

Photometric Test Report

Relevant Standards

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

Prepared For

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Issue Date

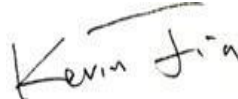
2018/11/23

Prepared By



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Approved By



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1.0 Test Summary

DLC Technical Requirements v4.4

Outdoor - Mid output Outdoor Pole/Arm-Mounted Area and Roadway Luminaires			
Requirement Category	Test Method	Requirements	Test value
Lamp Output (lm)	IES LM-79-2008	5000	7649
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	95	114.1
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥99%	100.00%
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	≤10%	3.86%
Allowable CCTs* (K)	IES LM-79-2008	≤5700	2971
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥65	79.6
Power Factor	ANSI C82.77:2014	0.873	0.929
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	IVAT5S-75L730[H, 4]	I1
2	Goniophotometer Test	2018/11/22	IVAT5S-75L730[H, 4]	I1
3	THD and PF Test	2018/11/22	IVAT5S-75L730[H, 4]	I1

Remark(If any)

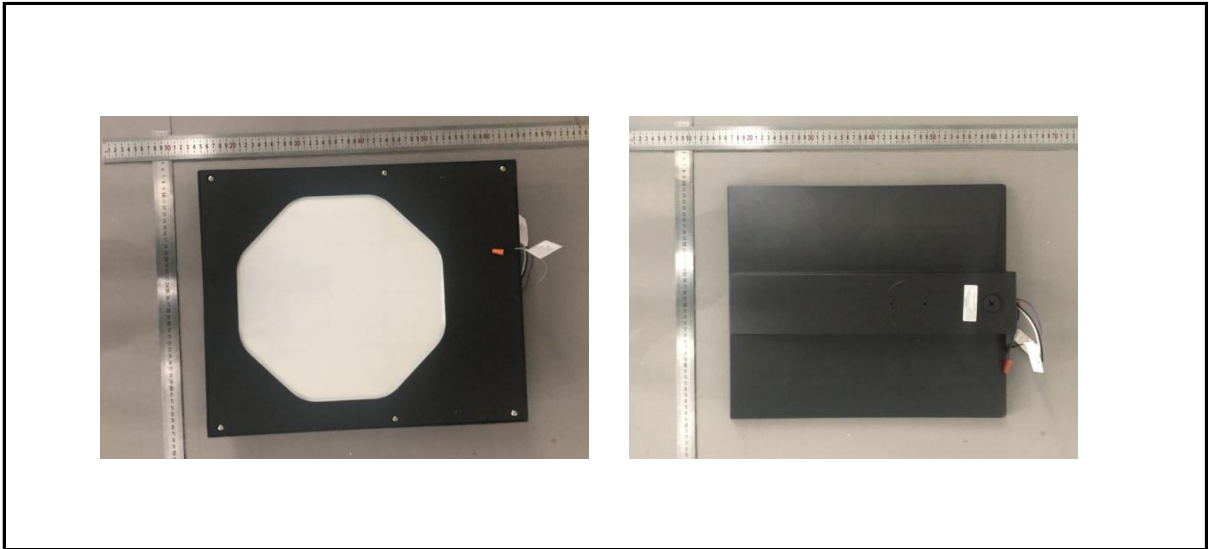
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3.0 Production Description

Luminaire Description: IVAT5S-75L730[H, 4]

Electrical Specification: 480V,50/60HZ, 75W

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	IVAT5S-75L730[H, 4]	Sample ID.	I1
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 ± 0.2 percent under load.

The sample was measured using 4π 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	479.96	60	0.151	67.4	0.929

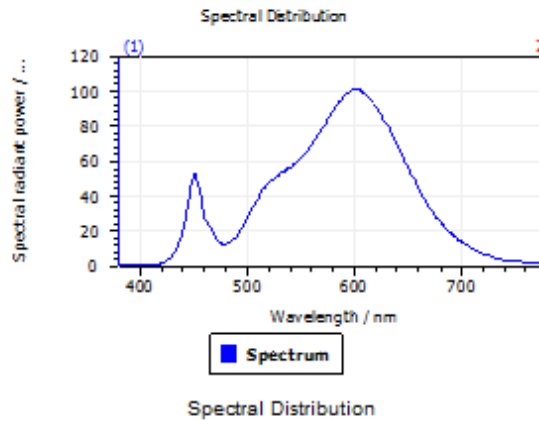
Test Result

CCT (K)	CRI (Ra)	Duv
2971	79.6	3.0E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results

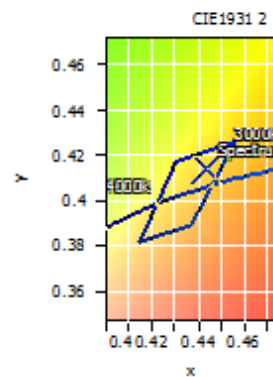


Spectral values

DominantWavelength	581.95 nm
Purity	0.574
PeakWavelength	601.32 nm
Width50%	129.54 nm

Color Coordinates

Correlated Color Temperature	2971 K		
x: 0.4435	u: 0.2505	u': 0.2505	
y: 0.4140	v: 0.3508	v': 0.5262	
CRI01	77.1	CRI09	-5.3
CRI02	87.3	CRI10	71.4
CRI03	96.7	CRI11	77.0
CRI04	78.0	CRI12	61.9
CRI05	76.7	CRI13	79.2
CRI06	84.3	CRI14	98.3
CRI07	82.3	CRI15	68.2
CRI08	54.6	CRI16	66.2
ResultsCRI	79.6		



PlanckDistance 3.0E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	IVAT5S-75L730[H, 4]	Sample ID.	I1
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 ± 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° vertical intervals and 10° horizontal intervals.

Test Conditions

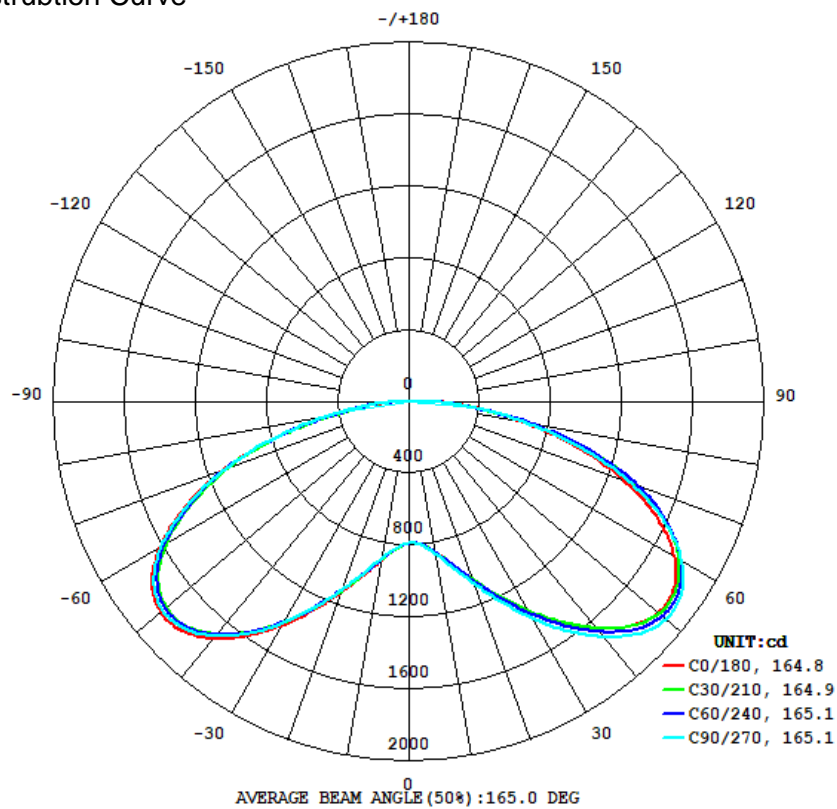
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.00	60	0.150	67.0	0.929	Light Down

Test Result

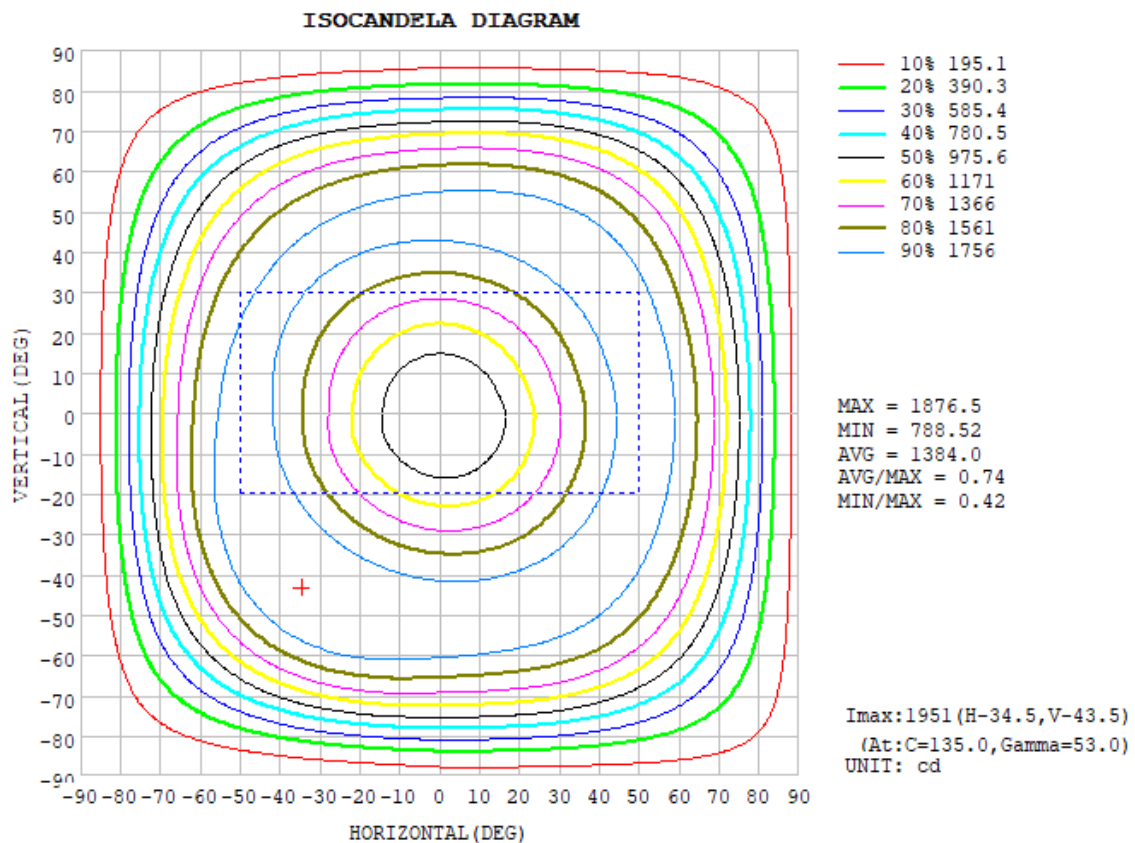
Flux (lm)	Zonal Lumen Requirement (0° - 90°)	Zonal Lumen Requirement (80° - 90°)	Field Angle(10°)		Beam Angle(50°)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
7649	100.00%	3.86%	177.6	178.3	164.8	165.1	114.1

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

°	C0	C45	C90	C135	C180	C225	C270	C315
10	852.7	848.7	857.6	871.4	890.7	887.7	883.1	876.6
20	1060	1052	1075	1105	1126	1115	1115	1109
30	1352	1346	1392	1433	1435	1412	1422	1415
40	1650	1657	1710	1753	1721	1689	1703	1708
50	1830	1847	1886	1942	1823	1785	1810	1846
60	1728	1773	1775	1859	1618	1584	1608	1702
70	1294	1384	1331	1361	1117	1101	1106	1248
80	645.8	695.5	657.0	589.5	446.9	440.0	460.3	546.4
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
DEG	LUMINOUS INTENSITY:cd							

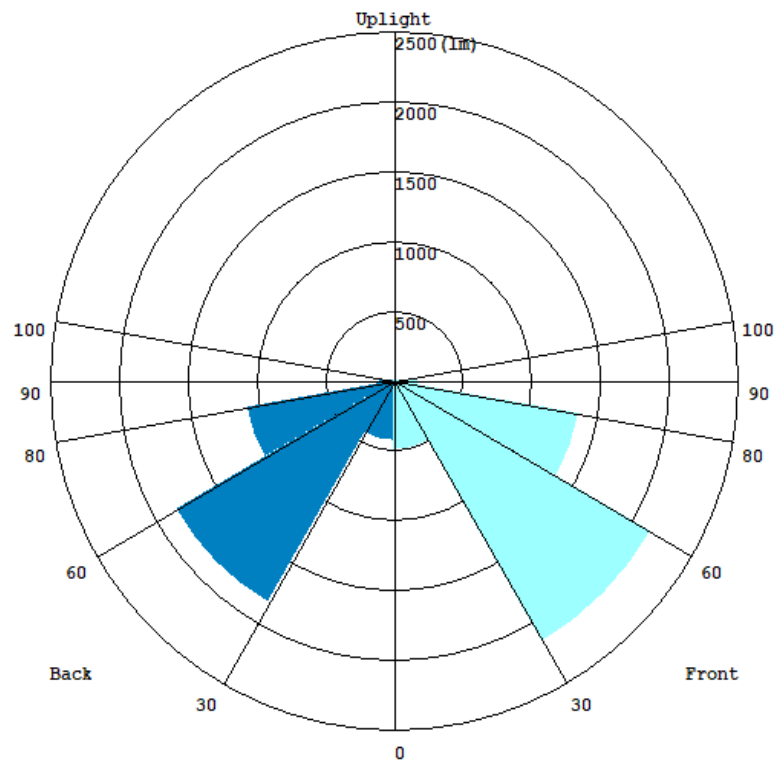
4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	79.26	0 - 10	79.26	1.04%
10-20	279.04	0 - 20	358.30	4.68%
20-30	579.58	0 - 30	937.88	12.26%
30-40	979.19	0 - 40	1917.07	25.06%
40-50	1385.30	0 - 50	3302.37	43.18%
50-60	1611.34	0 - 60	4913.71	64.24%
60-70	1480.40	0 - 70	6394.11	83.60%
70-80	959.22	0 - 80	7353.33	96.14%
80-90	295.34	0 - 90	7648.67	100.00%
90-100	0.00	0 - 100	7648.67	100.00%
100-110	0.00	0 - 110	7648.67	100.00%
110-120	0.00	0 - 120	7648.67	100.00%
120-130	0.00	0 - 130	7648.67	100.00%
130-140	0.00	0 - 140	7648.67	100.00%
140-150	0.00	0 - 150	7648.67	100.00%
150-160	0.00	0 - 160	7648.67	100.00%
160-170	0.00	0 - 170	7648.67	100.00%
170-180	0.00	0 - 180	7648.67	100.00%

3.2 Goniophotometer Test

LCS Graph



BUG-Rating

IESNA Luminaire Flux Distribution Table:

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	502.79	6.6
FM - Front-Medium(30-60)	2152.1	28.1
FH - Front-High(60-80)	1361.4	17.8
FVH - Front-Very High(80-90)	182.42	2.4
Total Forward Light	4198.7	54.8

BL - Back-Low(0-30)	435.99	5.7
BM - Back-Medium(30-60)	1835.7	23.9
BH - Back-High(60-80)	1084.6	14.1
BVH - Back-Very High(80-90)	113.72	1.5
Total Back Light	3470	45.2

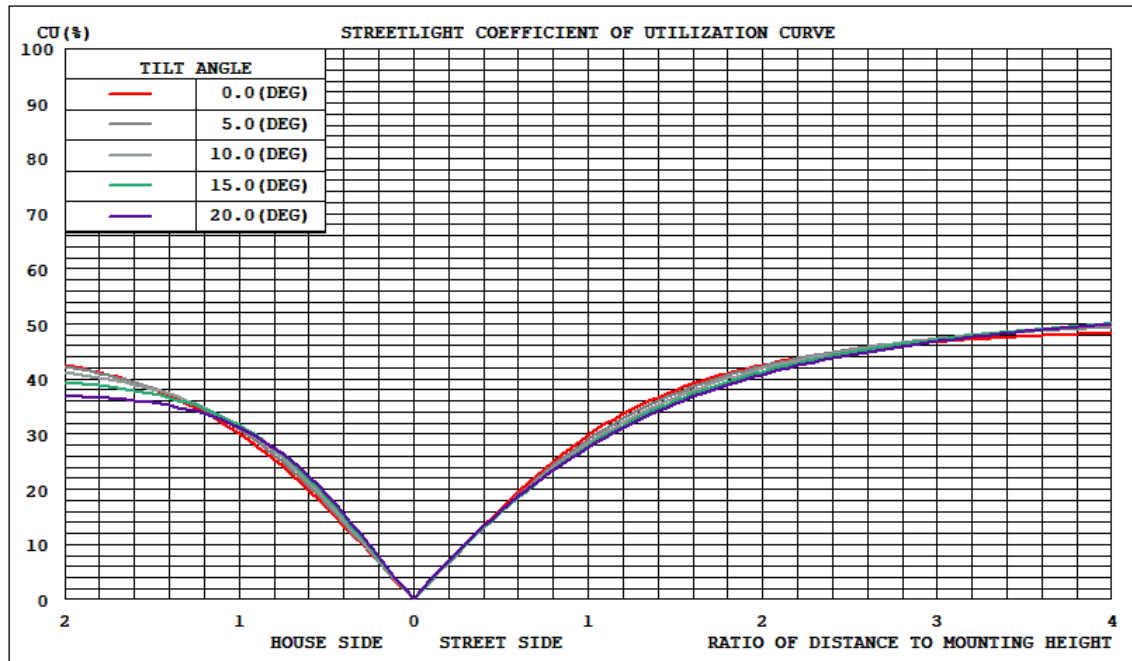
UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B3-U0-G2
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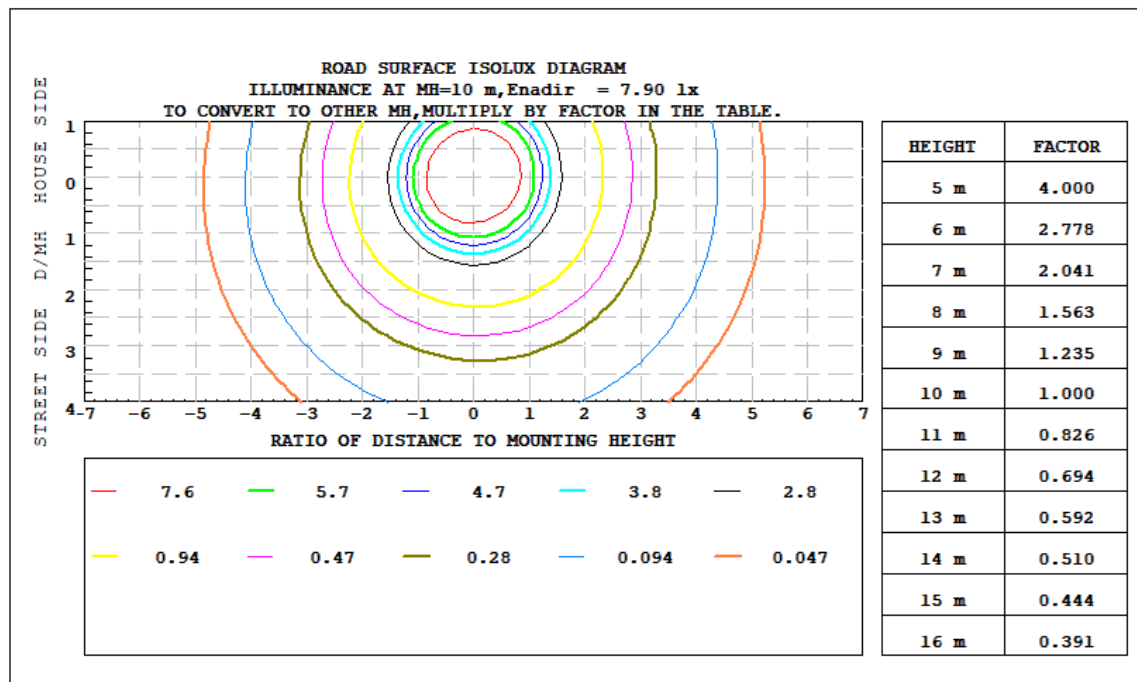
Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	3470	0	3470
Street Side	4198.7	0	4198.7

3.2 Goniophotometer Test

Coefficients of Utilization

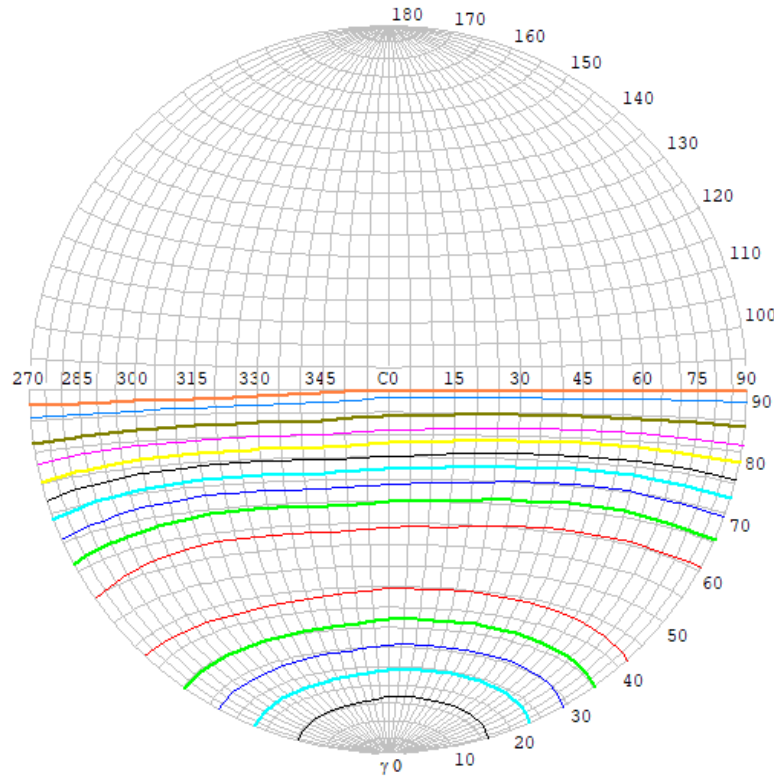


Iso-footcandle Lines of Horizontal Illumination



3.2 Goniophotometer Test

STREETLIGHT ISOCANDELA DIAGRAM

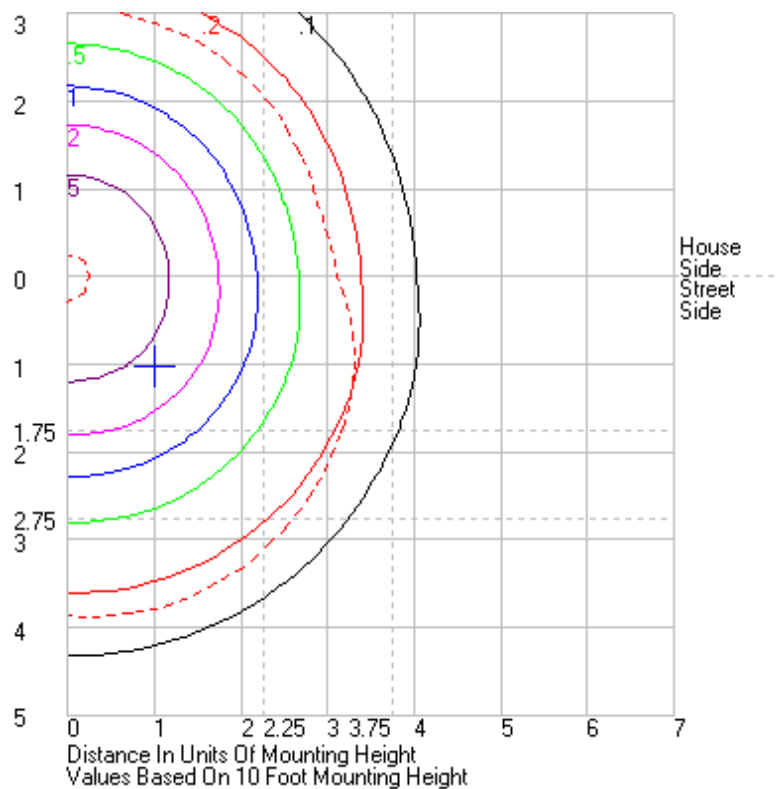


Classification:

IES:Type V - Very Short
CIE:Broad - Short
IES:Full cut-off
CIE:Semi-cut-off
Max.At80:90.70cd/klm
Max.At90:0cd/klm
Max.80-90:90.70cd/klm

ISOCANDELA DIAGRAM	
UNIT	cd
Imax=100%	1953
90%	1757
80%	1562
70%	1367
60%	1172
50%	976
40%	781
30%	586
20%	391
10%	195
5%	98

ROAD ISOCANDELA REPORT



5.0 THD and PF Test

Model No.	IVAT5S-75L730[H, 4]	Sample ID.	I1
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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	479.96	60	0.151	67.4	0.929	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*****