

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1811113**

## Data Number

**DLF1811113-24a**

## Test Date

**2018/11/22**

## Issue Date

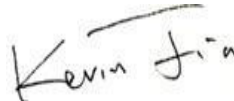
**2018/11/23**

## 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	13926
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	116.4	118.9
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	3.62%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	3917
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	72.1
Power Factor	ANSI C82.77:2014	0.873	0.937
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	6.56%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/11/22	IVAT5S-130L740[H, 4]	X1
2	Goniophotometer Test	2018/11/22	IVAT5S-130L740[H, 4]	X1
3	THD and PF Test	2018/11/22	IVAT5S-130L740[H, 4]	X1

### Remark(If any)

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### 3.0 Production Description

**Luminaire Description:** IVAT5S-130L740[H, 4]

**Electrical Specification:** 480V,50/60HZ, 130W

#### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	IVAT5S-130L740[H, 4]	Sample ID.	X1
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	480.03	60	0.262	117.5	0.937

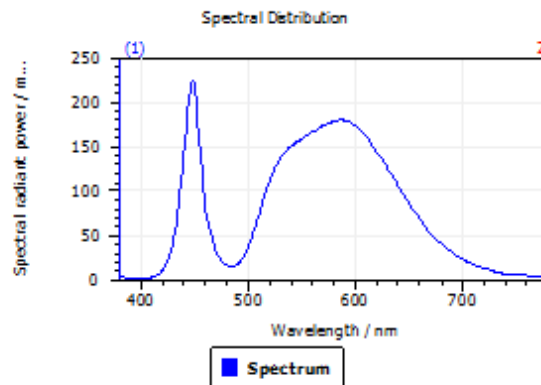
#### Test Result

CCT (K)	CRI (Ra)	Duv
3917	72.1	2.4E-04

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

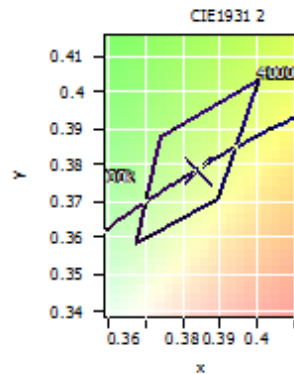
DominantWavelength	579.51 nm
Purity	0.288
PeakWavelength	447.93 nm
Radiant Power	30.27 W
Width50%:	19.59 nm

#### Color Coordinates

Correlated Color Temperatu 3917 K

x: 0.3840 u: 0.2268 u': 0.2268  
y: 0.3784 v: 0.3352 v': 0.5029

ResultsCRICRI01	70.6	ResultsCRICRI09	-16.9
ResultsCRICRI02	77.5	ResultsCRICRI10	45.3
ResultsCRICRI03	81.4	ResultsCRICRI11	67.6
ResultsCRICRI04	72.3	ResultsCRICRI12	37.8
ResultsCRICRI05	69.4	ResultsCRICRI13	71.1
ResultsCRICRI06	67.6	ResultsCRICRI14	89.0
ResultsCRICRI07	81.3	ResultsCRICRI15	65.3
ResultsCRICRI08	57.1	ResultsCRICRI16	67.6
ResultsCRI	72.1		



PlanckDistance 2.4E-004

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	IVAT5S-130L740[H, 4]	Sample ID.	X1
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

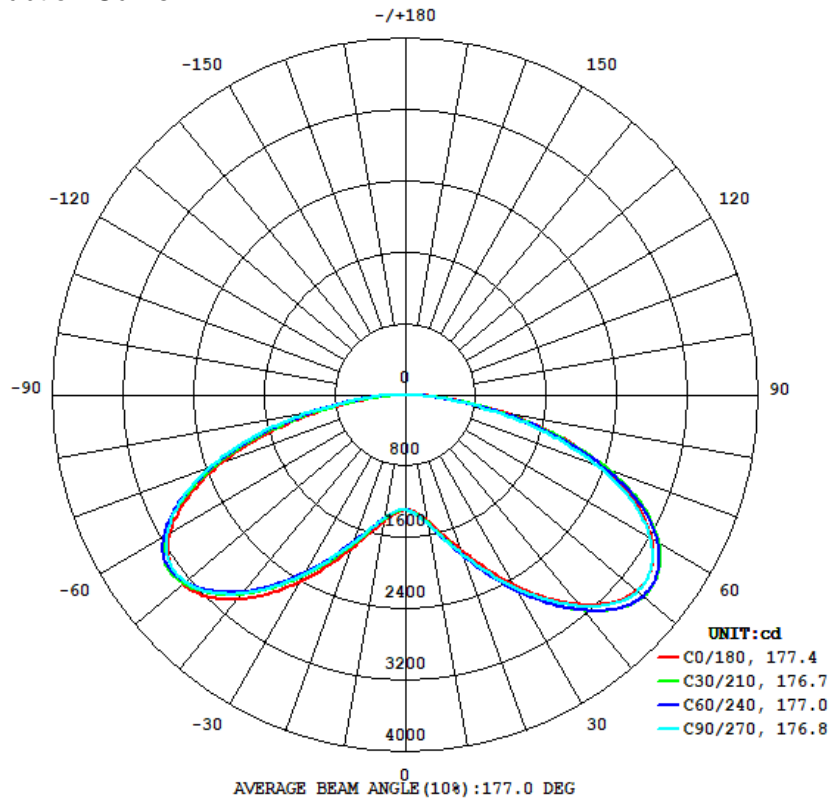
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.96	60	0.260	117.1	0.937	Light Down

#### Test Result

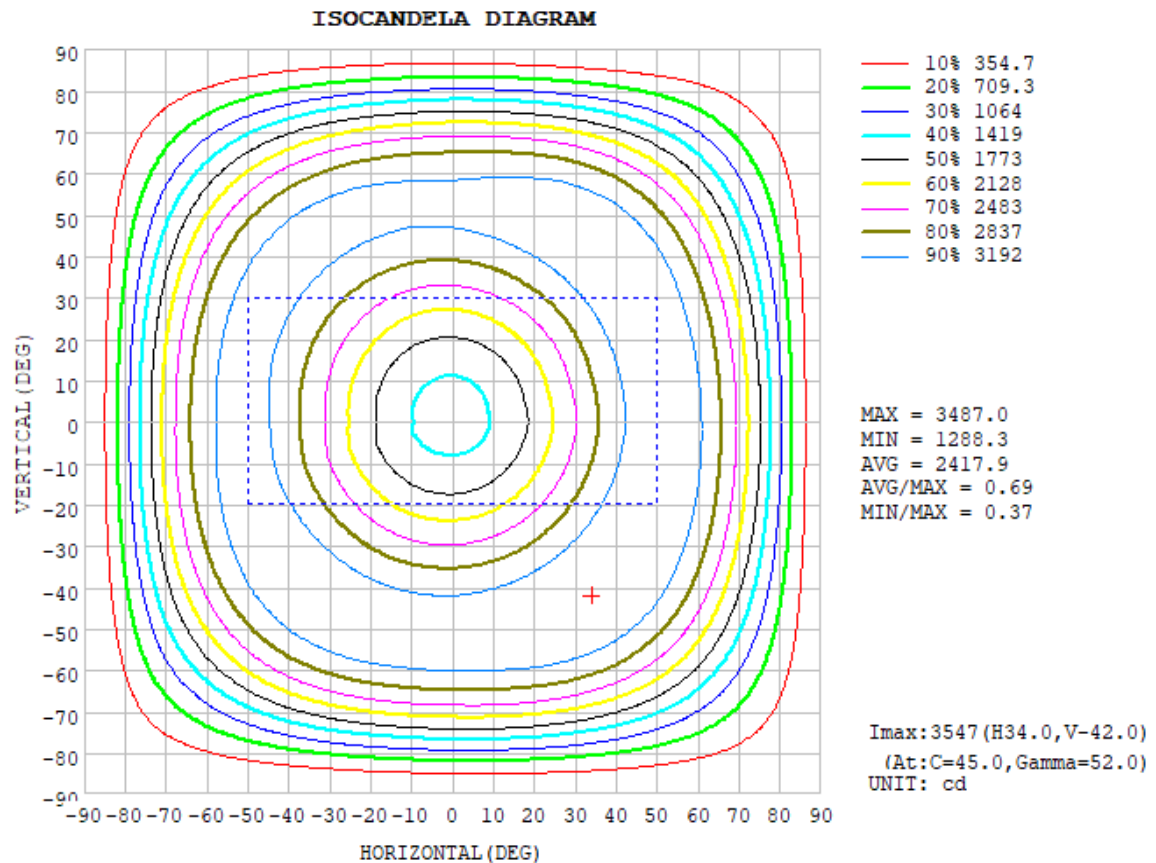
Flux (lm)	Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Zonal Lumen Requirement ( $80^{\circ}$ - $90^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
13926	100.00%	3.62%	177.2	176.8	165.7	166.1	118.9

### 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	1430	1463	1468	1444	1432	1399	1395	1420		
20	1846	1911	1899	1857	1833	1764	1762	1822		
30	2454	2536	2493	2448	2412	2311	2315	2421		
40	3066	3167	3090	3075	2987	2894	2905	3052		
50	3415	3533	3425	3447	3295	3290	3265	3433		
60	3229	3342	3203	3243	3082	3173	3120	3310		
70	2406	2449	2316	2337	2222	2324	2362	2470		
80	1118	1059	981.5	963.4	919.9	1024	1103	1101		
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		



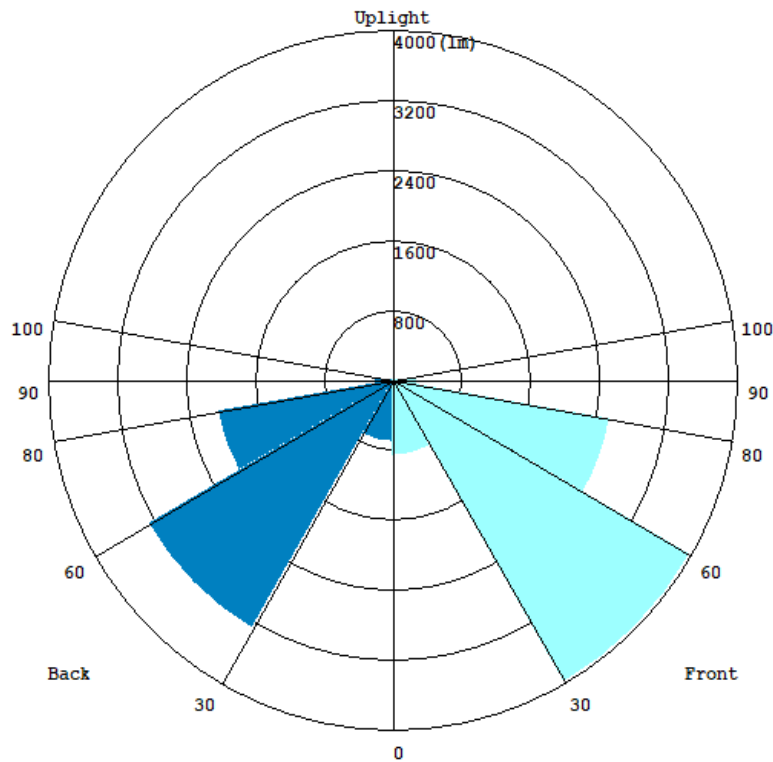
### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	129.95	0 - 10	129.95	0.93%
10-20	463.54	0 - 20	593.49	4.26%
20-30	988.92	0 - 30	1582.41	11.36%
30-40	1722.27	0 - 40	3304.68	23.73%
40-50	2508.13	0 - 50	5812.81	41.74%
50-60	2998.08	0 - 60	8810.89	63.27%
60-70	2805.33	0 - 70	11616.22	83.42%
70-80	1805.10	0 - 80	13421.32	96.38%
80-90	504.22	0 - 90	13925.54	100.00%
90-100	0.00	0 - 100	13925.54	100.00%
100-110	0.00	0 - 110	13925.54	100.00%
110-120	0.00	0 - 120	13925.54	100.00%
120-130	0.00	0 - 130	13925.54	100.00%
130-140	0.00	0 - 140	13925.54	100.00%
140-150	0.00	0 - 150	13925.54	100.00%
150-160	0.00	0 - 160	13925.54	100.00%
160-170	0.00	0 - 170	13925.54	100.00%
170-180	0.00	0 - 180	13925.54	100.00%

### 3.2 Goniophotometer Test

#### LCS Graph



#### BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	867.14	6.2
FM - Front-Medium(30-60)	3977.9	28.5
FH - Front-High(60-80)	2556.1	18.3
FVH - Front-Very High(80-90)	281.59	2.0
Total Forward Light	7682.8	55.1

BL - Back-Low(0-30)	716.76	5.1
BM - Back-Medium(30-60)	3273.3	23.5
BH - Back-High(60-80)	2070.9	14.8
BVH - Back-Very High(80-90)	212.11	1.5
Total Back Light	6273	44.9

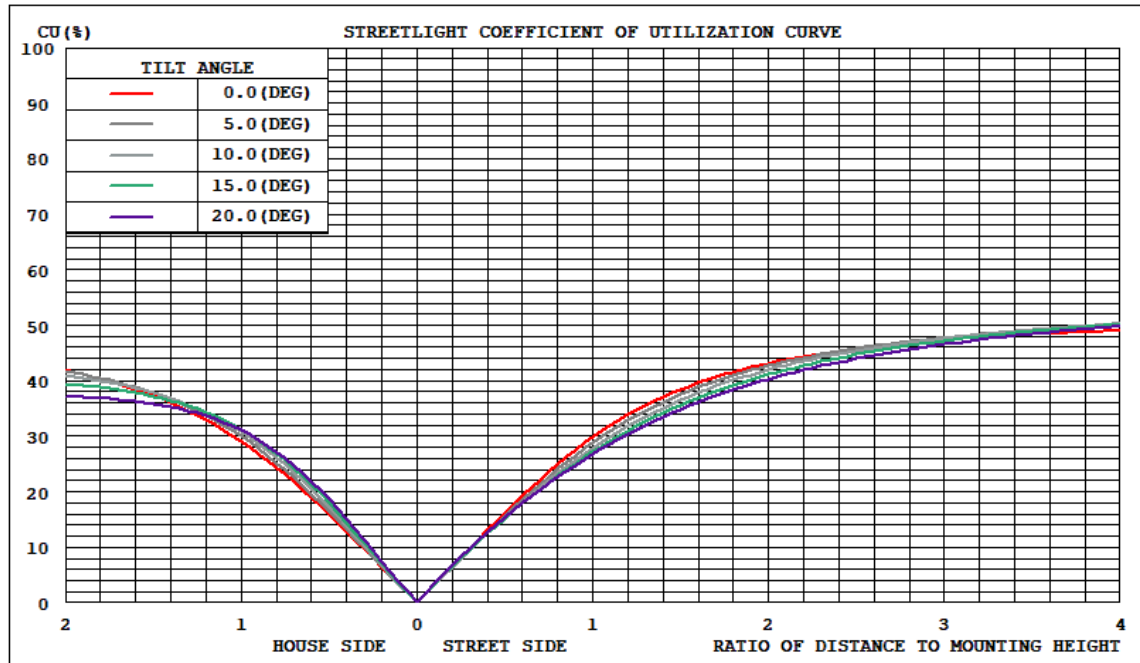
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B3-U0-G3
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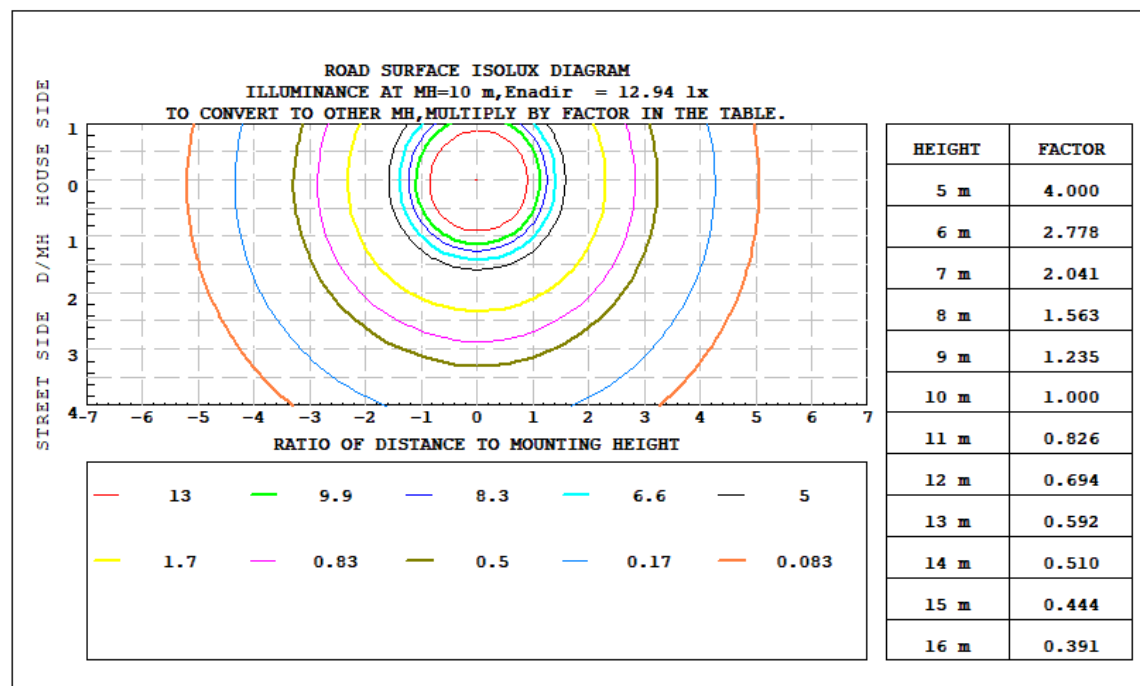
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	6273	0	6273
Street Side	7682.8	0	7682.8

### 3.2 Goniophotometer Test

#### Coefficients of Utilization

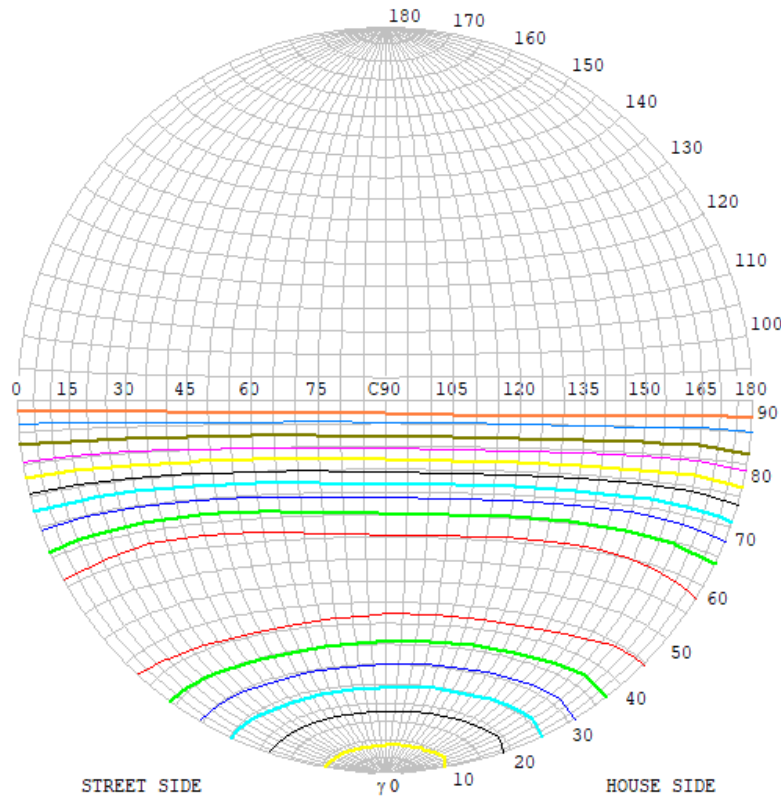


#### Iso-footcandle Lines of Horizontal Illumination



### 3.2 Goniophotometer Test

#### STREETLIGHT ISOCANDELA DIAGRAM

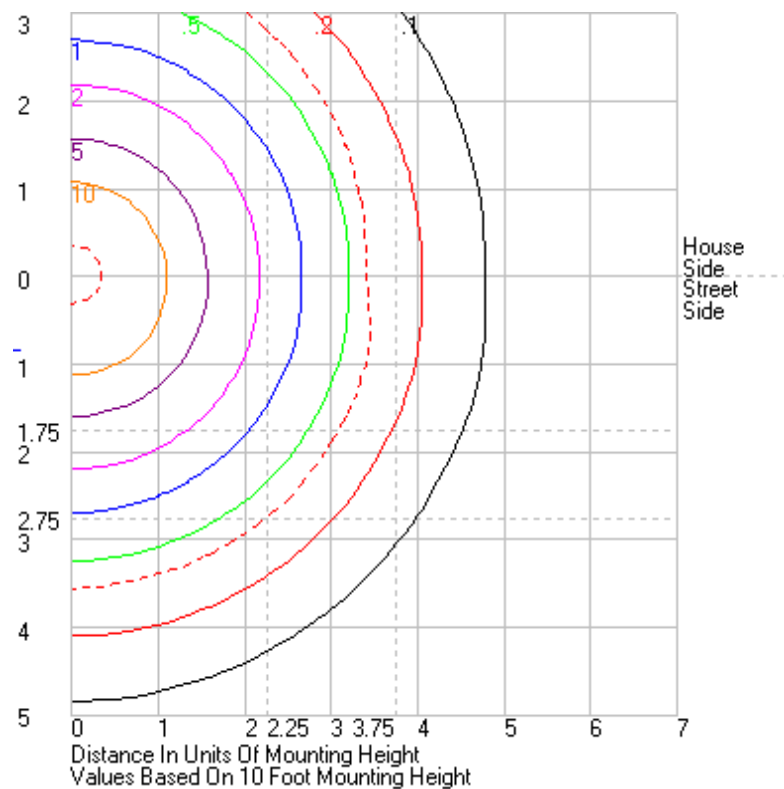


#### Classification:

IES: Type V - Very Short  
CIE: Broad - Short  
IES: Full cut-off  
CIE: Semi-cut-off  
Max. At 80: 80.10cd/klm  
Max. At 90: 0cd/klm  
Max. 80-90: 80.10cd/klm

ISOCANDELA DIAGRAM	
UNIT	cd
Imax=100%	3545
90%	3190
80%	2836
70%	2481
60%	2127
50%	1772
40%	1418
30%	1063
20%	709
10%	354
5%	177

#### ROAD ISOCANDELA REPORT



## 5.0 THD and PF Test

Model No.	IVAT5S-130L740[H, 4]	Sample ID.	X1
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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	480.03	60	0.262	117.5	0.937	6.56%

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