

Report of Test LL15654

Unilumin Group Co., LED Street Light. Product ID: UNISTAA-04-01.

Cast aluminium body 346 x 850 x 150 mm (nom.) with off-white finish and unpainted cover above light opening. Luminous opening of 260 x 420 mm (nom.) contains six panels, each containing two rows of eight LED's, total of 96 LED's. Hinged upper section houses two x "Inventronics, EUC-120S070ST" 100-277Vac 50/60Hz LED driver. Tested with L/O in the horizontal position.

Tested at 240V 50Hz, measured 960 mA, efficacy = 77.1 lm/W.

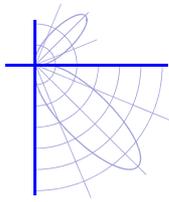


Performance Summary

Luminous flux	17162 lm
Luminaire Power	222.6 W

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





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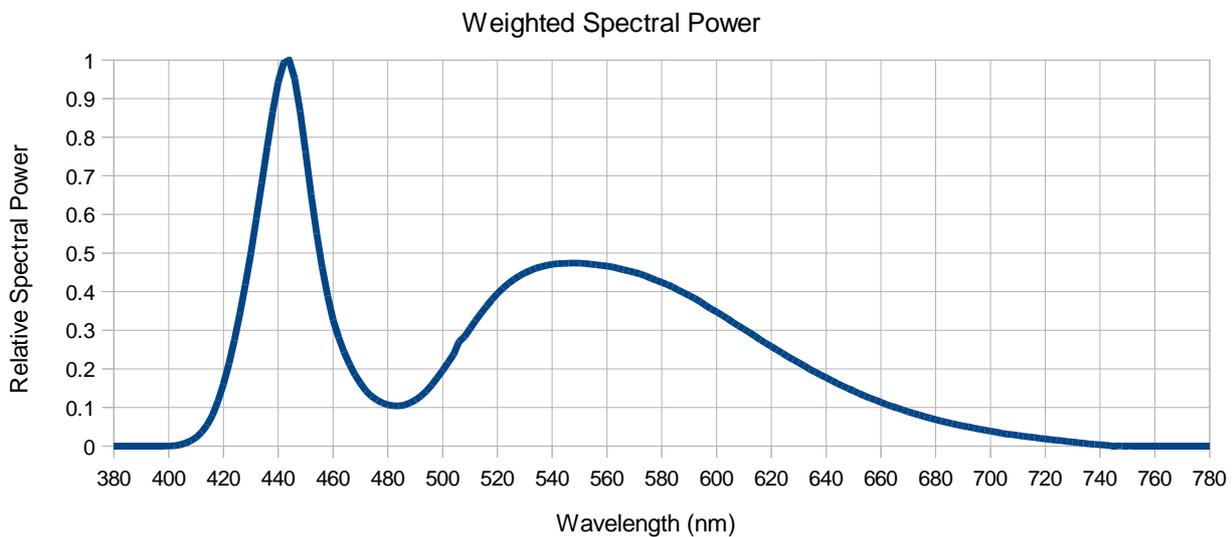
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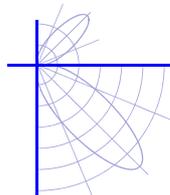
Performance data in accordance with IESNA LM-79 : 2008

Photometry	Total Luminous Flux	17162 lm
	Luminous efficacy	77.1 lm/W
Electrical	Voltage	240 V
	Frequency	50 Hz
	Current	0.960 A
	Power	222.6 W
	Power Factor	0.96
Spectral	CIE 1931 2 deg observer (x, y) ⁽¹⁾	(0.305, 0.316)
	CIE 1976 2 deg observer (u', v') ⁽¹⁾	(0.197, 0.460)
	Correlated Colour Temperature (CCT) ⁽¹⁾	7100 K
	Colour Rendering Index (CRI) ⁽¹⁾	70
	Colour Spatial Uniformity ⁽²⁾	0.0206
	Scotopic/Photopic Ratio ^{(1),(3)}	2.06



* 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, 0.442)	(0.197, 0.442)
10	(0.197, 0.443)	(0.197, 0.440)
20	(0.198, 0.444)	(0.197, 0.441)
30	(0.198, 0.447)	(0.198, 0.444)
40	(0.198, 0.451)	(0.197, 0.449)
50	(0.198, 0.457)	(0.197, 0.456)
60	(0.198, 0.463)	(0.197, 0.465)
70	(0.197, 0.474)	(0.196, 0.475)
80	(0.195, 0.476)	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

5.25 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 %

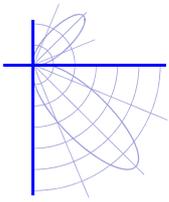
power factor

± 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)



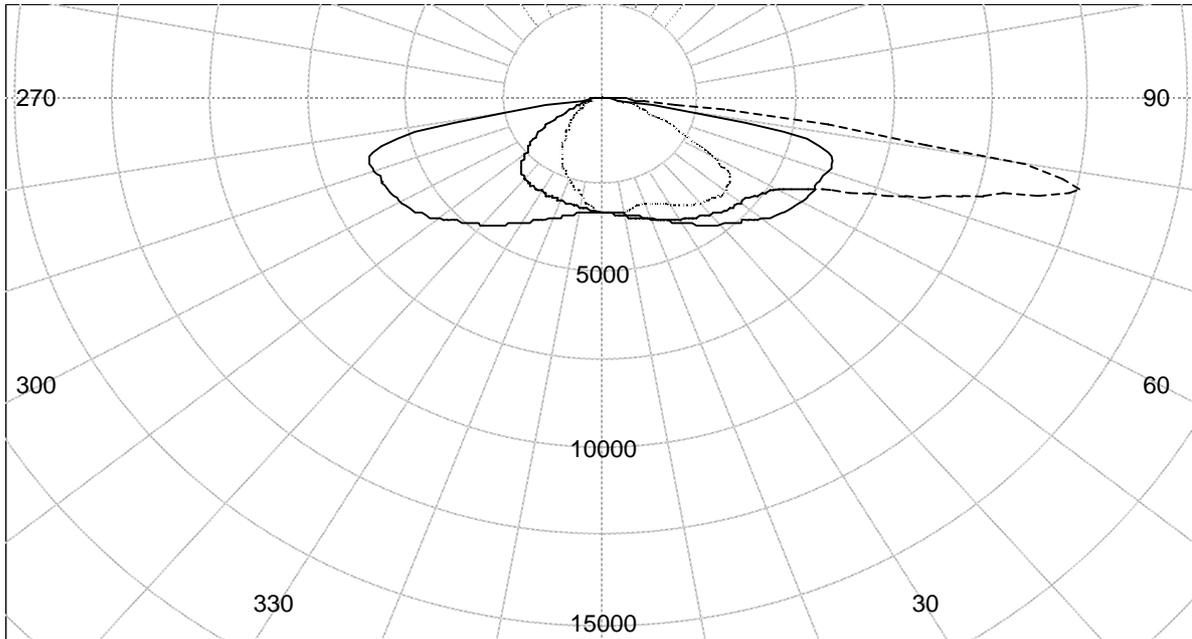
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Polar Light Distribution Curves



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

Street Lantern Summary: Report data as tested.

Percentage Outputs

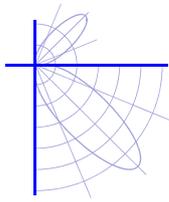
	Upward	Downward	Total
Street Side	N / A	N / A	N / A
House Side	N / A	N / A	N / A

Luminaire Efficiency (Light Output Ratio) N / A

Certified by: *K Monaghan*

Kevin Monaghan
Authorised Signatory

Date of test 24-Jul-2012
Date of report 24-Jul-2012



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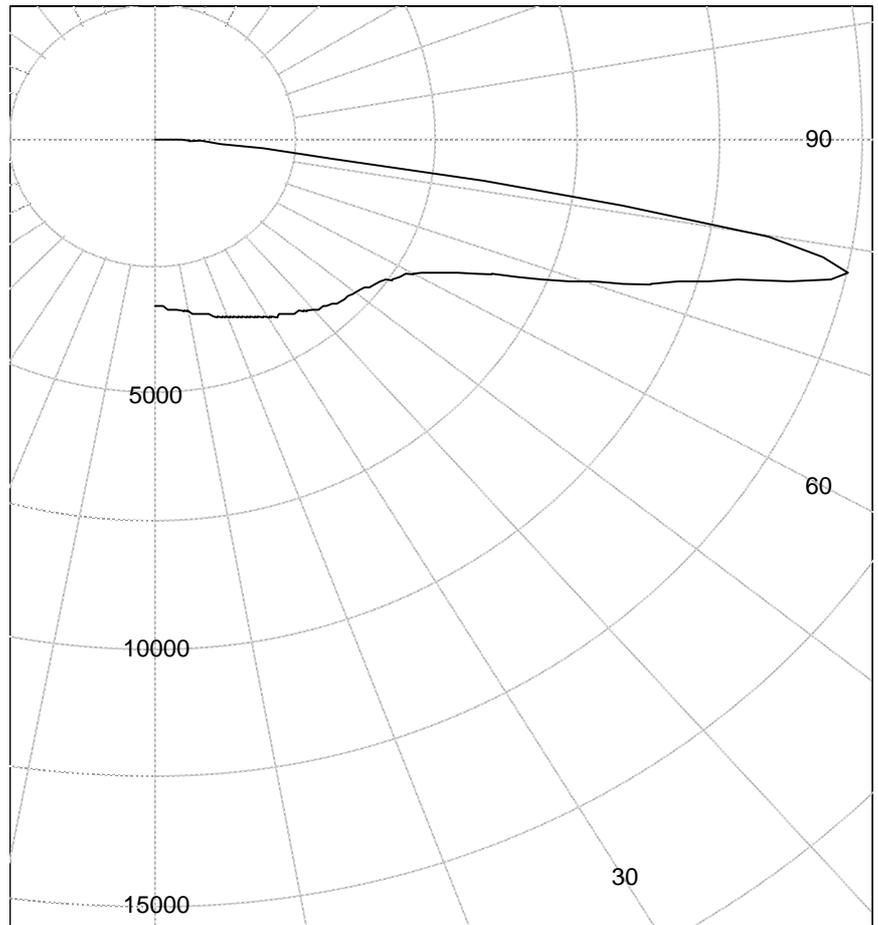
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Intensity
in principal plane

Principal Vertical Plane

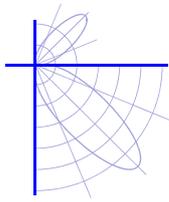
Gamma (Degrees)	Intensity (cd)
0.0	3277.6
10.0	3452.2
20.0	3719.4
30.0	4032.3
35.0	4191.5
40.0	4376.7
45.0	4570.6
47.5	4630.0
50.0	4681.0
52.5	4768.6
55.0	4903.4
57.5	5066.7
60.0	5291.0
62.5	5625.8
65.0	6248.7
67.5	7162.7
70.0	8270.3
72.5	9465.2
75.0	10689.0
77.5	12539.1
80.0	11037.2
82.5	4642.1
85.0	1161.5
87.5	576.2
90.0	108.8
92.5	19.7
95.0	10.5
97.5	6.8
100.0	4.9
102.5	4.9
105.0	4.9
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	6223.8 cd @ (0.0, 72.0)
Street Side	12539.1 cd @ (30.0, 77.5)

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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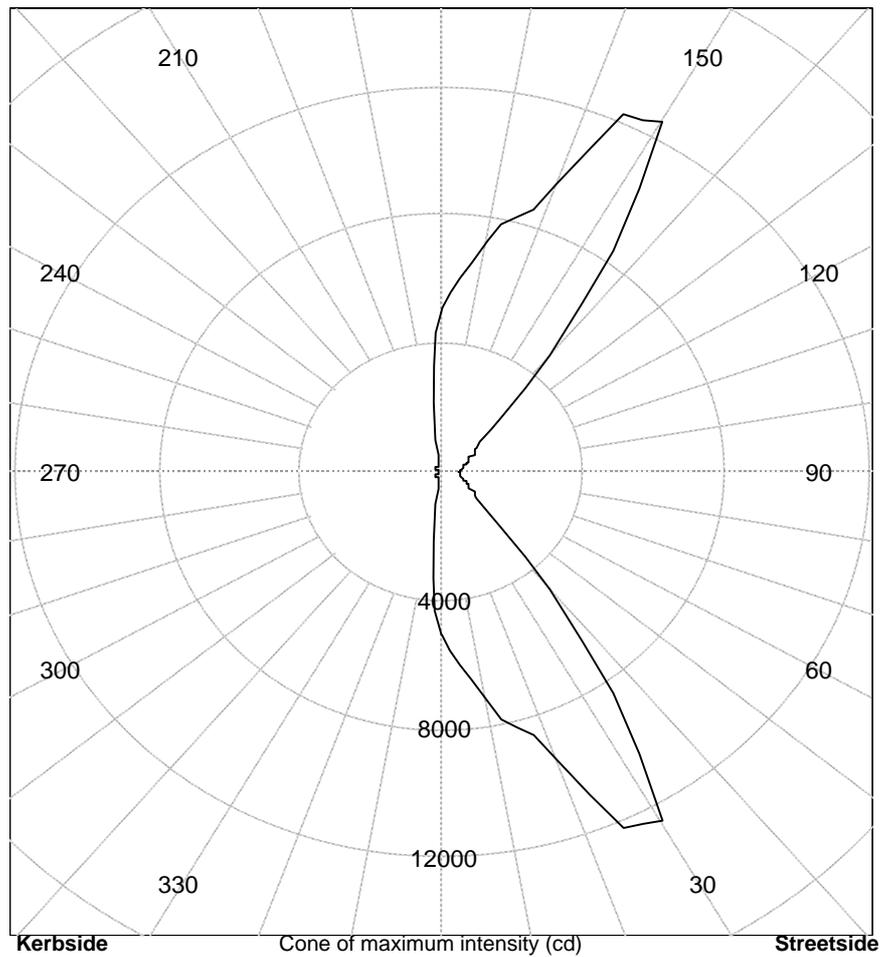
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Principal Conical Surface

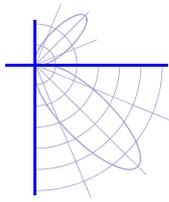
Intensity
in principal cone

C-Plane (Degrees)	Intensity (cd)
90.0	478.6
75.0	603.5
60.0	908.9
50.0	1396.9
45.0	2377.1
40.0	4721.6
35.0	8426.5
30.0	12539.1
25.0	12263.1
20.0	9517.4
15.0	8203.3
10.0	7290.5
5.0	6027.9
0.0	5081.9
355.0	3302.0
350.0	1042.0
345.0	395.2
340.0	292.5
335.0	258.7
330.0	246.2
325.0	233.1
320.0	219.1
315.0	208.2
310.0	187.6
300.0	154.9
285.0	115.1
270.0	107.0



	Maximum Intensity
House Side	6223.8 cd @ (0.0, 72.0)
Street Side	12539.1 cd @ (30.0, 77.5)

Note: The coordinate pairs in the above table are expressed in degrees and have the format (C plane, Gamma angle).
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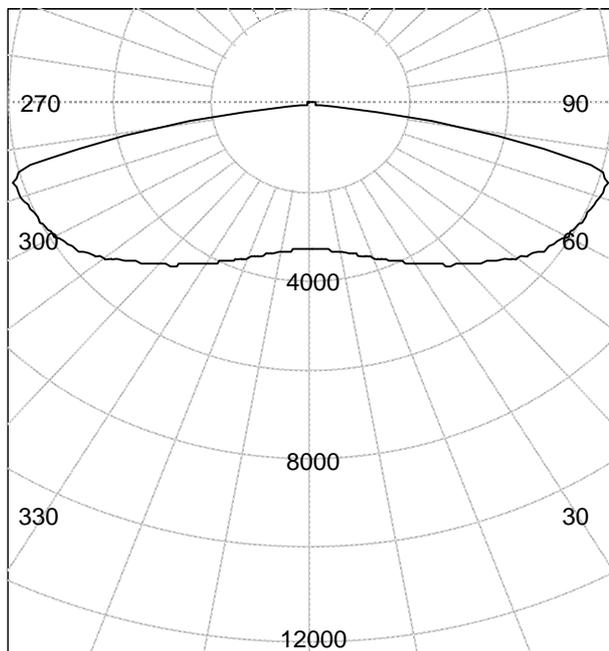
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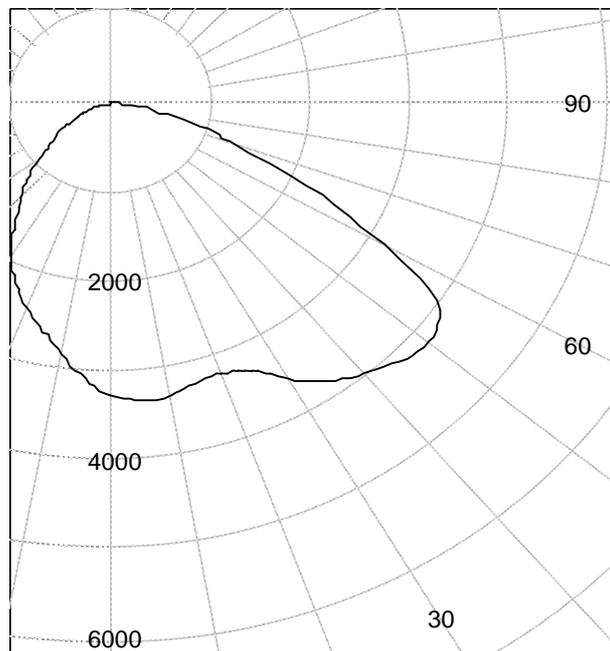
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Polar curve through CIE C0 / C180



Polar curve through CIE C90 / C270



**Downstream
(C180)**

(cd)

**Upstream
(C0)**

**Kerbside
(C270)**

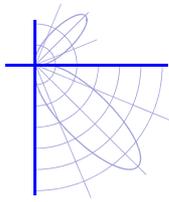
(cd)

**Streetside
(C90)**

Performance Parameters

I_{80}	=	2468.9	cd
I_{88}	=	25.4	cd
I_{90}	=	12.6	cd
I_{80} / I_{88}	=	97.281	

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



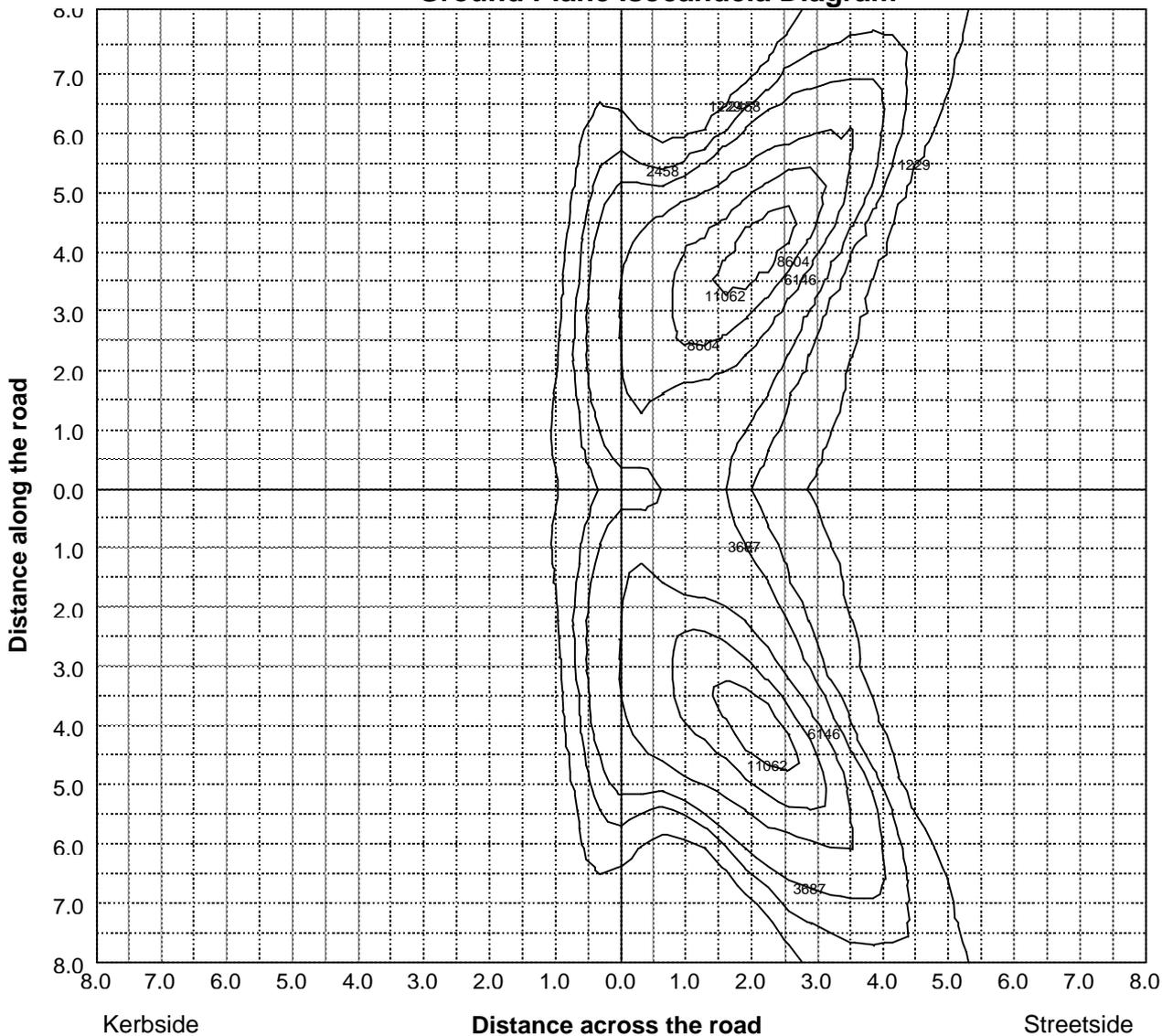
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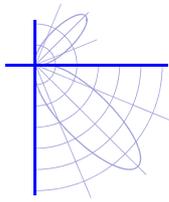
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Ground Plane Isocandela Diagram



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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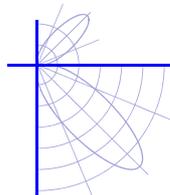
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KERB SIDE INTENSITY DATA (cd)

Gamma	C-Plane								
	C270	C285	C300	C310	C315	C320	C325	C330	C335
0.0	3278	3278	3278	3278	3278	3278	3278	3278	3278
10.0	2875	2889	2958	3028	3063	3104	3145	3186	3227
20.0	2447	2504	2637	2764	2837	2926	3026	3132	3241
30.0	1934	2021	2279	2512	2640	2780	2939	3101	3285
35.0	1649	1756	2018	2294	2473	2666	2878	3087	3307
40.0	1386	1488	1786	2055	2230	2459	2738	3023	3302
45.0	1152	1217	1517	1817	1987	2197	2475	2840	3214
47.5	1031	1079	1364	1670	1852	2053	2326	2695	3122
50.0	910	950	1195	1484	1676	1896	2150	2517	2984
52.5	813	837	1026	1302	1479	1710	1979	2331	2816
55.0	724	741	883	1092	1268	1483	1756	2093	2598
57.5	647	649	758	922	1057	1252	1506	1863	2348
60.0	544	554	650	774	877	1010	1240	1578	2072
62.5	458	462	543	645	720	825	986	1288	1774
65.0	386	385	451	521	588	663	762	979	1389
67.5	329	324	373	432	474	525	592	724	992
70.0	276	278	315	352	391	427	471	539	675
72.5	193	209	251	288	310	337	361	412	485
75.0	146	152	196	233	256	273	288	313	357
77.5	107	115	155	188	208	219	233	246	259
80.0	59	81	118	150	167	175	166	181	202
82.5	12	46	78	108	122	125	141	149	158
85.0	0	17	41	65	74	82	102	127	142
87.5	0	6	14	25	29	35	48	62	75
90.0	0	0	1	4	5	6	9	12	15
92.5	0	0	1	2	2	3	4	5	6
95.0	0	0	0	1	1	2	3	3	4
97.5	0	0	1	1	1	1	1	2	2
100.0	1	1	1	1	1	1	1	2	1
102.5	1	1	1	1	1	1	1	2	2
105.0	1	1	1	1	1	2	1	2	2
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



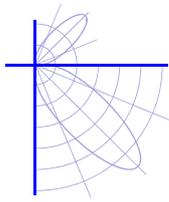
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Gamma	KERB SIDE				INTENSITY DATA (cd)		ROAD SIDE			
	C340	C345	C350	C355	C-Plane		C10	C15	C20	
					C0	C5				
0.0	3278	3278	3278	3278	3278	3278	3278	3278	3278	3278
10.0	3265	3305	3338	3365	3389	3409	3424	3434	3446	3446
20.0	3345	3452	3544	3623	3697	3735	3772	3788	3780	3780
30.0	3483	3684	3854	4005	4159	4248	4290	4274	4210	4210
35.0	3544	3804	4027	4225	4431	4562	4609	4560	4459	4459
40.0	3577	3886	4180	4440	4737	4939	5002	4921	4748	4748
45.0	3565	3922	4284	4634	5034	5329	5449	5344	5105	5105
47.5	3533	3929	4329	4735	5205	5550	5673	5574	5275	5275
50.0	3468	3930	4376	4857	5415	5807	5969	5827	5488	5488
52.5	3382	3932	4419	4952	5592	6059	6226	6087	5696	5696
55.0	3263	3927	4480	5051	5759	6285	6483	6375	5924	5924
57.5	3102	3904	4556	5141	5868	6452	6685	6608	6163	6163
60.0	2868	3859	4654	5246	5969	6584	6868	6849	6437	6437
62.5	2563	3731	4716	5340	6045	6690	7001	7102	6826	6826
65.0	2155	3435	4709	5440	6081	6758	7141	7352	7382	7382
67.5	1667	2928	4545	5533	6119	6805	7268	7635	8091	8091
70.0	1112	2270	4108	5529	6187	6895	7546	8017	8980	8980
72.5	673	1435	3328	5267	6221	6962	7826	8642	10007	10007
75.0	442	790	2297	4690	6051	6879	8039	8977	10677	10677
77.5	292	395	1042	3302	5082	6028	7290	8203	9517	9517
80.0	216	259	454	1672	2469	1625	2288	4874	6605	6605
82.5	174	188	241	457	302	159	199	577	2571	2571
85.0	139	127	151	178	91	68	90	178	474	474
87.5	81	63	57	47	32	36	54	84	209	209
90.0	19	18	21	15	13	17	26	30	47	47
92.5	7	8	9	10	11	11	14	16	16	16
95.0	5	6	7	7	8	9	11	12	12	12
97.5	3	3	4	4	4	4	6	8	7	7
100.0	1	1	2	2	1	1	3	4	5	5
102.5	2	2	1	1	1	1	3	5	5	5
105.0	2	2	2	1	1	1	2	4	4	4
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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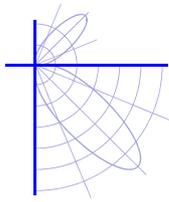
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ROAD SIDE INTENSITY DATA (cd)

Gamma	C-Plane								
	C25	C30	C35	C40	C45	C50	C60	C75	C90
0.0	3278	3278	3278	3278	3278	3278	3278	3278	3278
10.0	3449	3452	3449	3440	3433	3422	3397	3368	3347
20.0	3755	3719	3666	3603	3545	3482	3371	3273	3234
30.0	4127	4032	3918	3816	3740	3676	3596	3563	3565
35.0	4330	4192	4065	3940	3865	3823	3825	3829	3813
40.0	4555	4377	4214	4074	4032	4011	4000	3992	3965
45.0	4846	4571	4338	4208	4161	4123	4129	4116	4092
47.5	4952	4630	4384	4267	4212	4177	4202	4197	4168
50.0	5087	4681	4431	4315	4268	4243	4318	4253	4189
52.5	5246	4769	4496	4359	4325	4342	4424	4252	4142
55.0	5402	4903	4601	4433	4433	4485	4519	4185	4030
57.5	5555	5067	4743	4570	4628	4649	4518	4078	3773
60.0	5766	5291	4971	4861	4861	4773	4475	3694	3179
62.5	6132	5626	5352	5209	5070	4840	4311	3186	2604
65.0	6801	6249	5916	5538	5246	4894	3947	2753	2160
67.5	7853	7163	6452	5822	5397	4841	3473	2194	1641
70.0	9036	8270	7052	6092	5413	4457	2928	1567	1276
72.5	10219	9465	7761	6217	4935	3758	1899	1297	1097
75.0	11461	10689	8378	5654	4064	2484	1369	968	752
77.5	12263	12539	8427	4722	2377	1397	909	603	479
80.0	9473	11037	6801	2276	1173	806	667	430	394
82.5	3613	4642	2269	782	518	457	425	338	283
85.0	1061	1162	690	380	273	249	230	215	145
87.5	495	576	323	179	120	113	107	109	82
90.0	88	109	81	46	34	34	34	40	32
92.5	18	20	16	13	11	11	10	10	9
95.0	11	11	10	8	7	6	5	3	3
97.5	7	7	7	5	3	4	4	2	2
100.0	5	5	6	4	3	3	3	2	2
102.5	5	5	5	4	2	2	2	2	2
105.0	4	5	5	3	2	2	2	2	2
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. LL15654

Unilumin Group Co., LED Street Light. Product ID: UNISTAA-04-01.

Cast aluminium body 346 x 850 x 150 mm (nom.) with off-white finish and unpainted cover above light opening. Luminous opening of 260 x 420 mm (nom.) contains six panels, each containing two rows of eight LED's, total of 96 LED's. Hinged upper section houses two x "Inventronics, EUC-120S070ST" 100-277Vac 50/60Hz LED driver. Tested with L/O in the horizontal position.

Tested at 240V 50Hz, measured 960 mA, efficacy = 77.1 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).