

astro

PHOTOMETRIC
TEST REPORT

Report Number	GNC-21366
Customer	Astro Lighting Limited
Contact	Salvatore Bella
Product Type	LED Wall light
Test Purpose	Generation of photometric data
Quote Reference	Q-LUX17-21659
Works Order Number	WO-12013
Test Item Reference	TI-15234
LAB Test Method Reference	TES-102000
Test Standards	LM-79-08; (BS) EN 13032-4:2015; CIE S025:2015
Lab Location Reference	LUX-TSI
Tested by	Mike Sewell
Date of Test	23/07/2018
Reviewed by	Gareth Jones
Number of products tested	1

Address: LUX-TSI Ltd.,
Pencoed Technology Park,
Pencoed, Bridgend,
CF35 5AQ, UK
Telephone: +44 (0) 1656 864618
Authorised by: M. Schakel
Email: CustomerService@lux-tsi.com
Signed: 



Renoir 350 - 8576

Date: 23/07/2018

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Nomenclature

Lamp Orientation described below relates to the position in which a lamp is designed to operate for maximum performance and safety, these include:

BD - Base Down (bulb is vertically positioned with the metal base at the bottom, glass up)

BU - Base Up (bulb is vertically positioned with the metal base at the top, glass hanging down)

HBD - Horizontal $+15^{\circ}$ to Base Down

H45 - Horizontal to -45° only

VBU - Vertical Base Up $\pm 15^{\circ}$

VBD - Vertical Base Down $\pm 15^{\circ}$

HBU - Base Up $\pm 90^{\circ}$ (bulb can be operated in a base up or horizontal position)

HOR - Horizontal Burn (bulb is positioned with the metal base parallel to the ground)

H75 - Horizontal $\pm 75^{\circ}$ (bulb should not be operated within 15° of vertical)

U - Universal Burn (burn can be operated in any position)

Test Conditions

Measurements were made with an ambient temperature of $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. Measurements were taken only after sufficient time for thermal stabilisation has been allowed. Thermal stabilisation according to LM-79-08 was achieved before measurements are measured and reported.

Calibrations

The far field Type C Goniophotometer is calibrated using an intensity lamp calibrated by a NVLAP accredited calibration laboratory.

Test Equipment

UL LSI Custom Far-Field Type C Moving Mirror Goniophotometer measures intensity as a function of angle. On-axis spectral measurements taken using spectrometer, for which these measurements and outputs are not accredited.

Data Formats

IES (15 deg azimuth and 2.5 deg inclination) and LDT (15 deg C planes and 2.5 deg gamma angles)

Spectral Data file from which the calculation of chromaticity and CRI etc. have been performed and the derived results from the LightMtrX software are provided as a text file format.

All photometric data for LED products will be provided in ABSOLUTE photometric format and all non-LED data will be in relative photometric format with lamp lumens measured separately, where possible, for LOR estimation.

Product Name	Renoir 350
Part/Serial Number	1371009
Type of Product	LED Wall light
Base Type	Not Applicable - Luminaire
Driver Type	Internal
Test Time	30 mins
Operating Orientation	Base Up
Test Orientation	Base Up
Ambient Temperature	24.8°C
Manufacturer	Astro Lighting Limited
Date of Manufacture	Not Available
Thermal Management	Passive
Dimmable	No
Pre-Burning Time	0 hours
Stabilisation Time	30 mins
Humidity	50.9% RH
Averaging Applied	NONE

Driver Details		
Manufacturer		N/A
Model		N/A
Part/Serial #		N/A
Rated Voltage		N/A
Output	Current	N/A
	Voltage	N/A

Photometric Measurements	
Luminous Flux	190 lm
Luminous Efficacy	50 lm/W

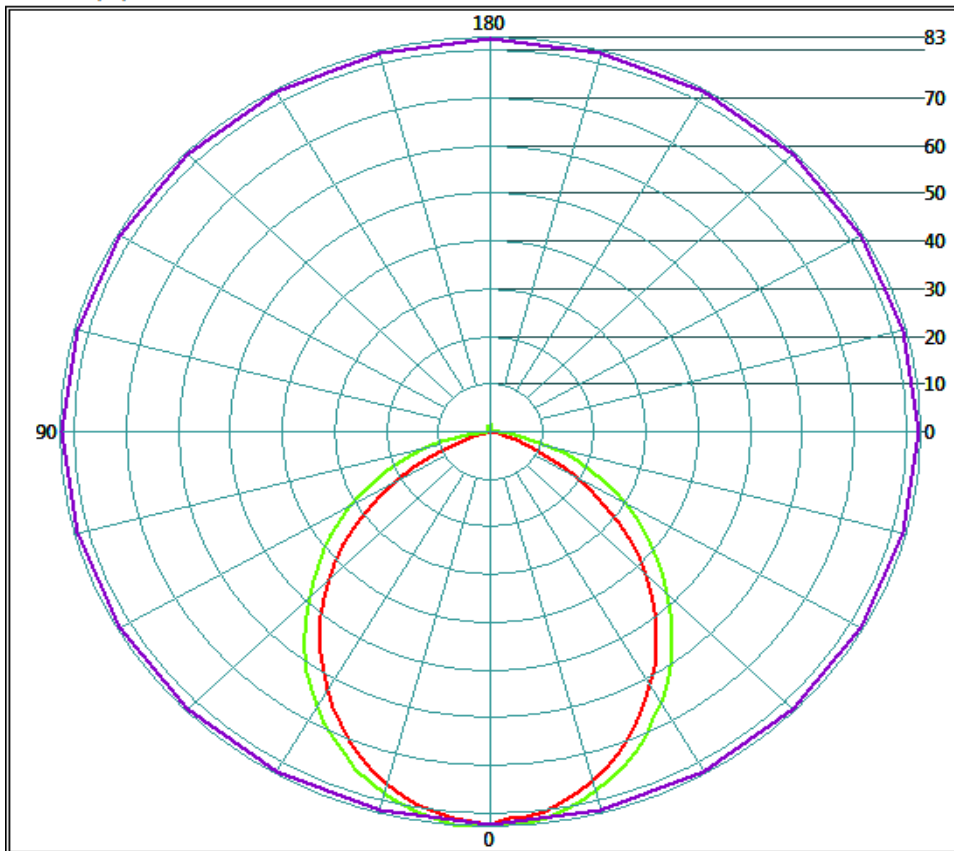
Dimension	Sample	Luminous Opening
Diameter/Width	350 mm	320 mm
Length	255 mm	25 mm
Height/Depth	50 mm	0 mm

Electrical Measurements	
Frequency	50 Hz
Voltage	240.0 V
Current	0.017 A
Power	3.8 W
Power Factor	0.937
Apparent Power	4.0 VA

Goniophotometric Measurements

Beam Angle	Horizontal	102°
	Vertical	93°
On-axis Intensity		82 cd
Peak Intensity		83 cd
Peak Direction	Horizontal	90°
	Vertical	3°

Polar Plot (cd)



0.00	
180.00	
90.00	
270.00	
0.00	

Mounting Height (m)	Beam Width (m)		Projected Illuminance (lux)
	C0-C180 plane	C90-270 plane	
0.5	1.2	1.0	329
1	2.5	2.1	82
2	5.0	4.2	21
3	7.4	6.3	9
4	9.9	8.4	5
5	12.4	10.5	3
7.5	18.6	15.7	1
10	24.8	21.0	1
20	49.6	42.0	0

Appendices & non-accredited results

On-axis Spectral Measurement

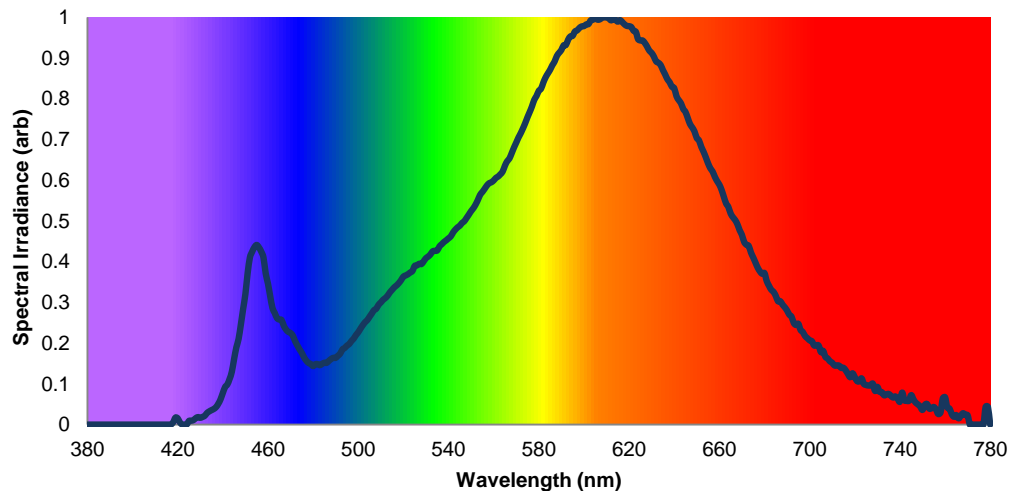
The following data was determined from an on-axis spectral measurement using a SP1000 spectrometer at a distance of 1500mm, for which these measurements and outputs are not accredited.
Results may differ if compared to spatially averaged colourimetric result (e.g. measured in an integrating sphere).

LM79 requires spatially averaged colourimetric results (i.e. from a sphere, or from a full gonio colourimetric scan).

The colourimetric results in this report do not follow those requirements.

BS (EN) 13032 and CIE S025 do not state this requirement.

Spectral Irradiance versus Wavelength



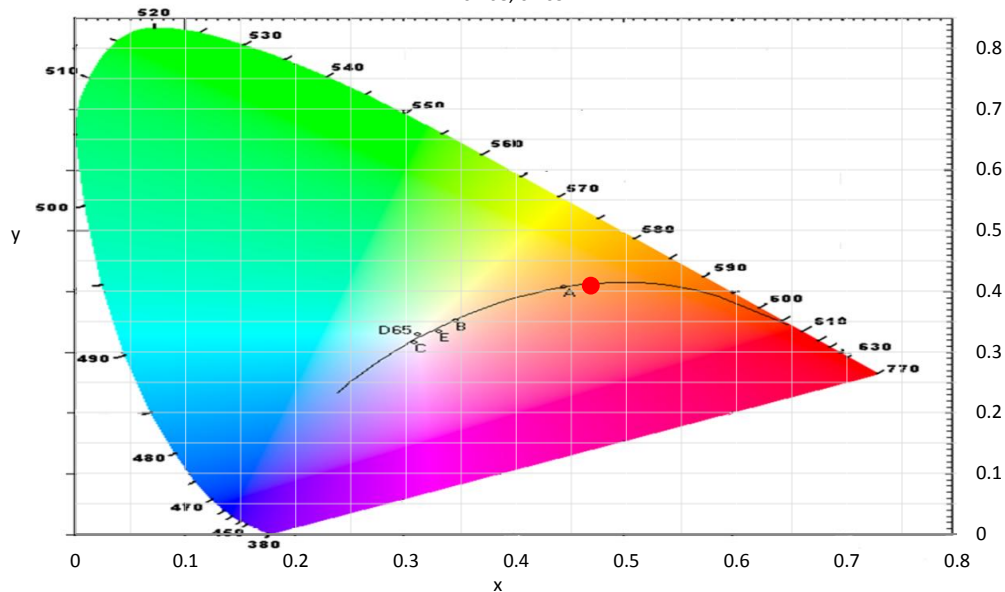
Colour Rendering Index Detail			
R1	82	R8	59
R2	93	R9	15
R3	95	R10	84
R4	79	R11	78
R5	82	R12	74
R6	92	R13	85
R7	81	R14	98

Colorimetric Details	
CCT	2574K
CRI (Ra)	83

Chromaticity Coordinates		
CIE 1931	x	0.4680
	y	0.4087
CIE 1960	u	0.2686
	v	0.3519
CIE 1976	u'	0.2686
	v'	0.5279
Duv		0.0015

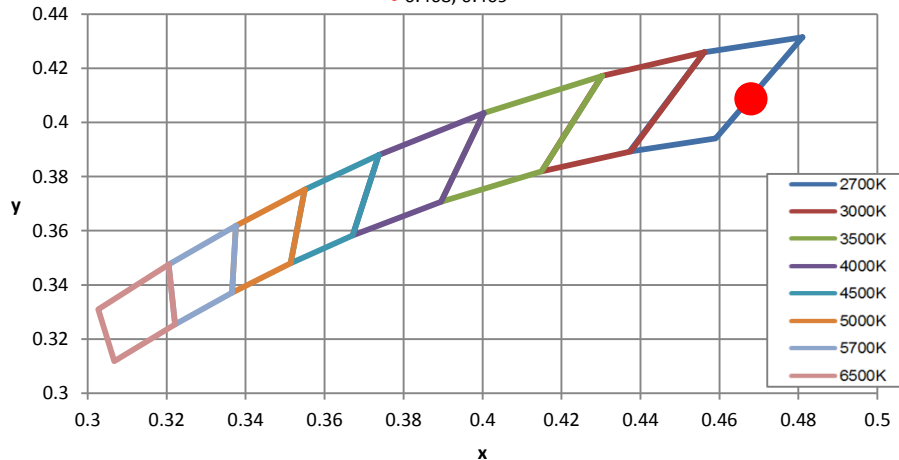
CIE 1931 Colour Chart

• 0.468, 0.409



CIE 1931 x, y Chromaticity Diagram - Nominal CCT Quadrangles

• 0.468, 0.409



Spectral Power Distribution

λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units
380	0.00E+00	430	1.67E-02	480	1.44E-01	530	4.09E-01
381	0.00E+00	431	1.88E-02	481	1.48E-01	531	4.13E-01
382	0.00E+00	432	2.16E-02	482	1.48E-01	532	4.18E-01
383	0.00E+00	433	2.85E-02	483	1.46E-01	533	4.26E-01
384	0.00E+00	434	3.25E-02	484	1.49E-01	534	4.27E-01
385	0.00E+00	435	3.55E-02	485	1.52E-01	535	4.28E-01
386	0.00E+00	436	3.84E-02	486	1.52E-01	536	4.38E-01
387	0.00E+00	437	4.29E-02	487	1.57E-01	537	4.43E-01
388	0.00E+00	438	5.11E-02	488	1.61E-01	538	4.48E-01
389	0.00E+00	439	6.23E-02	489	1.64E-01	539	4.53E-01
390	0.00E+00	440	7.77E-02	490	1.64E-01	540	4.57E-01
391	0.00E+00	441	9.21E-02	491	1.69E-01	541	4.62E-01
392	0.00E+00	442	9.86E-02	492	1.74E-01	542	4.72E-01
393	0.00E+00	443	1.12E-01	493	1.85E-01	543	4.79E-01
394	0.00E+00	444	1.30E-01	494	1.88E-01	544	4.84E-01
395	0.00E+00	445	1.61E-01	495	1.94E-01	545	4.88E-01
396	0.00E+00	446	1.90E-01	496	1.98E-01	546	4.95E-01
397	0.00E+00	447	2.11E-01	497	2.05E-01	547	4.99E-01
398	0.00E+00	448	2.46E-01	498	2.11E-01	548	5.07E-01
399	0.00E+00	449	2.84E-01	499	2.20E-01	549	5.16E-01
400	0.00E+00	450	3.21E-01	500	2.27E-01	550	5.24E-01
401	0.00E+00	451	3.72E-01	501	2.36E-01	551	5.31E-01
402	0.00E+00	452	4.10E-01	502	2.44E-01	552	5.40E-01
403	0.00E+00	453	4.25E-01	503	2.51E-01	553	5.52E-01
404	0.00E+00	454	4.35E-01	504	2.57E-01	554	5.64E-01
405	0.00E+00	455	4.41E-01	505	2.65E-01	555	5.71E-01
406	0.00E+00	456	4.35E-01	506	2.73E-01	556	5.79E-01
407	0.00E+00	457	4.25E-01	507	2.81E-01	557	5.87E-01
408	0.00E+00	458	4.11E-01	508	2.85E-01	558	5.93E-01
409	0.00E+00	459	3.71E-01	509	2.94E-01	559	5.95E-01
410	0.00E+00	460	3.46E-01	510	3.00E-01	560	6.00E-01
411	0.00E+00	461	3.15E-01	511	3.06E-01	561	6.06E-01
412	0.00E+00	462	2.86E-01	512	3.11E-01	562	6.09E-01
413	0.00E+00	463	2.74E-01	513	3.17E-01	563	6.15E-01
414	0.00E+00	464	2.62E-01	514	3.25E-01	564	6.22E-01
415	0.00E+00	465	2.58E-01	515	3.31E-01	565	6.36E-01
416	0.00E+00	466	2.57E-01	516	3.37E-01	566	6.47E-01
417	0.00E+00	467	2.43E-01	517	3.42E-01	567	6.54E-01
418	5.79E-03	468	2.33E-01	518	3.48E-01	568	6.67E-01
419	1.71E-02	469	2.28E-01	519	3.55E-01	569	6.80E-01
420	1.53E-02	470	2.25E-01	520	3.63E-01	570	6.92E-01
421	5.23E-03	471	2.18E-01	521	3.66E-01	571	7.05E-01
422	0.00E+00	472	2.05E-01	522	3.69E-01	572	7.16E-01
423	0.00E+00	473	1.95E-01	523	3.73E-01	573	7.28E-01
424	0.00E+00	474	1.85E-01	524	3.77E-01	574	7.41E-01
425	9.08E-03	475	1.76E-01	525	3.90E-01	575	7.55E-01
426	9.65E-03	476	1.65E-01	526	3.91E-01	576	7.68E-01
427	1.11E-02	477	1.57E-01	527	3.95E-01	577	7.82E-01
428	1.58E-02	478	1.51E-01	528	3.94E-01	578	7.98E-01
429	1.84E-02	479	1.49E-01	529	4.01E-01	579	8.07E-01
						580	8.20E-01

Spectral Power Distribution

λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units
581	8.25E-01	631	9.04E-01	681	3.52E-01	731	8.06E-02
582	8.40E-01	632	8.92E-01	682	3.41E-01	732	7.97E-02
583	8.52E-01	633	8.88E-01	683	3.31E-01	733	7.20E-02
584	8.62E-01	634	8.83E-01	684	3.26E-01	734	7.36E-02
585	8.71E-01	635	8.70E-01	685	3.16E-01	735	7.55E-02
586	8.82E-01	636	8.60E-01	686	3.03E-01	736	7.08E-02
587	8.92E-01	637	8.48E-01	687	3.03E-01	737	6.64E-02
588	9.05E-01	638	8.41E-01	688	2.95E-01	738	6.92E-02
589	9.13E-01	639	8.29E-01	689	2.88E-01	739	6.36E-02
590	9.20E-01	640	8.26E-01	690	2.80E-01	740	5.61E-02
591	9.31E-01	641	8.07E-01	691	2.70E-01	741	7.86E-02
592	9.32E-01	642	7.97E-01	692	2.65E-01	742	6.00E-02
593	9.45E-01	643	7.89E-01	693	2.49E-01	743	5.84E-02
594	9.53E-01	644	7.75E-01	694	2.44E-01	744	5.87E-02
595	9.55E-01	645	7.68E-01	695	2.47E-01	745	7.24E-02
596	9.65E-01	646	7.53E-01	696	2.32E-01	746	6.18E-02
597	9.68E-01	647	7.38E-01	697	2.27E-01	747	5.40E-02
598	9.74E-01	648	7.30E-01	698	2.17E-01	748	4.96E-02
599	9.78E-01	649	7.20E-01	699	2.12E-01	749	4.42E-02
600	9.78E-01	650	7.04E-01	700	2.07E-01	750	3.60E-02
601	9.83E-01	651	6.98E-01	701	2.05E-01	751	4.79E-02
602	9.83E-01	652	6.82E-01	702	1.94E-01	752	5.07E-02
603	9.93E-01	653	6.70E-01	703	1.95E-01	753	3.94E-02
604	9.94E-01	654	6.56E-01	704	1.94E-01	754	4.00E-02
605	9.98E-01	655	6.42E-01	705	1.78E-01	755	4.33E-02
606	9.94E-01	656	6.29E-01	706	1.81E-01	756	3.71E-02
607	9.95E-01	657	6.21E-01	707	1.66E-01	757	2.58E-02
608	9.99E-01	658	6.09E-01	708	1.62E-01	758	2.97E-02
609	1.00E+00	659	5.98E-01	709	1.55E-01	759	6.41E-02
610	1.00E+00	660	5.89E-01	710	1.52E-01	760	6.73E-02
611	9.97E-01	661	5.76E-01	711	1.45E-01	761	4.22E-02
612	9.93E-01	662	5.59E-01	712	1.45E-01	762	3.93E-02
613	9.95E-01	663	5.43E-01	713	1.45E-01	763	2.54E-02
614	9.94E-01	664	5.34E-01	714	1.39E-01	764	1.91E-02
615	9.89E-01	665	5.18E-01	715	1.39E-01	765	2.35E-02
616	9.93E-01	666	5.09E-01	716	1.33E-01	766	1.53E-02
617	9.88E-01	667	5.02E-01	717	1.24E-01	767	2.16E-02
618	9.83E-01	668	4.92E-01	718	1.16E-01	768	2.80E-02
619	9.79E-01	669	4.77E-01	719	1.26E-01	769	2.36E-02
620	9.78E-01	670	4.66E-01	720	1.17E-01	770	2.30E-02
621	9.76E-01	671	4.49E-01	721	1.07E-01	771	0.00E+00
622	9.67E-01	672	4.42E-01	722	1.06E-01	772	0.00E+00
623	9.65E-01	673	4.39E-01	723	1.14E-01	773	0.00E+00
624	9.46E-01	674	4.23E-01	724	1.00E-01	774	0.00E+00
625	9.43E-01	675	4.10E-01	725	9.72E-02	775	0.00E+00
626	9.43E-01	676	3.98E-01	726	9.60E-02	776	0.00E+00
627	9.37E-01	677	3.85E-01	727	9.64E-02	777	0.00E+00
628	9.28E-01	678	3.76E-01	728	1.01E-01	778	4.38E-02
629	9.18E-01	679	3.70E-01	729	8.25E-02	779	4.35E-02
630	9.13E-01	680	3.72E-01	730	9.27E-02	780	0.00E+00

Measurement Uncertainty

The following is the reported expanded uncertainty of the UL 6440T Type C Mirror Goniophotometer.

Parameter	Uncertainty
Total Luminous Flux (%)	± 4.9
Luminous Intensity (%)	± 4.9
Temperature ($^{\circ}\text{C}$)	± 1.0
Voltage DC TY720 (%)	± 0.017
Current DC TY720 (%)	± 0.10
Voltage AC WT210 (%)	± 0.059
Current AC WT210 (%)	± 0.025
Power AC WT210 (%)	± 0.23
Frequency (50/60 Hz) WT210 (%)	± 0.004
Power Factor WT210 (%)	± 0.06

The reported expanded uncertainty is based on the combined standard uncertainty multiplied by a coverage factor of $k = 2$. This value of k gives a coverage probability of approximately 95%, assuming a normal distribution. This determination of the measurement uncertainty has been done in accordance with international requirements including UKAS, BIPM Guide to the Expression of Uncertainty in Measurement and CIE 198:2011 and CIE S 025/E:2015.

Electrical measurement equipment used for the determination of results for this report, are compliant and meet the performance requirements of the measurement standards used.

----- END OF REPORT -----