

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1804109**

## Report Number

**DLF20180416001-17a**

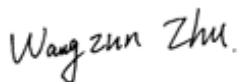
## Test Date

**2018/4/16**

## Issue Date

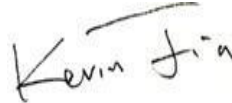
**2018/4/16**

## Prepared By



Wangzun Zhu

## Approved By



Kevin Jia

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## 1.0 Test Summary

DLC Technical Requirements v4.3

Outdoor Pole/Arm-Mounted Area and Roadway Luminaires				
Requirement Category	Test Method	Requirements	Test value	Results (Fail/Pass)
Lamp Output (lm)	IES LM-79-2008	1000	2460	P
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	99.90%	P
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	110	118.8	P
Allowable CCTs* (K)	IES LM-79-2008	5700	3110	P
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	65	70.4	P
Power Factor	ANSI C82.77:2014	0.873	0.922	P
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	18.41%	P

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/4/16	WPLED18Y	Q1
2	Goniophotometer Test	2018/4/16	WPLED18Y	Q1
3	THD and PF Test	2018/4/16	WPLED18Y	Q1

### Remark(If any)

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## 3.0 Production Description

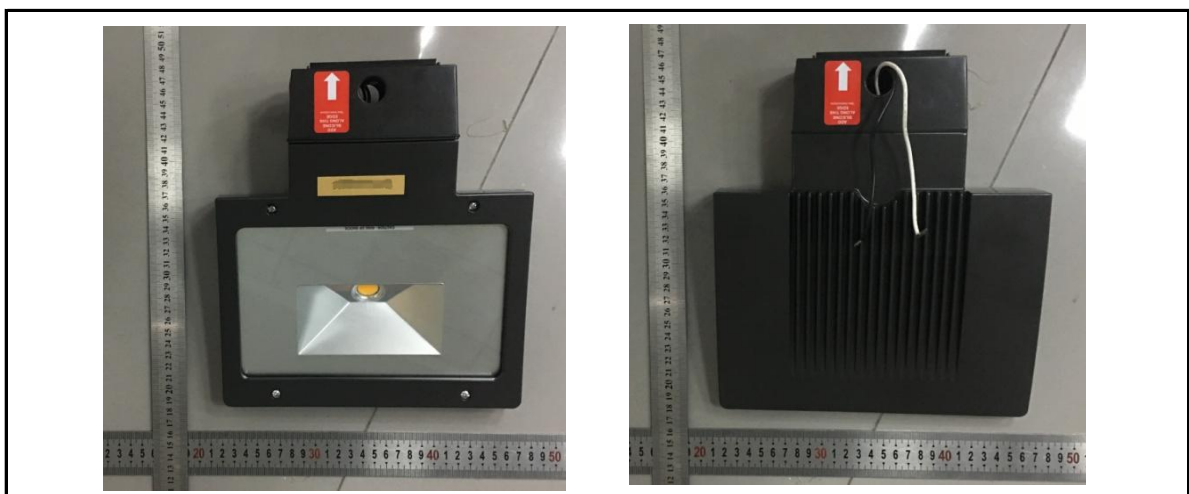
### Luminaire Description:

**Electrical Specification:** 120V-277V,50/60HZ

**Light source:** LL725F1212-XXC

**Manufacturer Of Light Source:** Lustrous International Technology Company

### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	WPLED18Y	Sample ID.	Q1
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
25.1	276.99	60	0.081	20.78	0.922

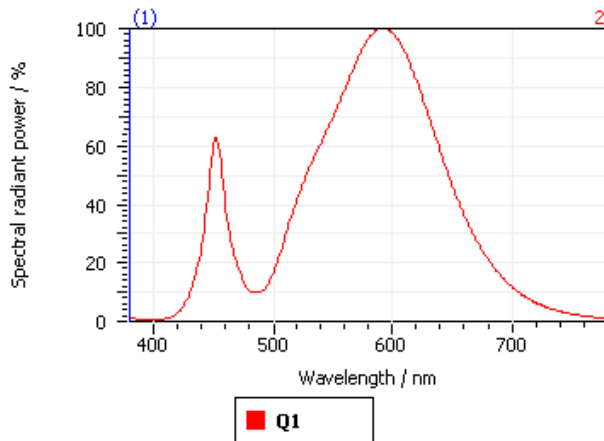
#### Test Result

CCT (K)	CRI (Ra)	Duv
3110	70.4	2.0E-03

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

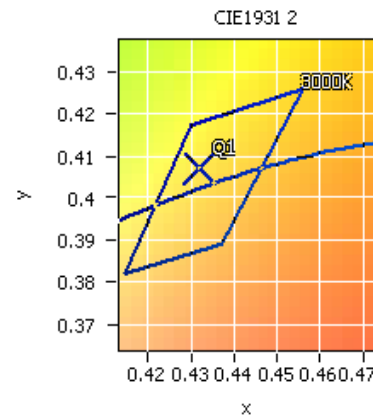
DominantWavelength	581.68 nm
Purity	0.519
PeakWavelength	592.48 nm
Width50%:	119.06 nm

#### Color Coordinates

Correlated Color Temperature 3110 K

x: 0.4320 u: 0.2461 u': 0.2461  
y: 0.4072 v: 0.3479 v': 0.5219

ResultsCRICRI01	66.4	ResultsCRICRI09	-34.1
ResultsCRICRI02	80.2	ResultsCRICRI10	53.4
ResultsCRICRI03	91.4	ResultsCRICRI11	58.4
ResultsCRICRI04	65.8	ResultsCRICRI12	40.3
ResultsCRICRI05	64.9	ResultsCRICRI13	68.7
ResultsCRICRI06	71.5	ResultsCRICRI14	94.9
ResultsCRICRI07	78.8	ResultsCRICRI15	59.2
ResultsCRICRI08	44.3	ResultsCRICRI16	58.7
ResultsCRI	70.4		



Nominal CCT: 3000K

PlanckDistance 2.0E-003

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	WPLED18Y	Sample ID.	Q1
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

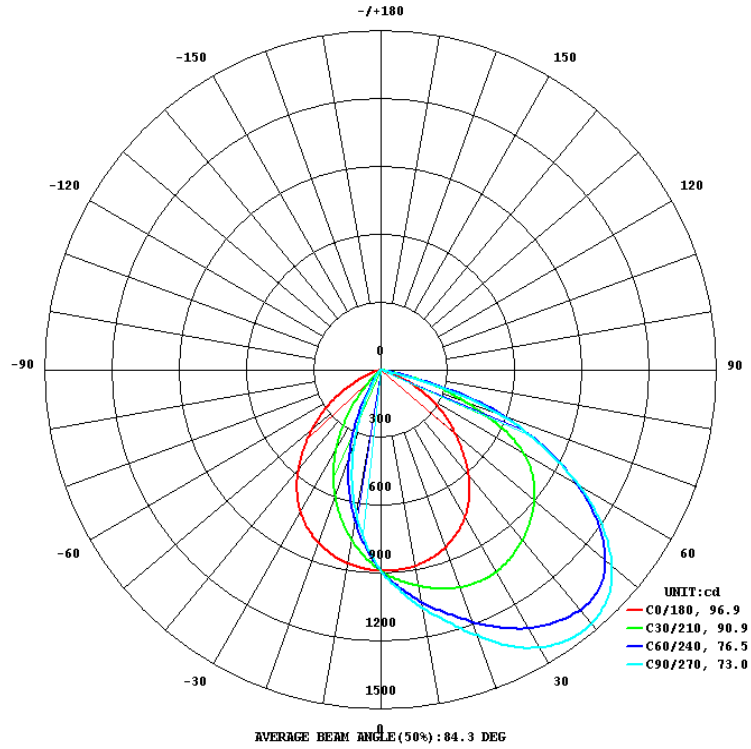
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	277.06	60	0.082	20.70	0.915	Light Down

#### Test Result

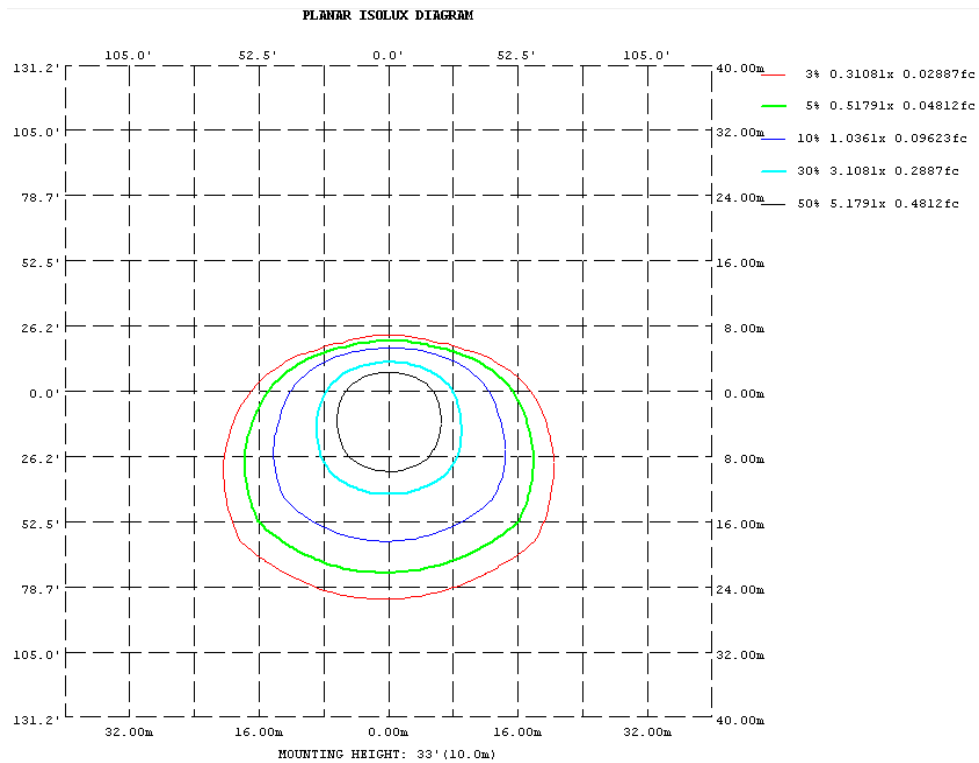
Flux(lm)	Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
2460	99.90%	102.8	137.1	73	96.9	118.8

### 4.3 Goniophotometer Test

#### Light Distrubtion Curve



#### Isolux Plot



### 4.3 Goniophotometer Test

#### Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 6.8 %										°
7	C0	C45	C90	C135	C180	C225	C270	C315			7
10	879.4	1011	1067	1004	869.3	714.3	644.3	719.2			0 - 10
20	837.3	1110	1246	1096	816.6	499.1	356.6	509.1			10 - 20
30	753.6	1192	1417	1169	721.0	263.6	98.11	274.7			20 - 30
40	615.2	1201	1463	1173	575.1	53.81	33.53	57.34			30 - 40
50	436.0	1165	1350	1130	400.5	12.92	11.01	11.45			40 - 50
60	260.8	999.0	1023	979.1	223.8	4.458	5.250	3.916			50 - 60
70	75.82	589.4	555.8	607.7	57.06	1.677	2.236	1.441			60 - 70
80	1.028	48.23	5.864	118.8	1.044	0.7936	1.213	0.6304			70 - 80
90	0.0175	0.0068	0.0066	0.0113	0.0252	0.0629	0.0623	0.0613			80 - 90
100	0.0598	0.0036	0.0023	0.0199	0.1829	0.3893	0.4133	0.2966			90 - 100
110	0.1698	0.0190	0.0021	0.0517	0.3973	0.7768	0.7924	0.5543			100 - 110
120	0.2557	0.0622	0.0164	0.0920	0.5715	1.052	1.106	0.8540			110 - 120
130	0.3912	0.1384	0.0747	0.1747	0.7740	1.197	1.358	1.093			120 - 130
140	0.5427	0.2572	0.1867	0.3170	1.010	1.425	1.593	1.407			130 - 140
150	0.7066	0.4598	0.3442	0.4946	1.245	1.633	1.659	1.600			140 - 150
160	0.8420	0.6411	0.5285	0.6408	1.383	1.479	1.528	1.506			150 - 160
170	0.9011	0.7874	0.6993	0.7206	1.314	1.234	1.082	1.089			160 - 170
180	1.159	1.014	0.8834	0.9190	1.157	1.044	0.9069	0.9117			170 - 180



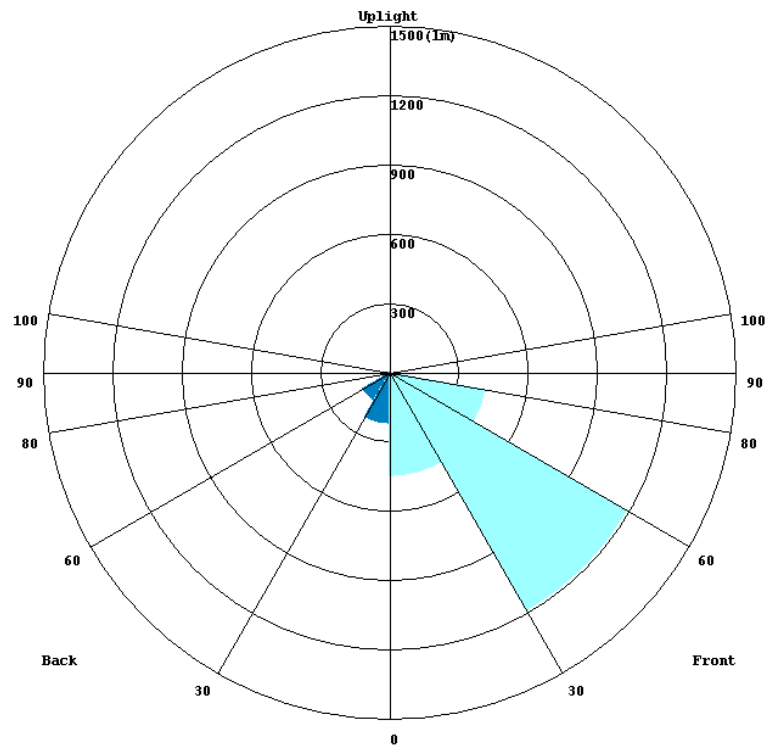
### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0 - 10	83.48	0 - 10	83.48	3.39%
10 - 20	236.59	0 - 20	320.07	13.01%
20 - 30	356.91	0 - 30	676.98	27.52%
30 - 40	434.25	0 - 40	1111.23	45.18%
40 - 50	467.39	0 - 50	1578.62	64.18%
50 - 60	438.93	0 - 60	2017.55	82.02%
60 - 70	322.44	0 - 70	2339.99	95.13%
70 - 80	114.39	0 - 80	2454.38	99.78%
80 - 90	2.10	0 - 90	2456.48	99.86%
90 - 100	0.09	0 - 100	2456.57	99.87%
100 - 110	0.28	0 - 110	2456.85	99.88%
110 - 120	0.42	0 - 120	2457.27	99.90%
120 - 130	0.51	0 - 130	2457.78	99.92%
130 - 140	0.58	0 - 140	2458.36	99.94%
140 - 150	0.58	0 - 150	2458.94	99.96%
150 - 160	0.49	0 - 160	2459.43	99.98%
160 - 170	0.29	0 - 170	2459.72	100.00%
170 - 180	0.09	0 - 180	2459.81	100.00%

### 3.2 Goniophotometer Test

#### LCS Graph



#### BUG-Rating

**IESNA Luminaire Flux Distribution Table:**

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	452.72	18.4
FM - Front-Medium(30-60)	1195.9	48.6
FH - Front-High(60-80)	427.61	17.4
FVH - Front-Very High(80-90)	1.854	0.1
<b>Total Forward Light</b>	<b>2078.7</b>	<b>84.5</b>

BL - Back-Low(0-30)	224.26	9.1
BM - Back-Medium(30-60)	144.64	5.9
BH - Back-High(60-80)	9.227	0.4
BVH - Back-Very High(80-90)	0.24662	0.0
<b>Total Back Light</b>	<b>381.1</b>	<b>15.5</b>

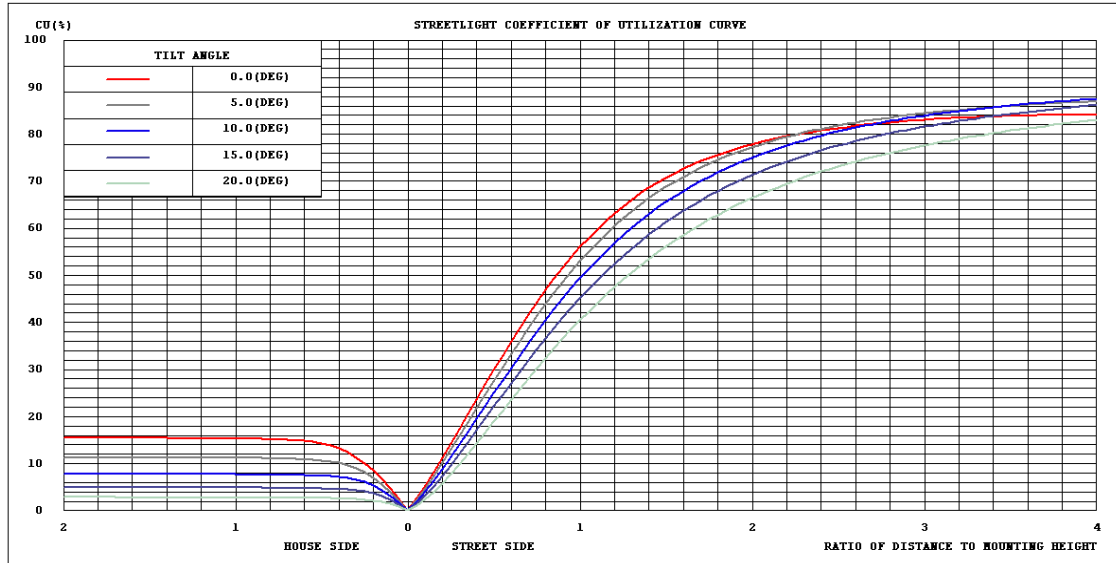
UL - Uplight-Low(90-100)	0.091771	0.0
UH - Uplight-High(100-180)	3.2452	0.1
<b>Total Up Light</b>	<b>3.3369</b>	<b>0.1</b>

<b>BUG(Back,Up,Glare) Rating</b>	<b>B1-U1-G0</b>
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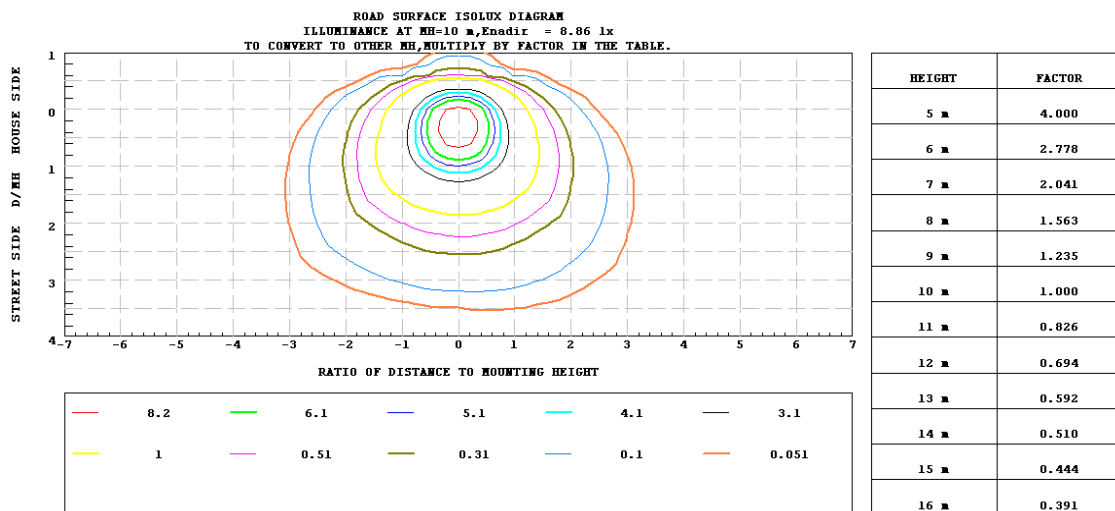
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	378.38	2.7186	381.1
Street Side	2078.1	0.61836	2078.7

### 3.2 Goniophotometer Test

#### Coefficients of Utilization

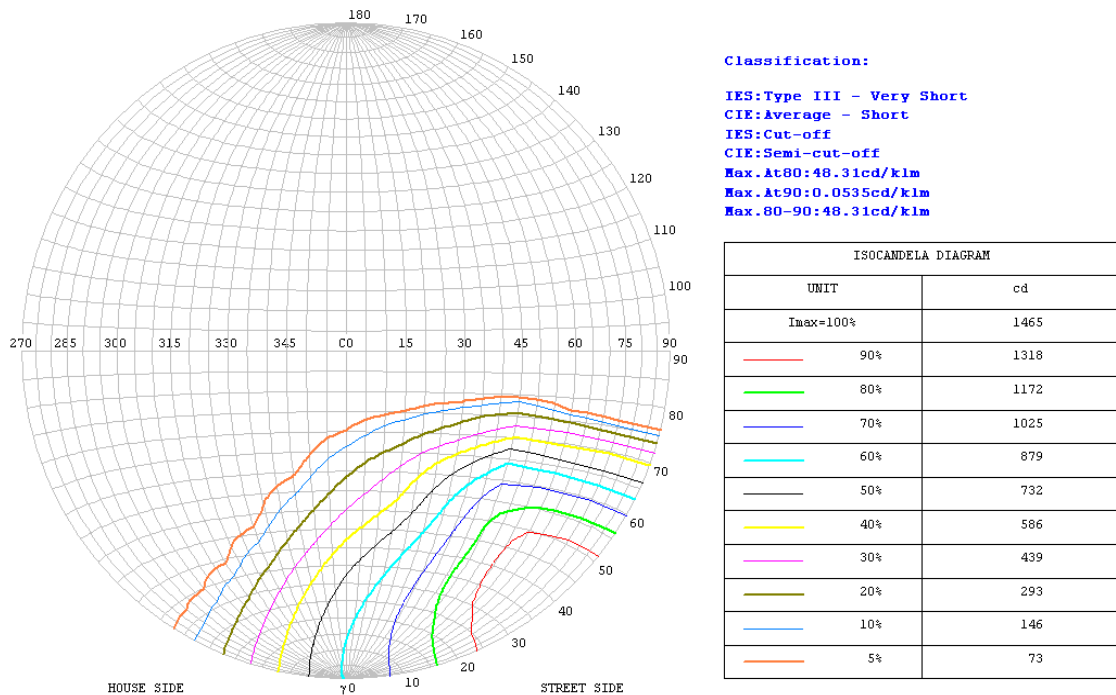


#### Iso-footcandle Lines of Horizontal Illumination

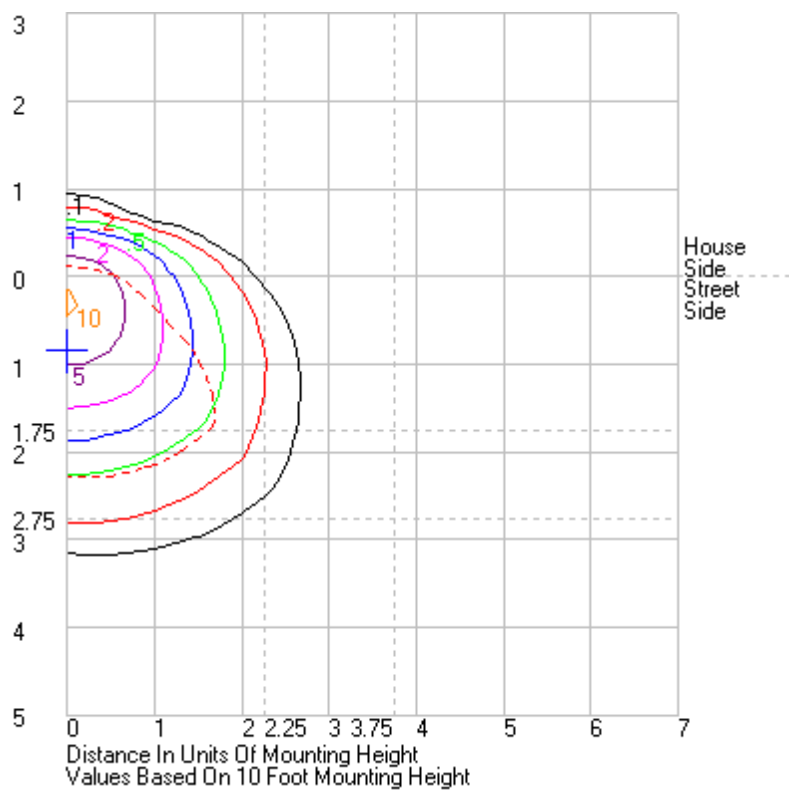


### 3.2 Goniophotometer Test

#### STREETLIGHT ISOCANDELA DIAGRAM



#### ROAD ISOCANDELA REPORT



## 5.0 THD and PF Test

Model No.	WPLED18Y	Sample ID.	Q1
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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	276.99	60	0.081	20.78	0.922	18.41%
25.1	120.00	60	0.170	20.30	0.992	9.77%

## 6.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last	Calibration Due
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\*\*\*\*\*