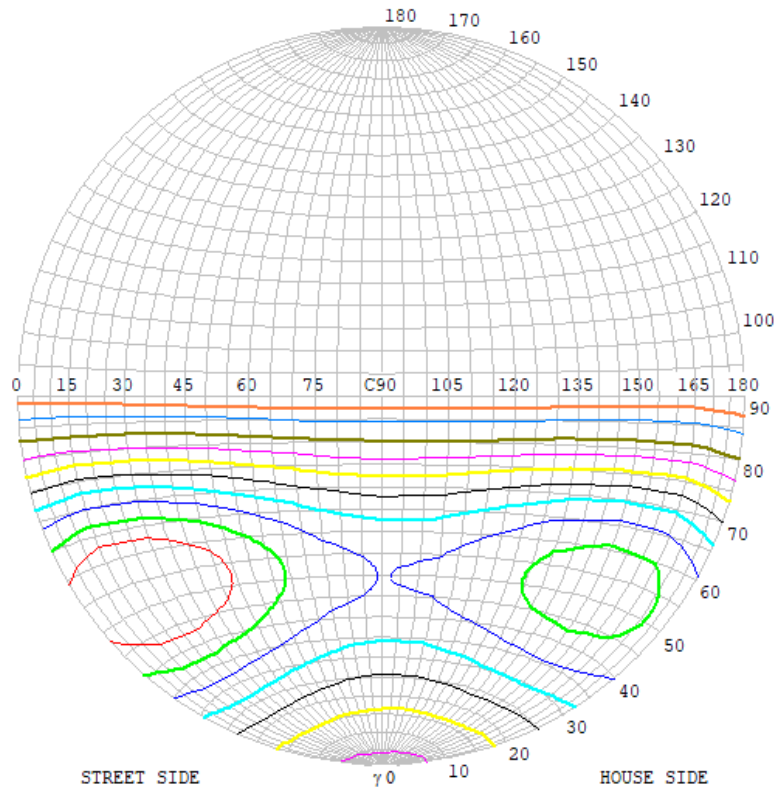


#### Iso-footcandle Lines of Horizontal Illumination



### 3.2 Goniophotometer Test

#### STREETLIGHT ISOCANDELA DIAGRAM

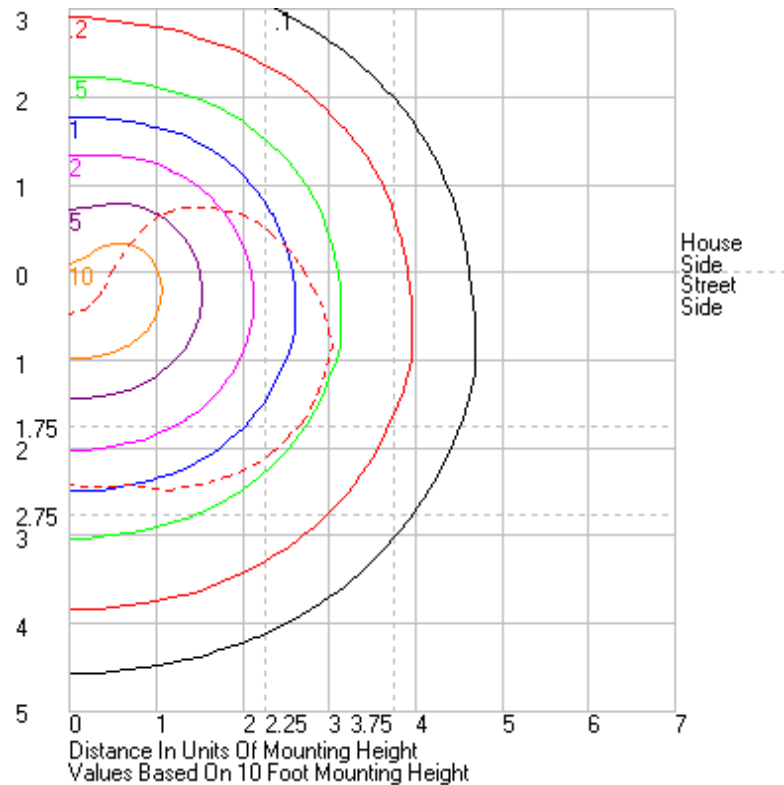


#### Classification:

IES:Type IV - Short  
CIE:Broad - Short  
IES:Semi cut-off  
CIE:Non-cut-off  
Max.At80:113.6cd/klm  
Max.At90:0cd/klm  
Max.80-90:113.6cd/klm

ISOCANDELA DIAGRAM	
UNIT	cd
Imax=100%	3975
90%	3577
80%	3180
70%	2782
60%	2385
50%	1987
40%	1590
30%	1192
20%	795
10%	397
5%	199

#### ROAD ISOCANDELA REPORT



## 5.0 THD and PF Test

Model No.	IVAT2-100L730[H, 4]	Sample ID.	L1
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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	60	0.216	99.9	0.962	12.72%

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