

Report of Test LL15551

Unilumin Group Co., LED Street Light. Product ID: UNISTWF-0009.

Cast aluminium body 230 x 620 x 120 mm (nom.) with beige finish and unpainted/finned cover above light opening. Luminous opening of 144 x 150 mm (nom.) contains four rows of seven LED's, total of 28 LED's.

Hinged upper section houses "Inventronics, EUV-050S024ST 50W" 100-277Vac 50/60Hz LED driver.

Tested with L/O in the horizontal position.

Tested at 240V 50Hz, measured 132 mA, efficacy = 81.0 lm/W.

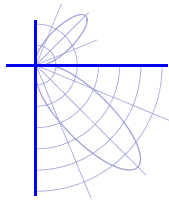


Performance Summary

Luminous flux	2245 lm
Luminaire Power	27.7 W

PREPARED FOR : Unilumin Group Co., Shenzhen, China, 518103.





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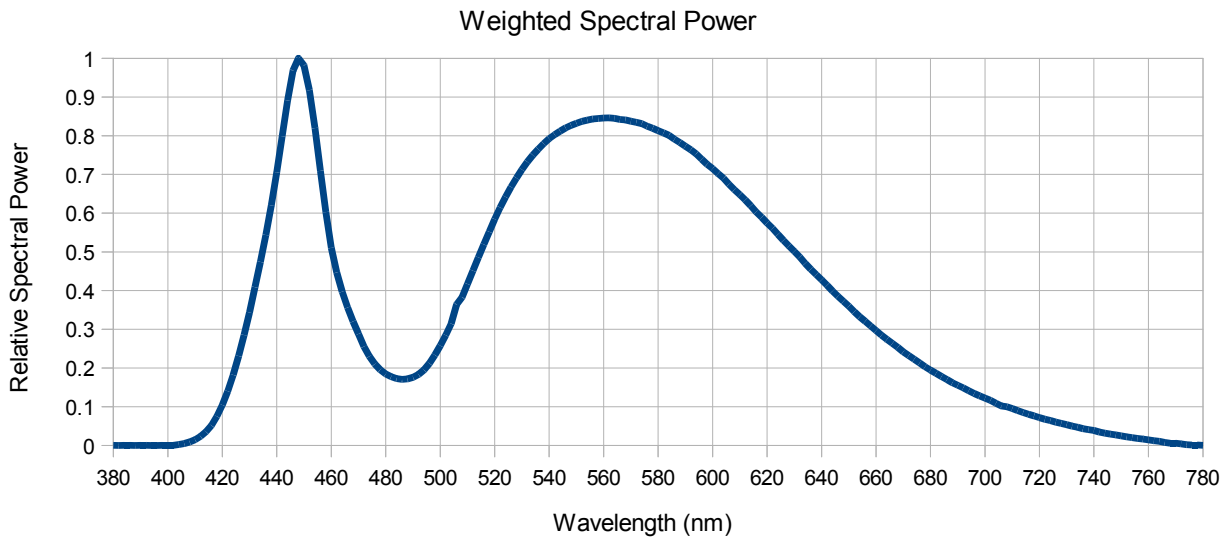
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Performance data in accordance with IESNA LM-79 : 2008

Photometry	Total Luminous Flux	2245 lm
	Luminous efficacy	81.0 lm/W
Electrical	Voltage	240 V
	Frequency	50 Hz
	Current	0.132 A
	Power	27.7 W
	Power Factor	0.88
Spectral	CIE 1931 2 deg observer (x, y) ⁽¹⁾	(0.357, 0.374)
	CIE 1976 2 deg observer (u', v') ⁽¹⁾	(0.211, 0.497)
	Correlated Colour Temperature (CCT) ⁽¹⁾	4680 K
	Colour Rendering Index (CRI) ⁽¹⁾	71
	Colour Spatial Uniformity ⁽²⁾	0.0162
	Scotopic/Photopic Ratio ^{(1),(3)}	1.67

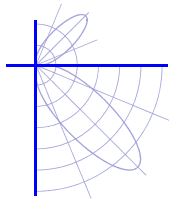


* The spectral power graph combines the weighted spectral power distributions of all spatial measurements.

(1) Value is computed from the weighted average of the spatial measurements

(2) Value is the maximum deviation of the spatial u' and v' measurements from the weighted average

(3) Quantity is in addition to the scope of IESNA LM-79:2008



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Spatial measurements (lower hemisphere)

Gamma angle (deg)	CIE 1976 (u',v' coordinates)	
	C0 plane	C90 plane
0	(0.210, 0.482)	(0.210, 0.483)
10	(0.210, 0.483)	(0.210, 0.481)
20	(0.210, 0.485)	(0.210, 0.482)
30	(0.210, 0.487)	(0.210, 0.487)
40	(0.211, 0.494)	(0.210, 0.491)
50	(0.211, 0.495)	(0.210, 0.499)
60	(0.211, 0.501)	(0.211, 0.507)
70	(0.211, 0.508)	(0.210, 0.505)
80	I <= 10 %	I <= 10 %
-	-	-

Spatial measurements (upper hemisphere)

Gamma angle (deg)	CIE 1976 (u',v' coordinates)	
	C plane	C plane
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

Test procedure

All measurements were performed in an environmentally controlled laboratory employing suitable baffling to minimise stray light. The sample was mounted in its normal operating orientation on a rotating mirror goniophotometer and operated from a stabilised supply. The photometric output was monitored and measurements were performed once stability was achieved.

The goniophotometer was used to measure the spatial distribution of both luminous intensity and, in conjunction with a spectroradiometer and spectrally flat reflectance tile, spectral irradiance. The distribution locus comprises points in the C0 and C90 planes at 10° gamma intervals from 0. The CIE (x,y) coordinates and other derived metrics (CIE (u', v'), CCT and CRI) are calculated from the weighted sum (weighted for intensity and represented solid angle) of the measured spectral irradiances.

Sample orientation	Beam downward	Stabilisation time	4.5 hour
		Total operation time	6.5 hour

Equipment and uncertainties

A C-gamma rotating mirror goniophotometer with a test distance of 8 m.

luminous intensity*	± 5 %	temperature*	± 1 °C
C, gamma angles*	± 0.25°	luminous efficacy	± 5 %

A PhotoResearch PR-670 spectroradiometer (380 - 780 nm., 2 nm. per pixel) measuring from a spectrally flat reflectance tile attached to goniophotometer arm at a distance from sample >5 times the maximum observed luminous opening dimension.

CIE (x, y) coordinates*	± 0.003	CCT*	± 100 K
CIE (u', v') coordinates	± 0.003	CRI	± 3
Δ (u', v') colour difference	± 0.0007	Scotopic / photopic ratio	0.02

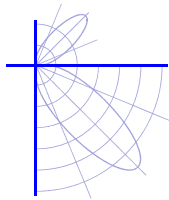
A Yokogawa WT210 power meter connected in circuit to the sample electrical supply

voltage*	± 0.1 %	frequency	± 0.1 Hz
current*	± 0.1 %	power*	± 0.5 %
		power factor	± 0.01

Accreditation & traceability

The laboratory is NATA accredited to ISO17025 : 2005 (details at www.nata.asn.au). The laboratory registration covers measurement and calculation of quantities indicated by *. Uncertainties calculated for this sample are at the 95% confidence interval with coverage factor k = 2 for measured and calculated quantities. All measurements are traceable through the Australian National Measurement Institute to International standards.

IESNA LM-79 : 2008 Calculator v3.2 (14th May 2012)



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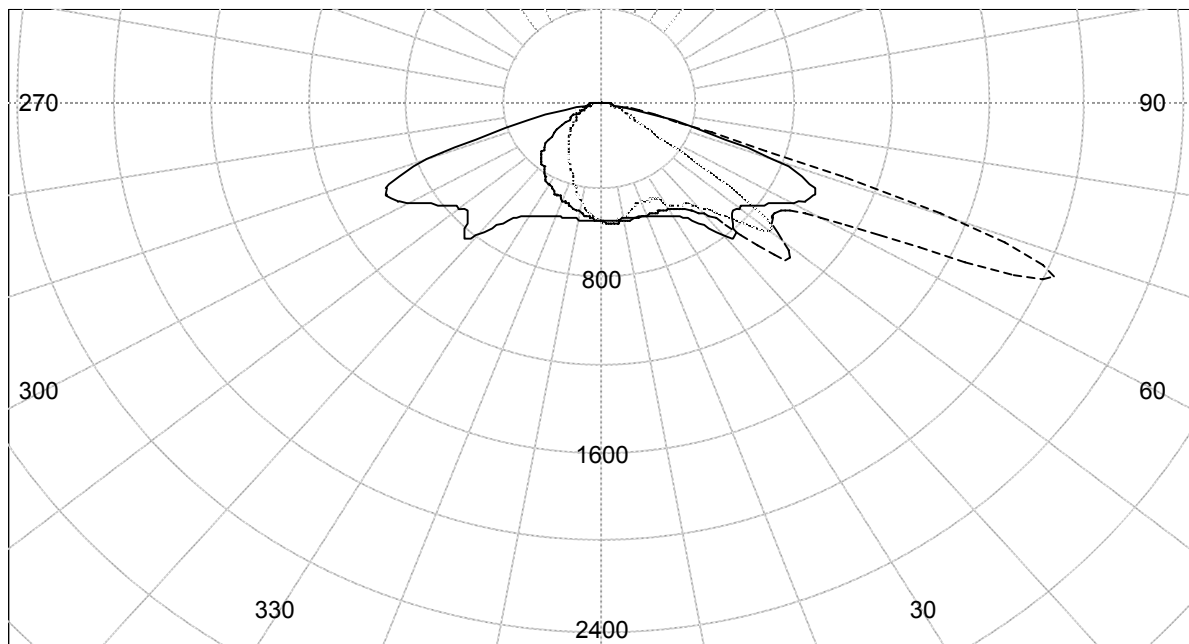
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Tested with L/O in the horizontal position.

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Polar Light Distribution Curves



Kerbside / Downstream C0-Solid, Plane of maximum-Dashed, C90-Grey (cd) **Streetside / Upstream**

Street Lantern Summary: Report data as tested.

Percentage Outputs

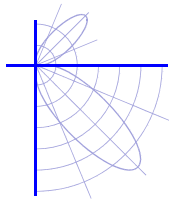
	Upward	Downward	Total
Street Side	N / A	N / A	N / A
House Side	N / A	N / A	N / A

Luminaire Efficiency (Light Output Ratio) N / A

Certified by: *K Monaghan*

Kevin Monaghan
Authorised Signatory

Date of test 18-Jun-2012
Date of report 19-Jun-2012



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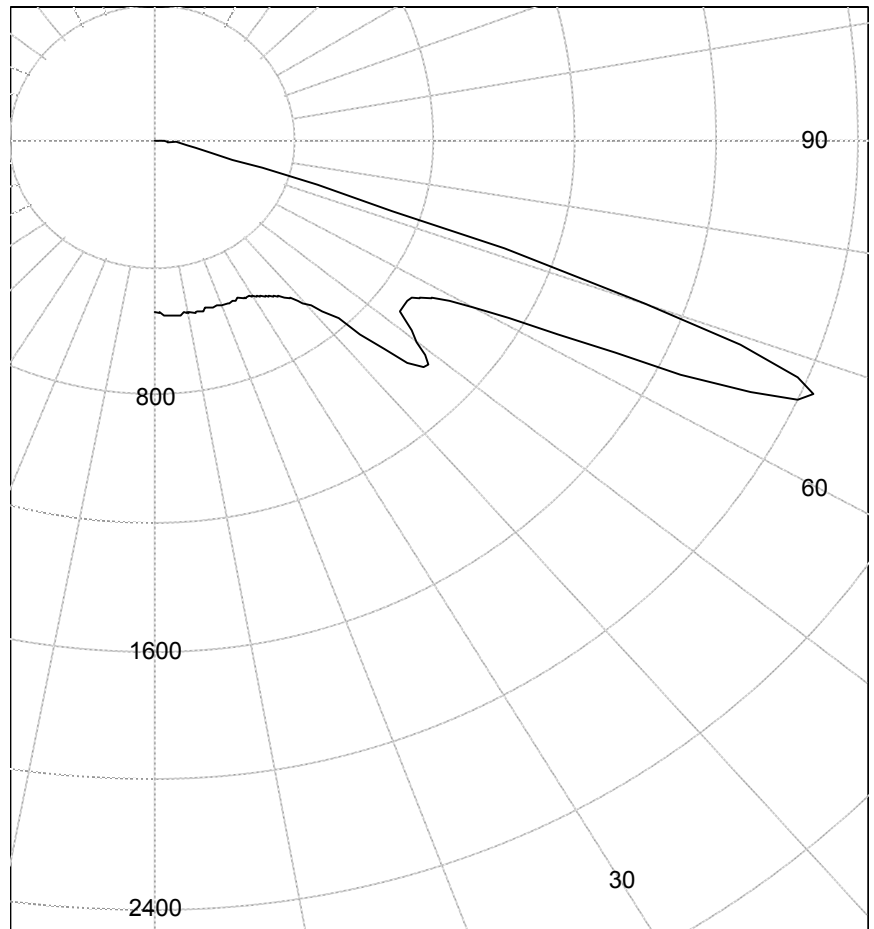
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Intensity
in principal plane

Principal Vertical Plane

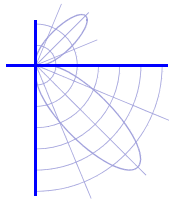
Gamma (Degrees)	Intensity (cd)
0.0	542.4
10.0	552.1
20.0	551.9
30.0	565.7
35.0	594.2
40.0	668.7
45.0	925.2
47.5	1055.9
50.0	981.7
52.5	893.9
55.0	880.7
57.5	917.8
60.0	1054.0
62.5	1386.7
65.0	1876.2
67.5	2032.2
70.0	1493.0
72.5	575.7
75.0	234.7
77.5	108.4
80.0	43.8
82.5	18.9
85.0	8.0
87.5	3.2
90.0	0.0
92.5	0.0
95.0	0.0
97.5	0.0
100.0	0.0
102.5	0.0
105.0	0.0
120.0	0.0
135.0	0.0
150.0	0.0
165.0	0.0
180.0	0.0



Legend: Plane of maximum intensity (cd)

	Maximum Intensity
House Side	979.7 cd @ (0.0, 64.5)
Street Side	2041.4 cd @ (30.0, 67.0)

Note: The coordinate pairs in the above table are expressed in degrees and have the format (C plane, Gamma angle).
Data for the two symmetric halves of the luminaire has been averaged.



Certified Test Report No. LL1551

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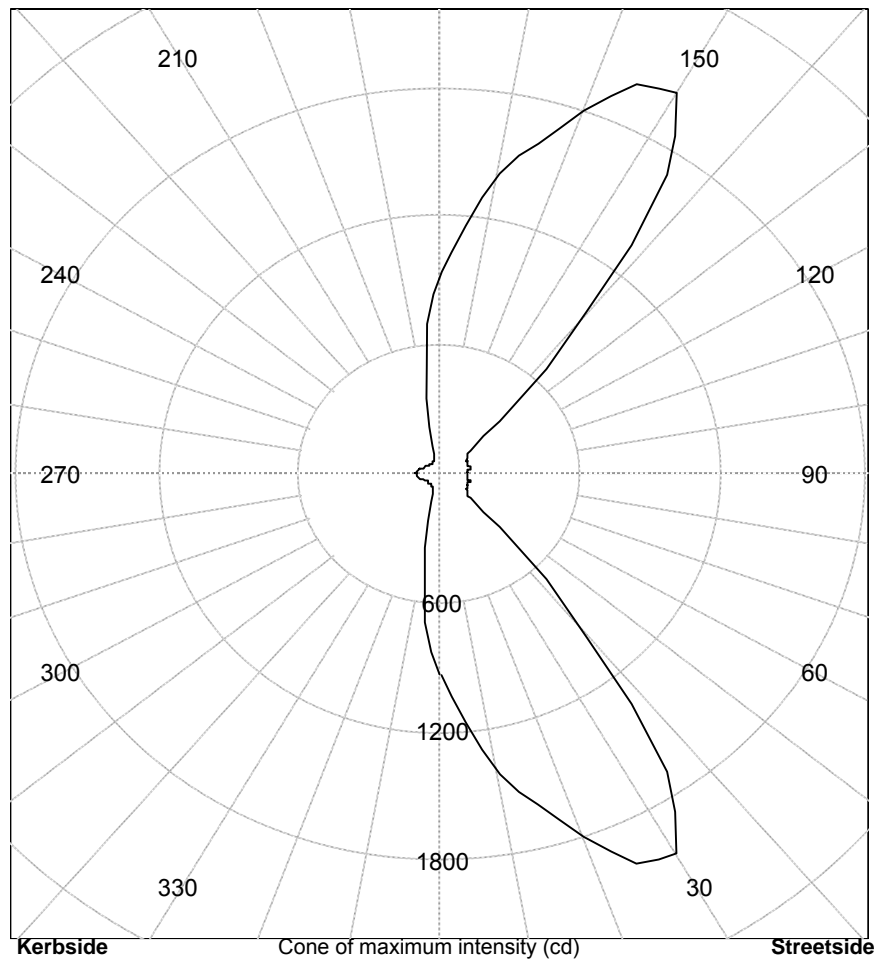
Tested with L/O in the horizontal position.

Tested at 240V 50Hz, measured 132 mA, efficacy = 81.0 lm/W.

Principal Conical Surface

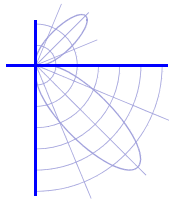
Intensity
in principal cone

C-Plane (Degrees)	Intensity (cd)
90.0	114.8
75.0	123.4
60.0	123.5
50.0	158.3
45.0	349.2
40.0	975.9
35.0	1699.6
30.0	2041.4
25.0	2001.7
20.0	1800.4
15.0	1593.8
10.0	1425.9
5.0	1159.8
0.0	943.2
355.0	700.6
350.0	351.4
345.0	135.6
340.0	78.6
335.0	70.6
330.0	66.7
325.0	64.0
320.0	63.8
315.0	62.9
310.0	62.3
300.0	64.7
285.0	85.8
270.0	102.0



	Maximum Intensity
House Side	979.7 cd @ (0.0, 64.5)
Street Side	2041.4 cd @ (30.0, 67.0)

Note: The coordinate pairs in the above table are expressed in degrees and have the format (C plane, Gamma angle).
Data for the two symmetric halves of the luminaire has been averaged.



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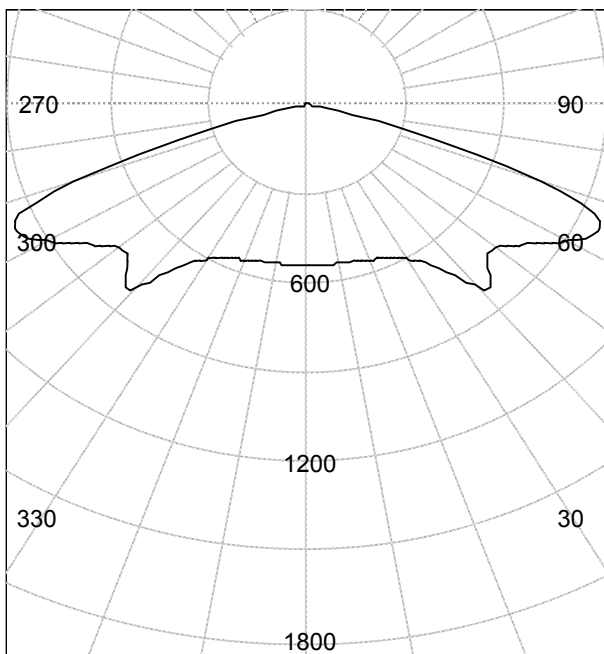
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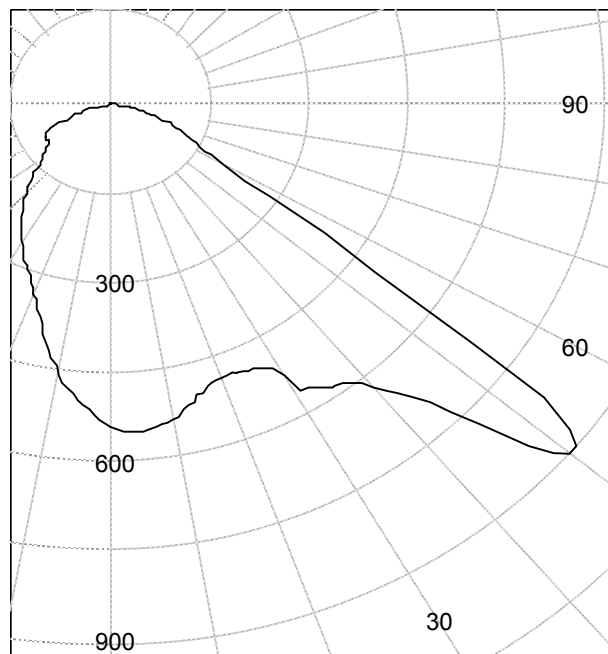
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Polar curve through CIE C0 / C180



Downstream (C180) (cd)

Polar curve through CIE C90 / C270



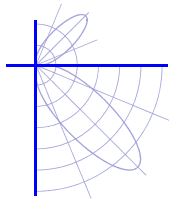
Upstream (C0) Kerbside (C270) (cd)

Streetside (C90)

Performance Parameters

I_{80}	=	30.0 cd
I_{88}	=	2.0 cd
I_{90}	=	0.0 cd
I_{80} / I_{88}	=	15.288

Note: The intensity values listed (I_{xx}) are all within the C0 half plane, the subscript refers to the gamma angle.



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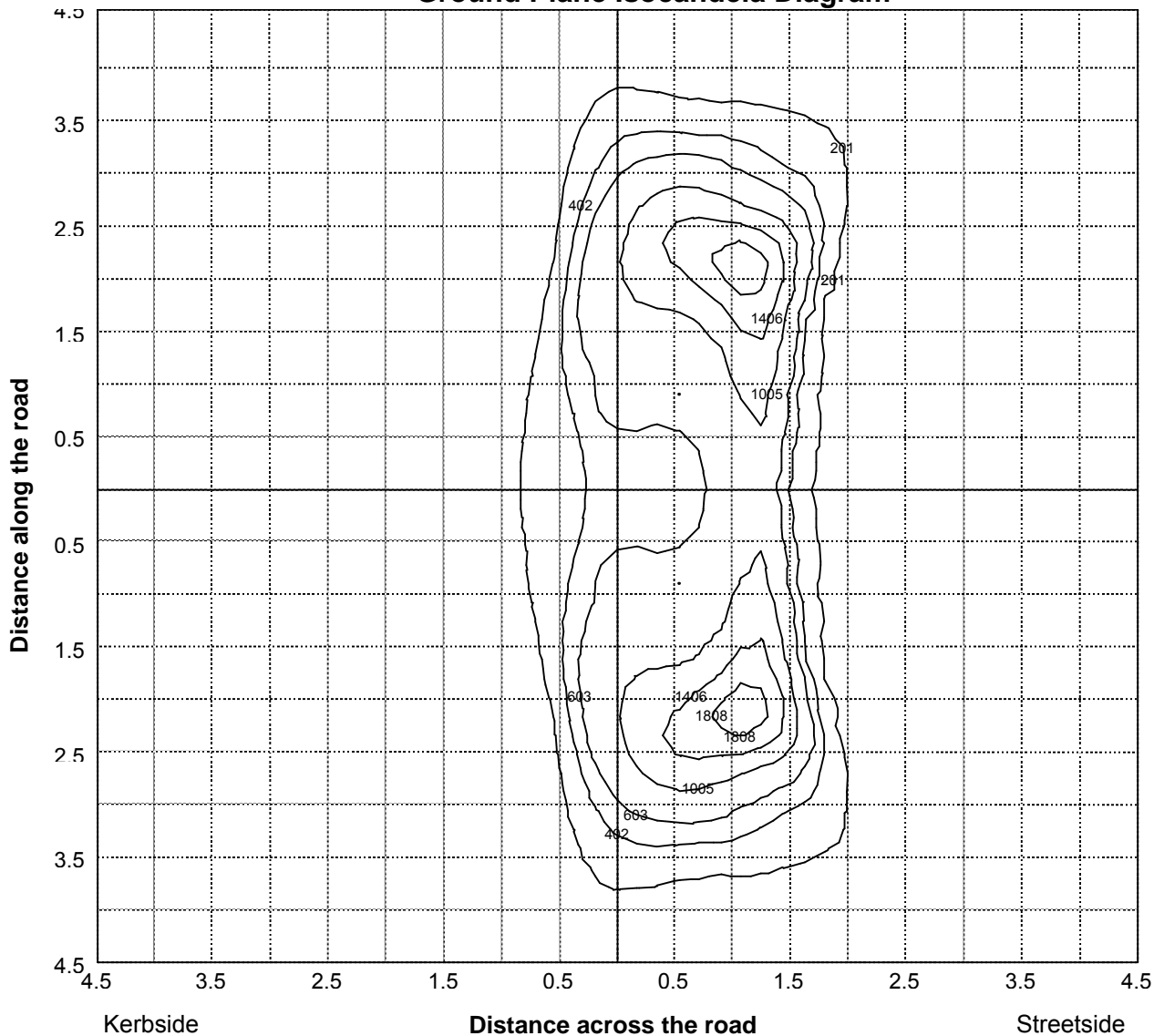
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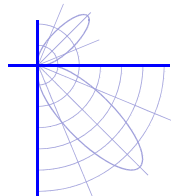
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Ground Plane Isocandela Diagram



Note: The isocandela levels are based on a mounting height of $H = 10.0$ metres. Grid values show multiples of mounting height.
 The isocandela contours are set to 10%, 20%, 30%, 50%, 70%, 90% of the maximum.
 The isocandela contour units are expressed as candela. Upstream and downstream sides have been averaged.



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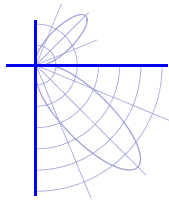
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KERB SIDE INTENSITY DATA (cd)

Gamma	C-Plane								
	C270	C285	C300	C310	C315	C320	C325	C330	C335
0.0	542	542	542	542	542	542	542	542	542
10.0	461	464	474	483	488	495	501	508	514
20.0	339	347	372	397	414	433	450	468	486
30.0	265	271	296	322	341	365	392	426	463
35.0	230	235	261	291	309	334	361	400	447
40.0	197	203	220	255	277	305	333	371	419
45.0	163	166	174	204	230	265	301	343	395
47.5	149	152	152	174	199	235	275	323	379
50.0	136	133	136	149	165	195	233	292	355
52.5	127	122	121	128	138	157	190	244	320
55.0	120	112	107	112	116	129	148	191	257
57.5	116	106	96	97	101	107	119	143	195
60.0	115	101	86	86	88	93	98	111	141
62.5	114	98	79	77	78	81	85	91	102
65.0	108	91	71	69	69	71	72	76	81
67.5	95	85	63	60	61	62	62	65	68
70.0	74	65	53	51	52	54	55	56	57
72.5	60	51	43	43	43	45	47	49	49
75.0	42	38	33	33	34	37	40	45	47
77.5	20	22	22	24	26	27	32	40	44
80.0	2	7	12	16	16	17	20	30	37
82.5	0	1	4	6	7	8	10	16	22
85.0	0	0	1	1	2	2	4	6	11
87.5	0	0	0	0	0	1	1	2	3
90.0	0	0	0	0	0	0	0	0	0
92.5	0	0	0	0	0	0	0	0	0
95.0	0	0	0	0	0	0	0	0	0
97.5	0	0	0	0	0	0	0	0	0
100.0	0	0	0	0	0	0	0	0	0
102.5	0	0	0	0	0	0	0	0	0
105.0	0	0	0	0	0	0	0	0	0
120.0	0	0	0	0	0	0	0	0	0
135.0	0	0	0	0	0	0	0	0	0
150.0	0	0	0	0	0	0	0	0	0
165.0	0	0	0	0	0	0	0	0	0
180.0	0	0	0	0	0	0	0	0	0



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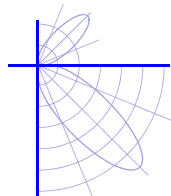
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Gamma	KERB SIDE		INTENSITY DATA (cd)				ROAD SIDE			
	C340	C345	C350	C355	C-Plane		C10	C15	C20	
					C0	C5				
0.0	542	542	542	542	542	542	542	542	542	542
10.0	520	525	532	538	542	547	550	553	554	554
20.0	502	518	533	545	555	563	569	569	563	563
30.0	498	533	563	585	599	611	615	609	597	597
35.0	502	560	611	644	660	672	674	659	642	642
40.0	477	557	652	738	793	818	822	784	738	738
45.0	456	534	613	692	777	882	1002	1078	1075	1075
47.5	448	532	616	684	742	809	905	998	1098	1098
50.0	434	534	629	703	751	796	841	880	944	944
52.5	412	535	649	730	778	818	849	860	878	878
55.0	373	523	670	765	819	856	874	873	881	881
57.5	303	489	680	805	867	906	916	903	905	905
60.0	220	407	659	839	920	974	990	979	986	986
62.5	151	303	593	842	962	1052	1104	1140	1184	1184
65.0	101	198	457	793	979	1128	1292	1408	1552	1552
67.5	75	118	325	664	920	1157	1431	1602	1799	1799
70.0	61	77	195	463	758	1007	1227	1302	1353	1353
72.5	50	57	111	276	461	575	690	708	618	618
75.0	44	42	65	151	226	237	229	238	256	256
77.5	37	31	37	66	67	53	53	58	87	87
80.0	30	20	21	31	30	23	25	27	41	41
82.5	19	13	14	18	15	11	12	13	18	18
85.0	9	6	8	8	7	6	7	7	8	8
87.5	3	2	2	2	2	2	3	3	3	3
90.0	0	0	0	0	0	0	0	0	0	0
92.5	0	0	0	0	0	0	0	0	0	0
95.0	0	0	0	0	0	0	0	0	0	0
97.5	0	0	0	0	0	0	0	0	0	0
100.0	0	0	0	0	0	0	0	0	0	0
102.5	0	0	0	0	0	0	0	0	0	0
105.0	0	0	0	0	0	0	0	0	0	0
120.0	0	0	0	0	0	0	0	0	0	0
135.0	0	0	0	0	0	0	0	0	0	0
150.0	0	0	0	0	0	0	0	0	0	0
165.0	0	0	0	0	0	0	0	0	0	0
180.0	0	0	0	0	0	0	0	0	0	0



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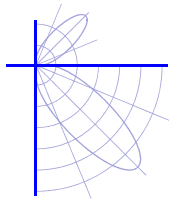
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ROAD SIDE INTENSITY DATA (cd)

Gamma	C-Plane								
	C25	C30	C35	C40	C45	C50	C60	C75	C90
0.0	542	542	542	542	542	542	542	542	542
10.0	554	552	551	548	547	545	542	541	538
20.0	558	552	544	534	525	516	502	494	489
30.0	581	566	549	531	519	509	504	516	528
35.0	617	594	570	558	569	575	576	584	583
40.0	692	669	645	632	634	627	611	612	620
45.0	1003	925	842	790	732	689	661	705	733
47.5	1126	1056	951	855	770	719	701	804	832
50.0	993	982	925	840	777	753	818	923	912
52.5	897	894	860	820	816	859	970	960	860
55.0	884	881	864	890	982	1075	1080	735	490
57.5	910	918	969	1091	1225	1249	935	364	265
60.0	998	1054	1212	1345	1360	1182	466	203	172
62.5	1248	1387	1487	1470	1227	757	214	161	149
65.0	1738	1876	1714	1325	739	291	149	139	130
67.5	2008	2032	1620	866	270	147	119	120	110
70.0	1428	1493	1009	299	132	106	90	97	95
72.5	632	576	352	129	93	74	70	77	65
75.0	244	235	149	82	59	55	56	56	52
77.5	113	108	71	46	41	38	44	47	40
80.0	53	44	28	23	25	26	37	38	29
82.5	23	19	13	13	14	15	25	28	22
85.0	8	8	7	6	7	8	14	17	14
87.5	4	3	3	3	3	4	6	8	6
90.0	0	0	0	0	0	0	0	0	0
92.5	0	0	0	0	0	0	0	0	0
95.0	0	0	0	0	0	0	0	0	0
97.5	0	0	0	0	0	0	0	0	0
100.0	0	0	0	0	0	0	0	0	0
102.5	0	0	0	0	0	0	0	0	0
105.0	0	0	0	0	0	0	0	0	0
120.0	0	0	0	0	0	0	0	0	0
135.0	0	0	0	0	0	0	0	0	0
150.0	0	0	0	0	0	0	0	0	0
165.0	0	0	0	0	0	0	0	0	0
180.0	0	0	0	0	0	0	0	0	0



Certified Test Report No. LL15551

Unilumin Group Co., LED Street Light. Product ID: UNISTWF-0009.

Cast aluminium body 230 x 620 x 120 mm (non.) with beige finish and unpainted/finned cover above light opening. Luminous opening of 144 x 150 mm (nom.) contains four rows of seven LED's, total of 28 LED's.

Hinged upper section houses "Inventronics, EUV-050S024ST 50W" 100-277Vac 50/60Hz LED driver.

Tested with L/O in the horizontal position.

Tested at 240V 50Hz, measured 132 mA, efficacy = 81.0 lm/W.

Test Distance: 8.0 metres
Test Temperature: 25.0 degrees Celsius

Significance: This laboratory has no control over the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.

Special Notes: The intensity values contained in this report are shown as tested. When using these values in calculations the appropriate Ballast Factor and Manufacturer's rated lumens MUST be taken into account.

It should also be noted that prorating the lumen output for the use of other lamp/ballast combinations, or for use in different environmental conditions, than that tested may produce erroneous results.

The generic term "LOR" is used in this report, it denotes the "Light Output Ratio Luminaire" as defined in Australian Standard AS1680, Part 3, 1991, Section 1.3.9.

This report is free of erasures and corrections.

Photometric intensity values are reported using the CIE Cgamma coordinate system as described in CIE Publication number 121.

Uncertainties: At the 95% confidence interval with a factor $k = 2$, the uncertainties for this report are :-

Temperature	+/- 1 degree Celsius
Light Output Ratio	+/- 4%
Luminous Intensity	+/- 4%
Angular displacement	+/- 0.25 degrees.

Testing Procedure: Tested in accordance with the applicable sections of CIE Publications Numbers 121 (1996) and 34 (1977).