Report of Test

LL18265

Empyrean Lighting 20 W (nom.) LED Oyster Light. Product ID: Cyllene-W24WN-5350. Circular pressed metal body with white finish, extent ~ 360 mm dia. x 18 mm deep. Opal diffuser forms luminous opening of 380 mm dia. x 105 mm deep. Two concentric rings of three 2B6WA and three 2B2WA PCBs centred 66 mm apart and 10 mm above L/O. Clear plastic cover about LEDs. One C090P-24-0300 180-240VAC 50/60Hz electronic driver.
Tested at 240 V 50 Hz.

Performance Summary

Luminous flux	1709 lm
Total Luminaire Power (LCP)	21.6 W
Luminous Efficacy	78.9 lm/W
SHR Nominal	1.50
SHR Maximum	1.68

PREPARED FOR : Empyrean Lighting, Birtinya. QLD. 4575.

ORIGINAL REPORT

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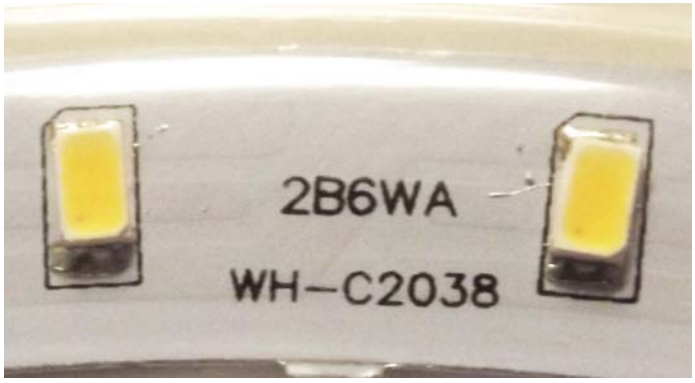

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LM-79 Performance Data

Spectral	CIE 1931 (x, y)	(1)	(0.377, 0.370)
	CIE 1976 (u', v')	(1)	(0.226, 0.498)
	Correlated Colour Temperature (CCT)	(1)	4040 K
	Colour Spatial Uniformity	(2)	0.0017
	Colour Rendering Index (Ra)	(1)	87
	Special CRI 9 (R_9)	(1),(3)	31
	Distance from Planckian Locus (Duv)	(1),(3)	-0.0022
	Scotopic/Photopic Ratio	(1),(3)	1.77

Electrical	Voltage		240 V
	Frequency		50 Hz
	Current		0.189 A
	Power		21.6 W
	Power Factor		0.48
	Current THD		178 %

Performance data in accordance with IESNA LM-79-08. Spectral calculations are for a CIE 2° observer

(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-79-08

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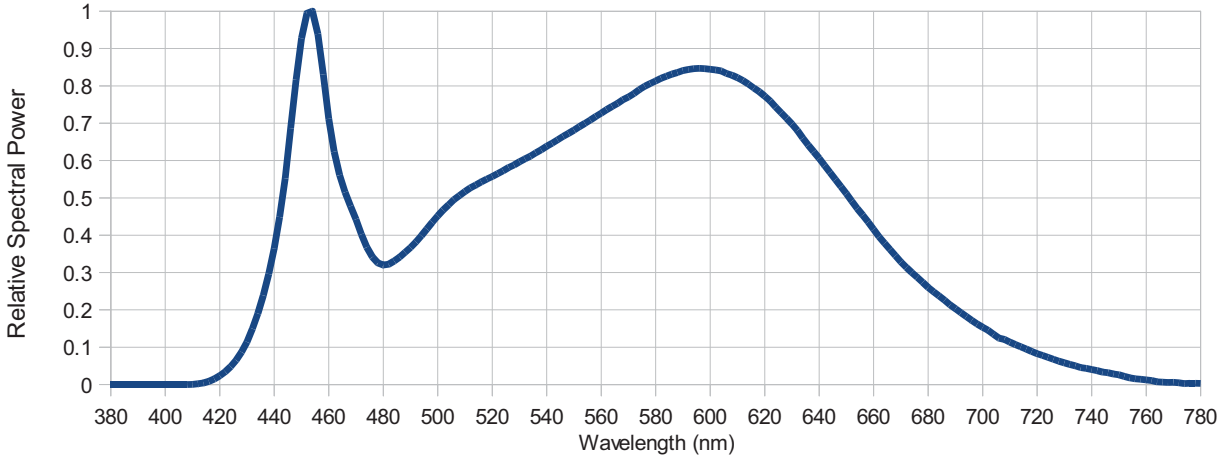
LM-79 Performance Data

Summary Relative Spectral Irradiance Distribution (wavelength – nm, irradiance – relative to peak = 1)

380	2.82E-05	480	3.20E-01	580	8.13E-01	680	2.60E-01
385	0.00E+00	485	3.36E-01	585	8.29E-01	685	2.32E-01
390	6.51E-05	490	3.67E-01	590	8.41E-01	690	2.03E-01
395	3.74E-05	495	4.08E-01	595	8.47E-01	695	1.77E-01
400	2.94E-05	500	4.52E-01	600	8.45E-01	700	1.53E-01
405	7.69E-05	505	4.88E-01	605	8.37E-01	705	1.29E-01
410	5.83E-04	510	5.17E-01	610	8.22E-01	710	1.14E-01
415	6.38E-03	515	5.39E-01	615	7.99E-01	715	9.81E-02
420	2.35E-02	520	5.57E-01	620	7.73E-01	720	8.25E-02
425	5.66E-02	525	5.77E-01	625	7.36E-01	725	7.02E-02
430	1.14E-01	530	5.96E-01	630	6.98E-01	730	5.82E-02
435	2.15E-01	535	6.16E-01	635	6.50E-01	735	4.76E-02
440	3.64E-01	540	6.38E-01	640	6.06E-01	740	4.04E-02
445	6.19E-01	545	6.60E-01	645	5.58E-01	745	3.25E-02
450	9.27E-01	550	6.81E-01	650	5.11E-01	750	2.61E-02
455	9.70E-01	555	7.04E-01	655	4.63E-01	755	1.67E-02
460	7.12E-01	560	7.27E-01	660	4.16E-01	760	1.24E-02
465	5.38E-01	565	7.49E-01	665	3.70E-01	765	6.92E-03
470	4.43E-01	570	7.70E-01	670	3.28E-01	770	6.11E-03
475	3.55E-01	575	7.94E-01	675	2.94E-01	775	2.96E-03
						780	2.84E-03



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

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LM-79 Performance Data

Spatial measurements

Gamma angle (deg)	CIE 1976 (u',v') coordinates C 0 plane	C 90 plane
0	(0.226, 0.498)	(0.226, 0.498)
10	(0.226, 0.498)	(0.226, 0.498)
20	(0.226, 0.498)	(0.226, 0.498)
30	(0.226, 0.498)	(0.226, 0.498)
40	(0.226, 0.498)	(0.226, 0.498)
50	(0.226, 0.498)	(0.226, 0.498)
60	(0.226, 0.498)	(0.226, 0.498)
70	(0.226, 0.498)	(0.226, 0.499)
80	(0.226, 0.498)	(0.226, 0.499)
90	(0.225, 0.498)	(0.225, 0.498)

Spatial measurements

Gamma angle (deg)	CIE 1976 (u',v') coordinates C 0 plane	C 90 plane
90	(0.225, 0.498)	(0.225, 0.498)
100	(0.224, 0.498)	(0.224, 0.498)
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

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 two or more C planes at no more than 10º gamma intervals. 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.

		Stabilisation Time	18.25 hour
Sample Orientation	Ceiling mount	Total Operation Time	19.75 hour

Equipment and uncertainties

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

Luminous Intensity	± 4 %	Temperature	± 1 °C
Luminous Flux	± 4 %	Luminous Efficacy	± 4.5 %
C, Gamma Angles	± 0.5º		

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 deemed >5 times the maximum observed luminous opening dimension.

CIE (x, y) coordinates	± 0.004	CCT	± 150 K
CIE (u', v') coordinates	± 0.0025	CRI (Ra)	± 2
Δ (u', v') Colour difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 2

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

Voltage	± 0.5 %	Frequency *	± 0.1 Hz
Current	± 0.5 %	Power	± 0.5 %
Current THD *	± 3 %	Power Factor	± 0.02

Quantities marked with * : NATA accreditation does not cover the performance of this service.
IESNA LM-79-08 Calculator v4.9 (23rd Sep 2014)

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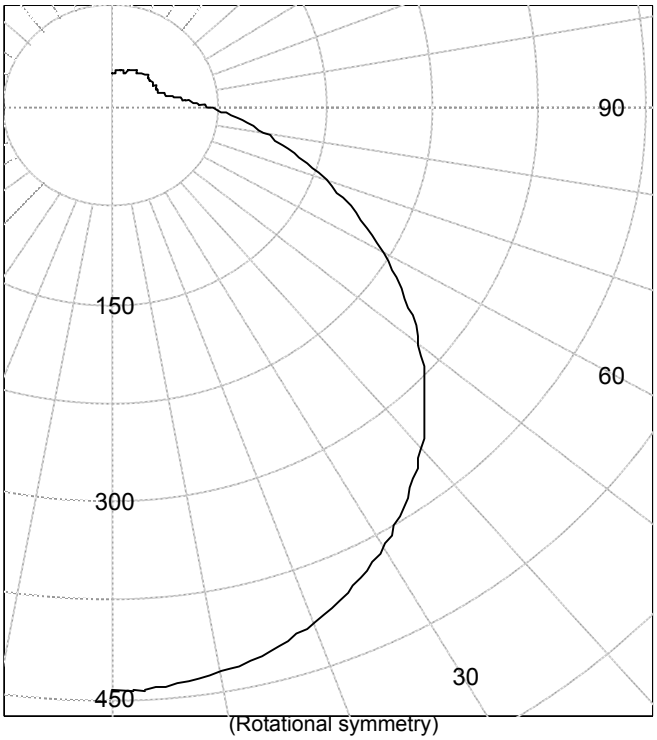
Legend: All planes - Solid (cd)



(Rotational symmetry)

INTENSITY SUMMARY (cd)

Gamma	All Planes	Flux (lm)	Gamma	C0	Flux (lm)
0	444		90	70	
5	443	42	95	57	62
10	438		100	46	
15	429	121	105	39	42
20	418		110	36	
25	403	186	115	34	34
30	385		120	34	
35	363	227	125	34	30
40	339		130	34	
45	312	241	135	34	26
50	283		140	34	
55	252	225	145	33	21
60	220		150	32	
65	189	187	155	31	15
70	160		160	30	
75	133	140	165	29	8
80	109		170	29	
85	88	96	175	29	3
90	70		180	27	

AVERAGE LUMINANCE (cd / sq.m)

Gamma	C0
45.0	2876
55.0	2576
65.0	2243
75.0	1955
85.0	1770

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	%Lamp	%Luminaire
0-30	349	N / A	20.4
0-40	576	N / A	33.7
0-60	1042	N / A	61.0
0-90	1466	N / A	85.8
40-90	890	N / A	52.1
60-90	424	N / A	24.8
90-180	242	N / A	14.2
0-180	1709	N / A	100.0

Light Output Ratio = N / A

SHR-NOM = 1.50
SHR-MAX = 1.68

Calculated using the TM5 fine grid method.

CERTIFIED BY: K Monaghan

Kevin Monaghan
Authorised Signatory

Date of test 19-Jan-2015
Date of report 23-Jan-2015

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Intensity (cd) and Flux (lm) data

Gamma	Intensity	Flux	Gamma	Intensity	Flux
0.0	444		90.0	70	
2.5	444		92.5	63	
5.0	443	42	95.0	57	
7.5	441		97.5	51	62
10.0	438		100.0	46	
12.5	434		102.5	43	
15.0	429	121	105.0	39	
17.5	424		107.5	37	42
20.0	418		110.0	36	
22.5	411		112.5	35	
25.0	403	186	115.0	34	
27.5	394		117.5	34	34
30.0	385		120.0	34	
32.5	374		122.5	34	
35.0	363	227	125.0	34	
37.5	351		127.5	34	30
40.0	339		130.0	34	
42.5	325		132.5	34	
45.0	312	241	135.0	34	
47.5	298		137.5	34	26
50.0	283		140.0	34	
52.5	267		142.5	34	
55.0	252	225	145.0	33	
57.5	236		147.5	33	21
60.0	220		150.0	32	
62.5	204		152.5	32	
65.0	189	187	155.0	31	
67.5	174		157.5	31	15
70.0	160		160.0	30	
72.5	145		162.5	29	
75.0	133	140	165.0	29	
77.5	120		167.5	29	8
80.0	109		170.0	29	
82.5	97		172.5	29	
85.0	88	96	175.0	29	
87.5	78		177.5	28	3
90.0	70		180.0	27	

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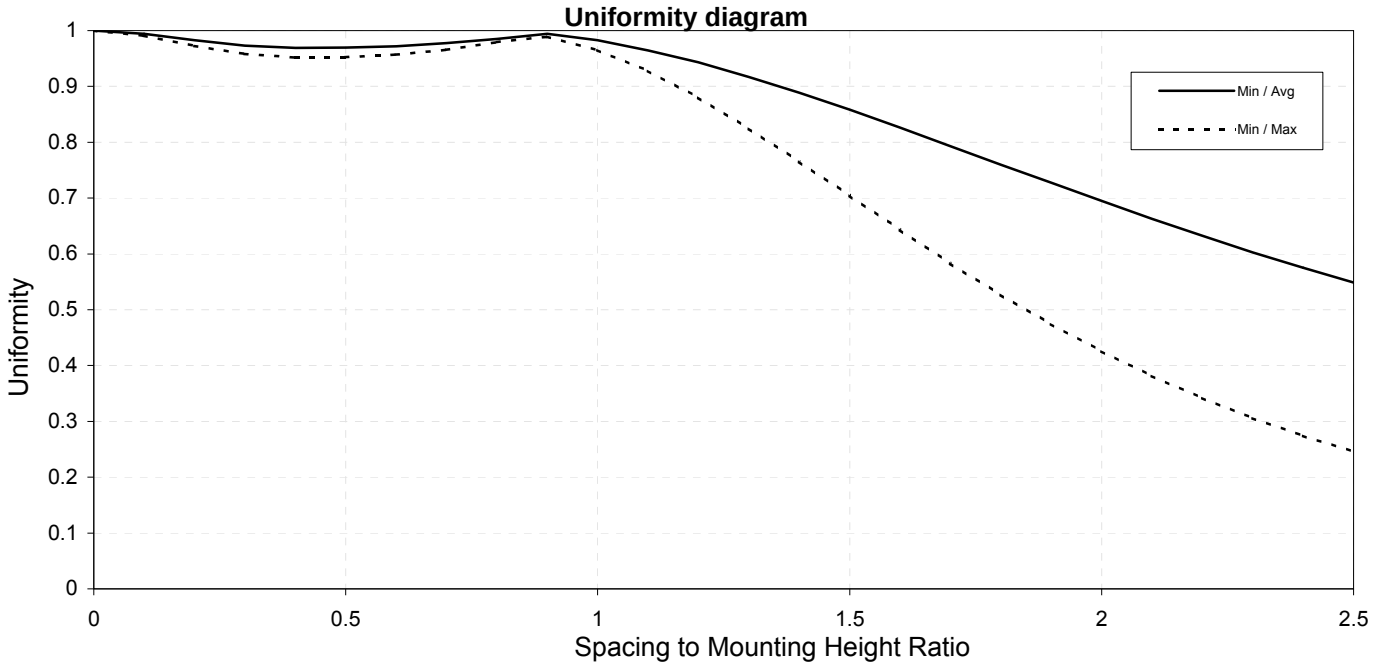

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Tested at 240 V 50 Hz.

Test Distance: 8.0 metres

Test Temperature: 25.6 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	+/- 0.5 degrees.

Testing Procedure: Tested in accordance with the applicable sections of CIE Publication Number 121; and with reference to Australian Standard AS1680, Part 3, 1991.

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