Report of Test

LL16165

LCL Manufacturing LED Luminaire. Product ID: AUS 80 GS LED 4 x 6W LED.
Extruded aluminium housing 1127 x 83 x 80 mm deep with silver finish.
Translucent diffuser forming luminous opening of 1122 x 74 mm. Four x “E74739 94V-0 Sung Wei 55V0” LED panels mounted on white reflector, ~35 mm above L/O. “Tridonic LCAI 050/0350 IO10 one4all” 220 -240V 0/50/60 Hz LED driver. Tested at 240 V 50 Hz.

Performance Summary

Luminous flux	1870 lm
Luminaire Power	28.2 W
SHR Nominal	1.50
SHR Maximum	1.62

PREPARED FOR : LCL Manufacturing Pty. Ltd., Seven Hills, NSW. 2147.

ORIGINAL REPORT

USA: LightLab International Inc.
24825 N. 16th Avenue
Suite 125
Phoenix, AZ, 85085
Ph : +1 623-434-1499
Fx : +1 623-434-1492
www.lightlabint.com

Australasia & S.E Asia: LightLab International
50 Recliffe Gardens Drive
Clontarf
Queensland, 4019, Australia
Ph : +61 7 3283 7862
Fx : +61 7 3283 8751
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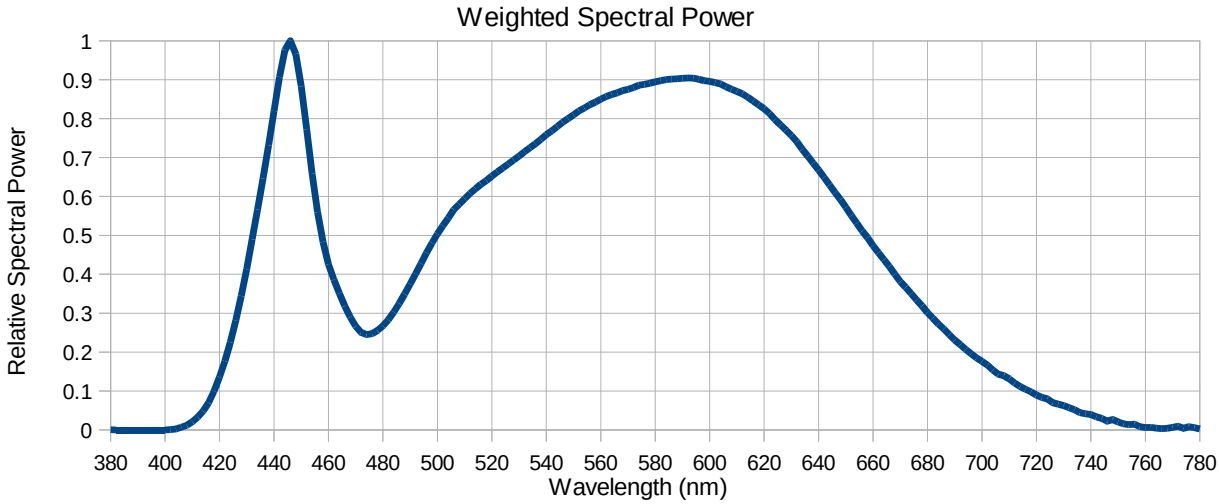
Performance data in accordance with IESNA LM-79 : 2008

Photometry	Total Luminous Flux	1870	lm
	Luminous efficacy	66.3	lm/W
Electrical	Voltage	240	V
	Frequency	50	Hz
	Current	0.126	A
	Power	28.2	W
	Power Factor	0.93	
Spectral	CIE 1931 2 deg observer (x, y) (1)	(0.376, 0.374)	
	CIE 1976 2 deg observer (u', v') (1)	(0.223, 0.500)	
	Correlated Colour Temperature (CCT) (1)	4120	K
	Colour Spatial Uniformity (2)	0.0010	
	Colour Rendering Index (CRI) (1)	84	
	Special CRI 9 (R_9) (1),(3)	26	
	Distance from planckian locus (Duv) (1),(3)	0.0002	
	Scotopic/Photopic Ratio (1),(3)	1.7	



* The spectral power graph combines the weighted spectral power distributions of all spatial measurements.
* 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-79:2008

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Spatial measurements (lower hemisphere)

Gamma angle (deg)	CIE 1976 (u',v') coordinates C0 plane	C90 plane
0	(0.223, 0.500)	(0.224, 0.500)
10	(0.223, 0.500)	(0.224, 0.500)
20	(0.223, 0.500)	(0.223, 0.500)
30	(0.223, 0.500)	(0.223, 0.500)
40	(0.223, 0.500)	(0.223, 0.500)
50	(0.223, 0.499)	(0.223, 0.500)
60	(0.222, 0.499)	(0.223, 0.500)
70	(0.222, 0.499)	(0.223, 0.499)
80	I <= 10 %	I <= 10 %
90	I <= 10 %	I <= 10 %

Spatial measurements (upper hemisphere)

Gamma angle (deg)	CIE 1976 (u',v') coordinates C0 plane	C90 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 10º 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	Ceiling mounted	Stabilisation time	5.5 hour
		Total operation time	7 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	± 0.25º	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 & R_9 *	± 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	± 0.2 %	power	± 0.5 %
		power factor *	± 0.01

Quantities indicated by * are not covered by the laboratory accreditation.
IESNA LM-79 : 2008 Calculator v4.2 (16th Nov 2012)

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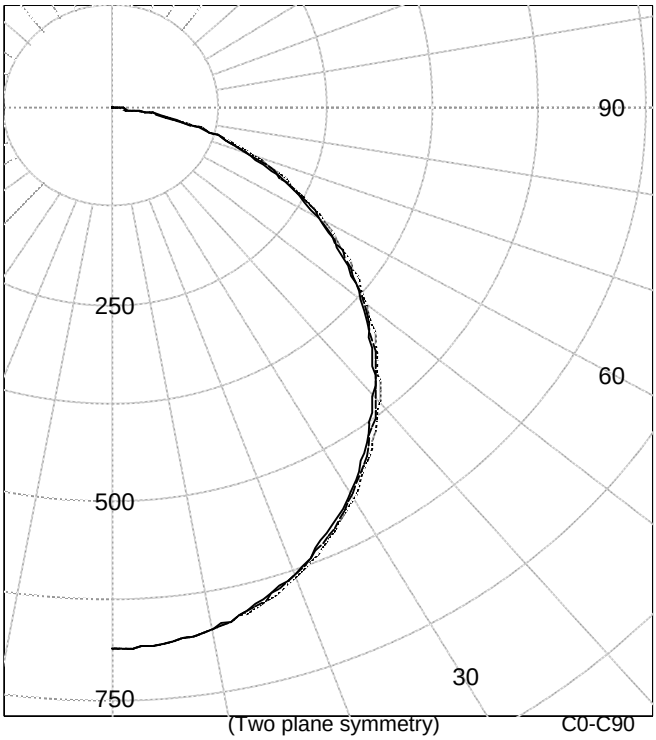
Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



INTENSITY SUMMARY (cd)

Gamma	C-Plane C0	C22.5	C45	C67.5	C90	Flux (lm)
0.0	688	688	688	688	688	
5.0	684	684	684	685	685	65
10.0	673	673	674	674	674	
15.0	655	655	656	657	657	185
20.0	629	630	631	633	634	
25.0	598	599	600	603	604	277
30.0	562	563	566	569	570	
35.0	521	523	525	529	530	329
40.0	477	479	481	486	488	
45.0	430	433	434	440	440	336
50.0	381	383	386	391	391	
55.0	331	332	334	340	340	300
60.0	279	279	281	286	287	
65.0	225	226	227	231	231	226
70.0	171	171	171	174	175	
75.0	117	117	118	118	118	125
80.0	66	66	65	66	67	
85.0	24	24	23	21	21	29
90.0	0	0	0	0	0	

AVERAGE LUMINANCE (cd / sq.m)

Gamma	C0	C45	C90
45.0	7327	7398	7503
55.0	6950	7008	7145
65.0	6411	6463	6578
75.0	5455	5487	5504
85.0	3334	3183	2893

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	527	N / A	28.2
0-40	855	N / A	45.7
0-60	1491	N / A	79.7
0-90	1870	N / A	100.0
40-90	1015	N / A	54.3
60-90	379	N / A	20.3
90-180	0	N / A	0.0
0-180	1870	N / A	100.0

Light Output Ratio = N / A

SHR-NOM = 1.50
SHR-MAX = 1.62

Calculated using the TM5 fine grid method.

CERTIFIED BY: K Monaghan

Kevin Monaghan
Authorised Signatory

Date of test 20-Dec-2012
Date of report 21-Dec-2012

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Intensity data (cd)

	C-Plane				
Gamma	**C0**	**C22.5**	**C45**	**C67.5**	**C90**
0.0	688	688	688	688	688
2.5	687	687	687	687	687
5.0	684	684	684	685	685
7.5	680	680	680	680	680
10.0	673	673	674	674	674
12.5	665	665	666	667	666
15.0	655	655	656	657	657
17.5	643	643	645	646	647
20.0	629	630	631	633	634
22.5	614	615	617	619	619
25.0	598	599	600	603	604
27.5	580	581	583	587	587
30.0	562	563	566	569	570
32.5	542	543	545	550	549
35.0	521	523	525	529	530
37.5	500	501	503	508	508
40.0	477	479	481	486	488
42.5	454	456	458	462	464
45.0	430	433	434	440	440
47.5	407	407	410	415	415
50.0	381	383	386	391	391
52.5	357	359	360	366	367
55.0	331	332	334	340	340
57.5	305	307	308	313	314
60.0	279	279	281	286	287
62.5	253	253	255	260	260
65.0	225	226	227	231	231
67.5	197	198	200	204	204
70.0	171	171	171	174	175
72.5	144	144	144	147	147
75.0	117	117	118	118	118
77.5	92	91	90	91	91
80.0	66	66	65	66	67
82.5	43	43	42	42	41
85.0	24	24	23	21	21
87.5	9	9	9	7	6
90.0	0	0	0	0	0

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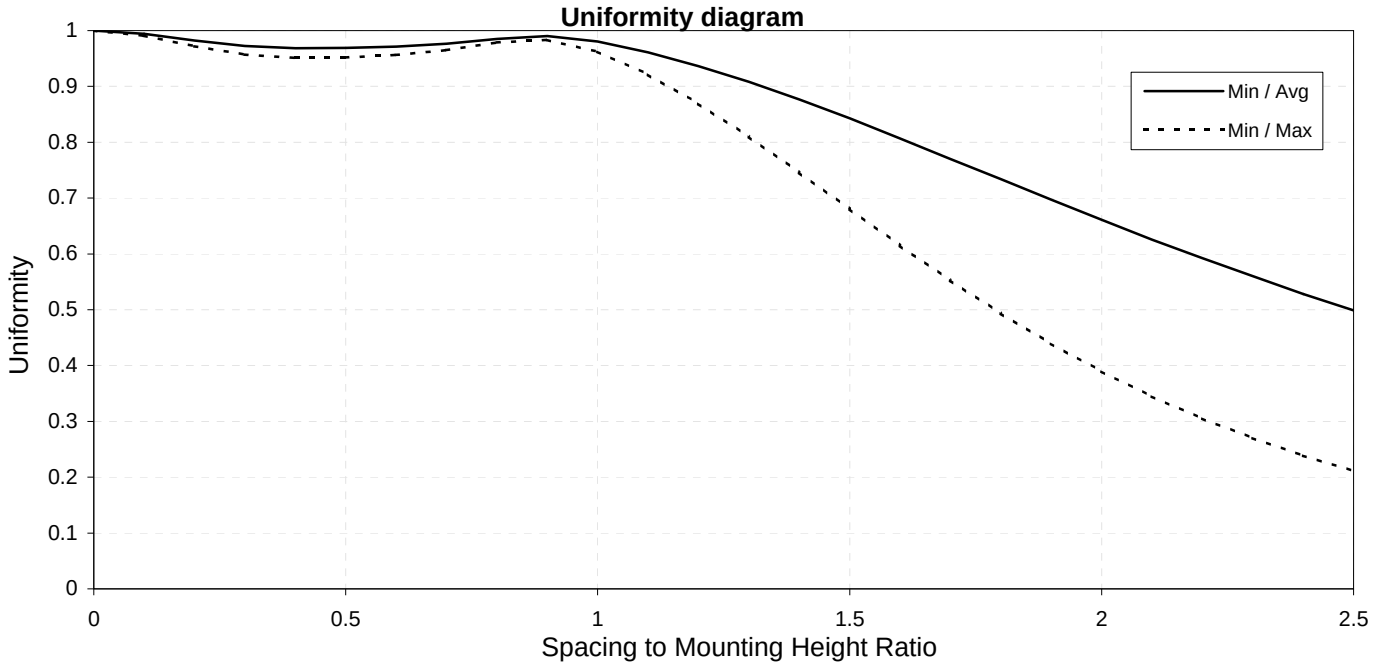

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Test Distance: 8.0 metres

Test Temperature: 24.6 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	+/- 0.25 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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