

Report of Test LL15538

Unilumin Group Co., LED Street Light. Product ID: UNISTAA-02-01.

Cast aluminium body 350 x 745 x 160 mm (nom.) with off-white finish and unpainted cover above light opening. Luminous opening of 260 x 277 mm (nom.) contains four panels each containing two rows of eight LED's, total of 64 LED's. Hinged upper section houses "Inventronics, EUC-150S070ST" 100-277Vac 50/60Hz LED driver. Tested with L/O in the horizontal position.
Tested at 240V 50Hz, measured 638 mA, efficacy = 79.4 lm/W.

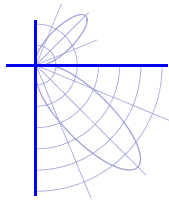


Performance Summary

Luminous flux	11541 lm
Luminaire Power	145.4 W

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





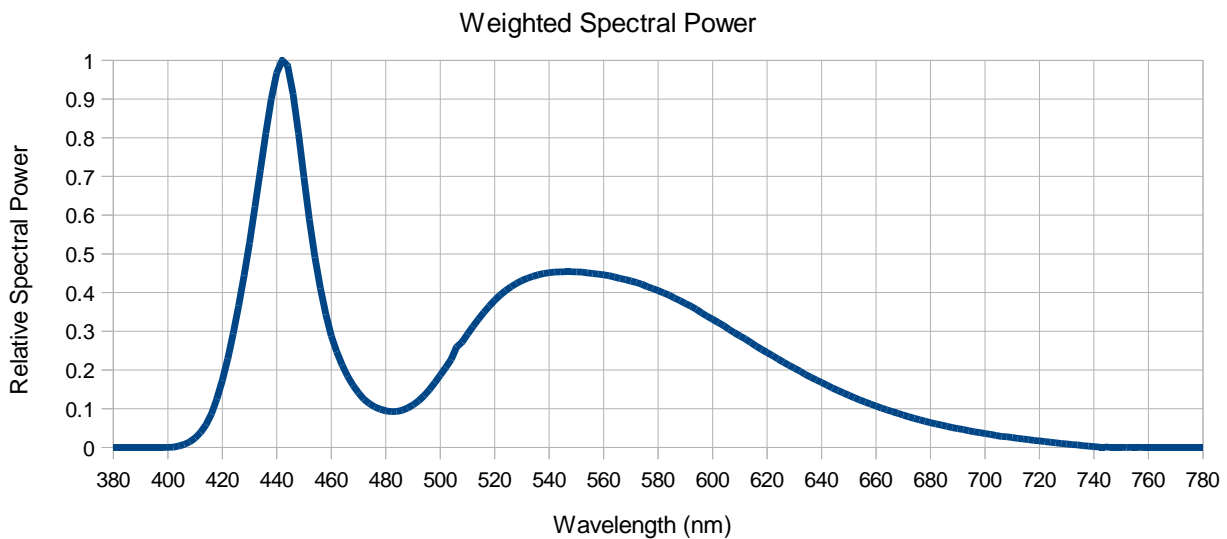
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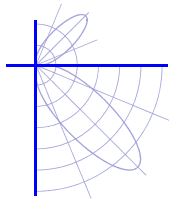
Performance data in accordance with IESNA LM-79 : 2008

Photometry	Total Luminous Flux	11541 lm
	Luminous efficacy	79.4 lm/W
Electrical	Voltage	240 V
	Frequency	50 Hz
	Current	0.638 A
	Power	145.4 W
	Power Factor	0.95
Spectral	CIE 1931 2 deg observer (x, y) ⁽¹⁾	(0.304, 0.314)
	CIE 1976 2 deg observer (u', v') ⁽¹⁾	(0.197, 0.459)
	Correlated Colour Temperature (CCT) ⁽¹⁾	7210 K
	Colour Rendering Index (CRI) ⁽¹⁾	69
	Colour Spatial Uniformity ⁽²⁾	0.0187
	Scotopic/Photopic Ratio ^{(1),(3)}	2.05



* 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	(0.197, 0.441)	(0.198, 0.442)
10	(0.198, 0.442)	(0.197, 0.440)
20	(0.198, 0.444)	(0.198, 0.440)
30	(0.198, 0.446)	(0.198, 0.444)
40	(0.198, 0.450)	(0.198, 0.448)
50	(0.198, 0.455)	(0.197, 0.455)
60	(0.198, 0.462)	(0.196, 0.463)
70	(0.197, 0.470)	(0.196, 0.474)
80	(0.196, 0.476)	I <= 10 %
90	I <= 10 %	I <= 10 %

Spatial measurements (upper hemisphere)

Gamma angle (deg)	CIE 1976 (u',v' coordinates)	
	C plane	C plane
90	I <= 10 %	I <= 10 %
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

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 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

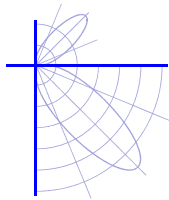
A Yokogawa WT210 power meter connected in circuit to the sample electrical supply

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)

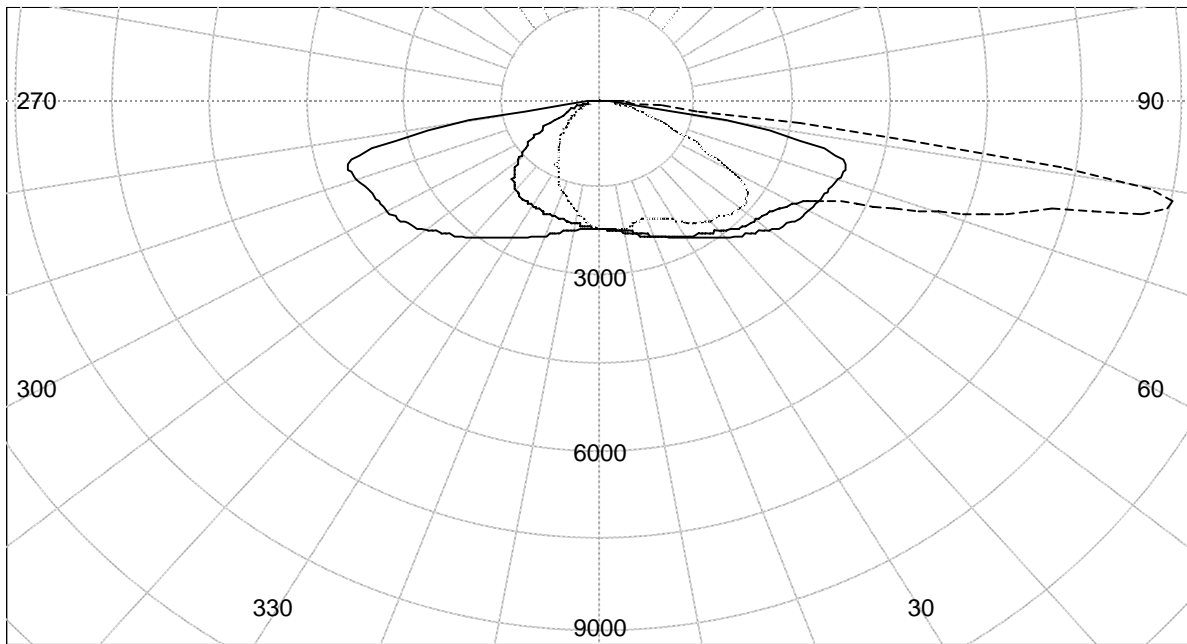


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Polar Light Distribution Curves



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

Street Lantern Summary: Report data as tested.

Percentage Outputs

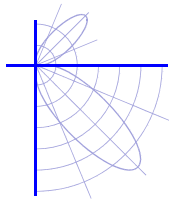
	Upward	Downward	Total
Street Side	N / A	N / A	N / A
House Side	N / A	N / A	N / A

Luminaire Efficiency (Light Output Ratio) N / A

Certified by: *K Monaghan*

Kevin Monaghan
Authorised Signatory

Date of test 13-Jun-2012
Date of report 14-Jun-2012



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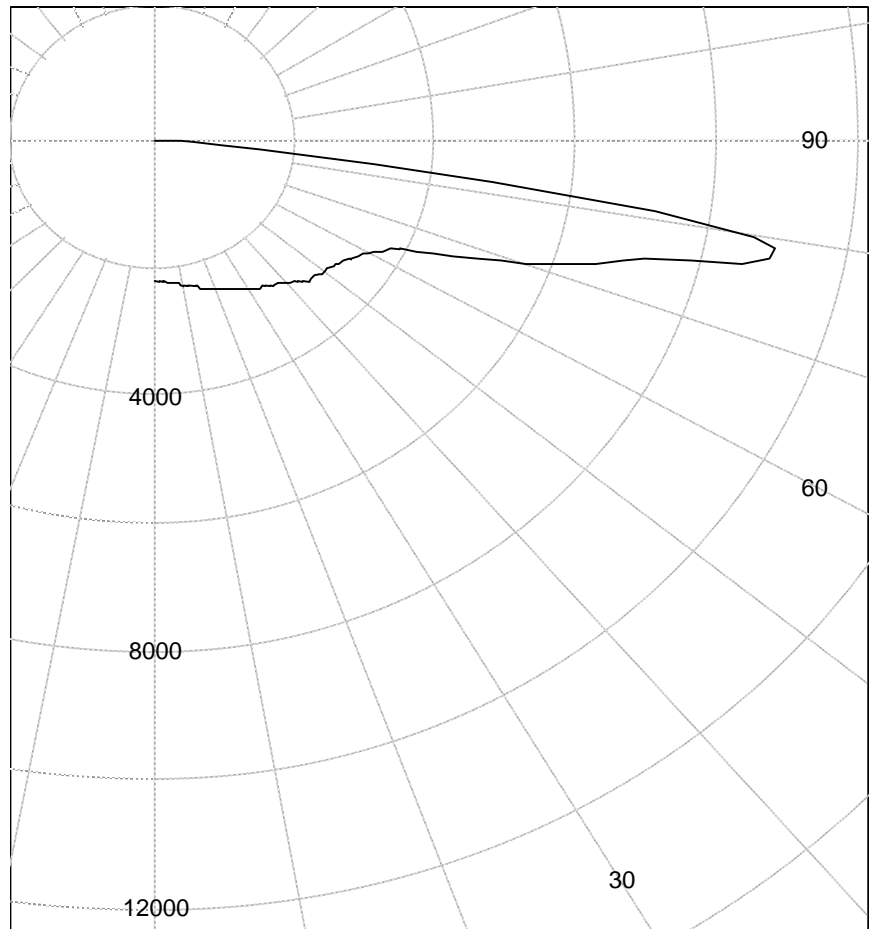
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Intensity
in principal plane

Principal Vertical Plane

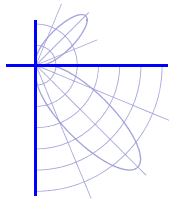
Gamma (Degrees)	Intensity (cd)
0.0	2196.3
10.0	2304.1
20.0	2478.3
30.0	2684.9
35.0	2797.8
40.0	2931.2
45.0	3097.7
47.5	3148.7
50.0	3183.4
52.5	3233.4
55.0	3313.5
57.5	3421.9
60.0	3540.4
62.5	3735.0
65.0	4124.4
67.5	4819.4
70.0	5617.9
72.5	6455.8
75.0	7262.4
77.5	8841.4
80.0	8670.4
82.5	3897.6
85.0	965.9
87.5	340.6
90.0	62.2
92.5	13.8
95.0	8.0
97.5	5.4
100.0	3.5
102.5	2.8
105.0	2.6
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	4015.4 cd @ (0.0, 72.5)
Street Side	9066.9 cd @ (30.0, 78.5)

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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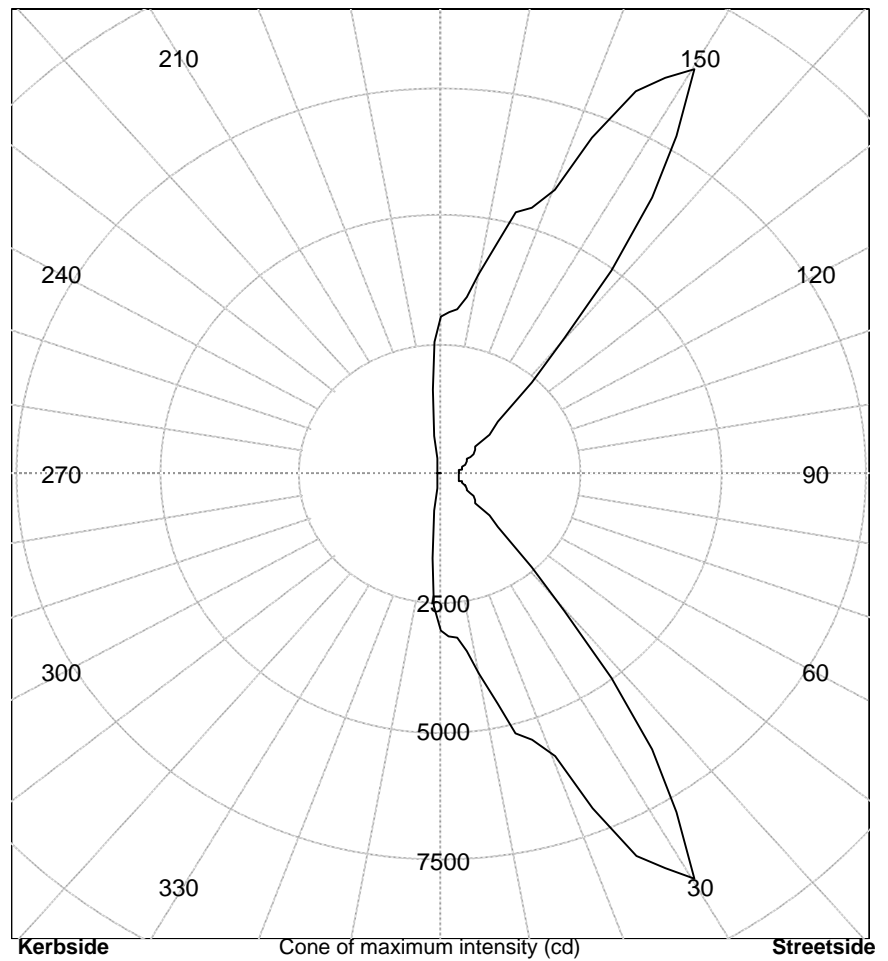
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Principal Conical Surface

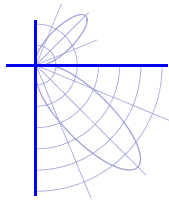
Intensity
in principal cone

C-Plane (Degrees)	Intensity (cd)
90.0	306.5
75.0	340.5
60.0	568.6
50.0	826.2
45.0	1436.1
40.0	3454.3
35.0	6554.9
30.0	9066.9
25.0	8211.7
20.0	5859.1
15.0	5249.4
10.0	3928.1
5.0	3221.2
0.0	3024.7
355.0	1665.5
350.0	316.1
345.0	186.9
340.0	147.8
335.0	136.3
330.0	132.9
325.0	123.5
320.0	122.9
315.0	111.2
310.0	97.3
300.0	74.0
285.0	36.0
270.0	21.5



	Maximum Intensity
House Side	4015.4 cd @ (0.0, 72.5)
Street Side	9066.9 cd @ (30.0, 78.5)

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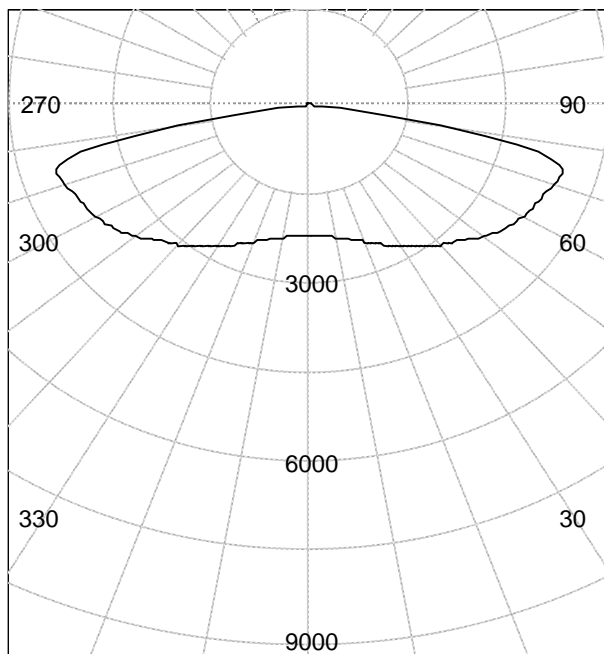


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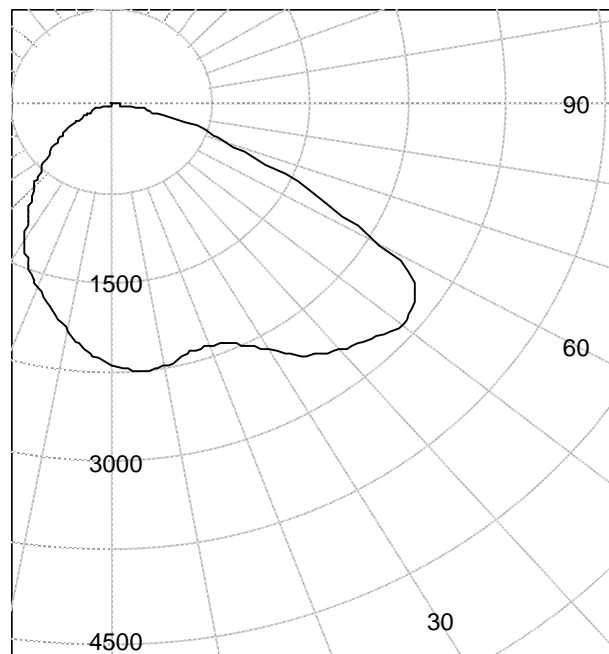
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Polar curve through CIE C0 / C180



Polar curve through CIE C90 / C270



**Downstream
(C180)**

(cd)

**Upstream
(C0)**

**Kerbside
(C270)**

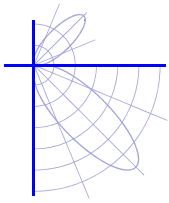
(cd)

**Streetside
(C90)**

Performance Parameters

I_{80}	=	2023.1 cd
I_{88}	=	14.5 cd
I_{90}	=	6.5 cd
I_{80} / I_{88}	=	139.969

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

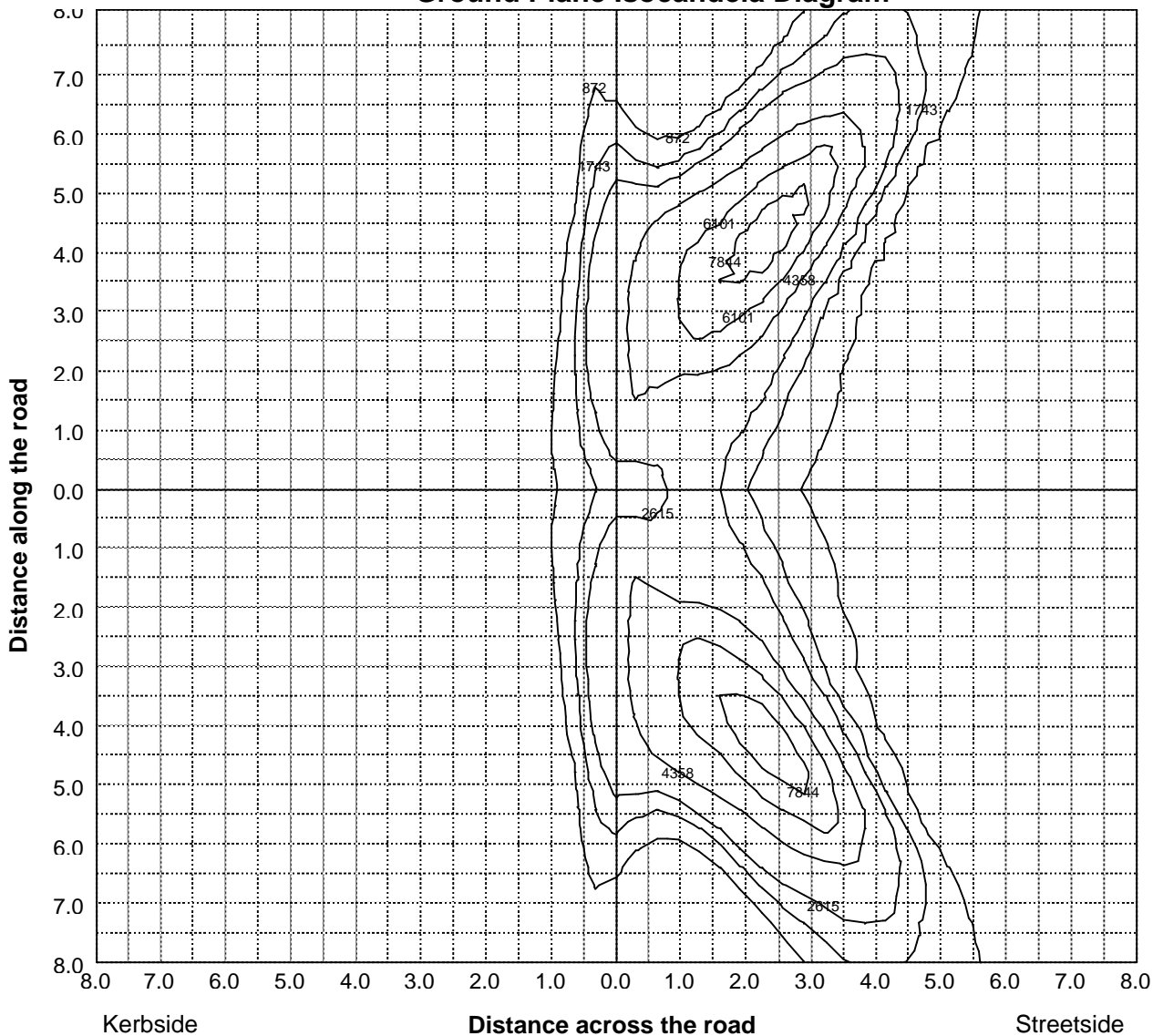


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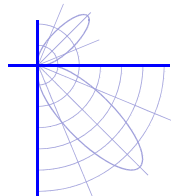
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Ground Plane Isocandela Diagram



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.



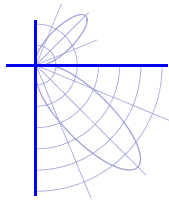
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KERB SIDE INTENSITY DATA (cd)

Gamma	C-Plane								
	C270	C285	C300	C310	C315	C320	C325	C330	C335
0.0	2196	2196	2196	2196	2196	2196	2196	2196	2196
10.0	1933	1950	1993	2040	2064	2091	2115	2142	2166
20.0	1644	1677	1768	1861	1914	1973	2032	2105	2178
30.0	1283	1343	1518	1681	1774	1868	1963	2070	2189
35.0	1094	1158	1338	1532	1651	1781	1910	2055	2195
40.0	914	982	1183	1362	1479	1634	1800	1998	2183
45.0	772	805	1002	1200	1314	1443	1609	1857	2099
47.5	699	716	901	1099	1218	1350	1505	1742	2027
50.0	616	627	789	981	1106	1249	1392	1618	1925
52.5	554	561	687	860	977	1130	1280	1480	1789
55.0	493	495	586	724	829	982	1131	1337	1624
57.5	433	434	504	604	701	815	977	1185	1455
60.0	355	356	433	510	570	656	794	1005	1279
62.5	293	298	355	422	463	537	622	808	1083
65.0	243	241	293	339	378	427	482	604	836
67.5	201	204	244	276	299	338	371	443	568
70.0	167	174	205	228	248	263	294	338	410
72.5	99	118	157	178	195	209	221	252	295
75.0	68	76	114	144	157	165	173	189	214
77.5	34	46	84	109	123	131	136	146	155
80.0	3	20	59	82	95	102	97	105	116
82.5	0	8	33	56	67	73	83	86	88
85.0	0	2	13	30	36	46	60	82	89
87.5	0	0	2	7	11	16	24	39	44
90.0	0	0	0	0	1	2	3	5	8
92.5	0	0	0	0	0	1	1	2	2
95.0	0	0	0	0	0	0	0	1	1
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

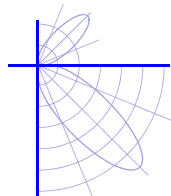


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Gamma	KERB SIDE		INTENSITY DATA (cd)				ROAD SIDE			
	C340	C345	C350	C355	C-Plane		C10	C15	C20	
					C0	C5				
0.0	2196	2196	2196	2196	2196	2196	2196	2196	2196	2196
10.0	2192	2214	2234	2253	2269	2278	2287	2295	2302	2302
20.0	2248	2312	2367	2421	2463	2486	2511	2523	2522	2522
30.0	2329	2457	2561	2665	2747	2807	2853	2842	2810	2810
35.0	2356	2529	2667	2798	2911	3010	3071	3038	2978	2978
40.0	2364	2566	2753	2925	3084	3242	3330	3280	3180	3180
45.0	2343	2558	2803	3022	3244	3474	3613	3568	3426	3426
47.5	2308	2549	2816	3075	3341	3619	3768	3719	3550	3550
50.0	2250	2541	2824	3141	3452	3784	3948	3901	3707	3707
52.5	2179	2529	2837	3195	3553	3945	4120	4084	3864	3864
55.0	2079	2502	2864	3247	3645	4099	4299	4265	4016	4016
57.5	1951	2476	2915	3297	3709	4206	4431	4415	4172	4172
60.0	1762	2449	2976	3366	3766	4299	4544	4561	4354	4354
62.5	1524	2351	3006	3432	3816	4361	4637	4705	4581	4581
65.0	1284	2114	3006	3518	3851	4374	4721	4834	4914	4914
67.5	986	1724	2920	3581	3897	4368	4801	5002	5317	5317
70.0	598	1283	2608	3591	3961	4416	4939	5236	5893	5893
72.5	387	712	1989	3466	4015	4482	5129	5628	6624	6624
75.0	254	390	1274	3027	3926	4480	5272	6031	7216	7216
77.5	166	214	476	2113	3406	4046	4934	5784	6463	6463
80.0	127	148	211	1000	2023	1324	1570	3295	4577	4577
82.5	99	105	132	268	248	96	110	284	1685	1685
85.0	87	70	84	118	59	37	49	84	251	251
87.5	45	34	33	33	19	20	30	42	115	115
90.0	11	9	11	8	6	10	16	18	28	28
92.5	3	3	4	5	5	6	7	8	10	10
95.0	1	2	3	3	3	4	4	4	7	7
97.5	0	1	1	1	1	1	2	1	3	3
100.0	0	0	0	0	0	0	0	0	1	1
102.5	0	0	0	0	0	0	0	0	1	1
105.0	0	0	0	0	0	0	0	0	1	1
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



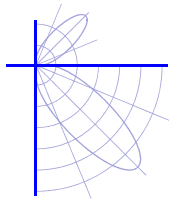
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ROAD SIDE INTENSITY DATA (cd)

Gamma	C-Plane								
	C25	C30	C35	C40	C45	C50	C60	C75	C90
0.0	2196	2196	2196	2196	2196	2196	2196	2196	2196
10.0	2302	2304	2300	2297	2287	2282	2266	2245	2237
20.0	2500	2478	2443	2405	2354	2315	2244	2178	2160
30.0	2755	2685	2618	2561	2495	2456	2398	2368	2381
35.0	2887	2798	2719	2658	2580	2543	2546	2564	2573
40.0	3050	2931	2836	2748	2685	2674	2674	2686	2690
45.0	3247	3098	2926	2840	2781	2760	2769	2780	2786
47.5	3330	3149	2958	2881	2815	2797	2824	2837	2849
50.0	3432	3183	2981	2920	2852	2838	2894	2898	2882
52.5	3551	3233	3023	2955	2882	2894	2990	2919	2860
55.0	3661	3313	3094	2993	2941	3000	3084	2889	2815
57.5	3770	3422	3190	3064	3054	3139	3116	2851	2693
60.0	3911	3540	3323	3241	3244	3256	3111	2691	2353
62.5	4109	3735	3544	3500	3431	3339	3070	2298	1880
65.0	4498	4124	3942	3790	3571	3414	2880	1971	1554
67.5	5193	4819	4395	4018	3718	3466	2516	1644	1200
70.0	6031	5618	4821	4255	3868	3301	2160	1127	896
72.5	6874	6456	5401	4537	3680	2768	1434	911	767
75.0	7750	7262	6091	4437	3013	2003	1000	698	570
77.5	8311	8841	6599	3791	1938	1031	667	425	327
80.0	7014	8670	6052	2469	887	593	463	297	273
82.5	2913	3898	2666	639	326	309	289	229	202
85.0	803	966	506	259	167	157	138	139	100
87.5	302	341	186	110	68	64	58	64	55
90.0	60	62	48	27	23	21	24	33	27
92.5	12	14	13	8	8	7	6	7	7
95.0	7	8	6	4	4	4	2	2	2
97.5	3	5	3	2	2	2	1	0	0
100.0	1	4	2	1	0	0	0	0	0
102.5	1	3	1	0	0	0	0	0	0
105.0	1	3	1	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. LL15538

Unilumin Group Co., LED Street Light. Product ID: UNISTAA-02-01.

Cast aluminium body 350 x 745 x 160 mm (nom.) with off-white finish and unpainted cover above light opening. Luminous opening of 260 x 277 mm (nom.) contains four panels each containing two rows of eight LED's, total of 64 LED's. Hinged upper section houses "Inventronics, EUC-150S070ST" 100-277Vac 50/60Hz LED driver. Tested with L/O in the horizontal position.
Tested at 240V 50Hz, measured 638 mA, efficacy = 79.4 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).