

astro

PHOTOMETRIC
TEST REPORT

Report Number	GNC-21590
Customer	Astro Lighting Limited
Contact	Ross Dickson
Product Type	LED Wall light
Test Purpose	Generation of photometric data
Quote Reference	Q-LUX17-21659
Works Order Number	WO-12237
Test Item Reference	TI-15352
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	15/08/2018
Reviewed by	Gareth Jones
Number of products tested	1

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Versailles 370 Bronze - 8544

Date: 15/08/2018

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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 and Integrating Sphere spectroradiometer 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. Spectral measurements are measured using a Labsphere 1 metre integrating sphere.

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	Versailles 370 Bronze - 8544
Part/Serial Number	N/A
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	25.4°C
Manufacturer	Astro Lighting Limited
Date of Manufacture	Not Available
Thermal Management	Passive
Dimmable	No
Pre-Burning Time	0 hours
Stabilisation Time	60 mins
Humidity	43.7% 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	609 lm
Luminous Efficacy	40 lm/W

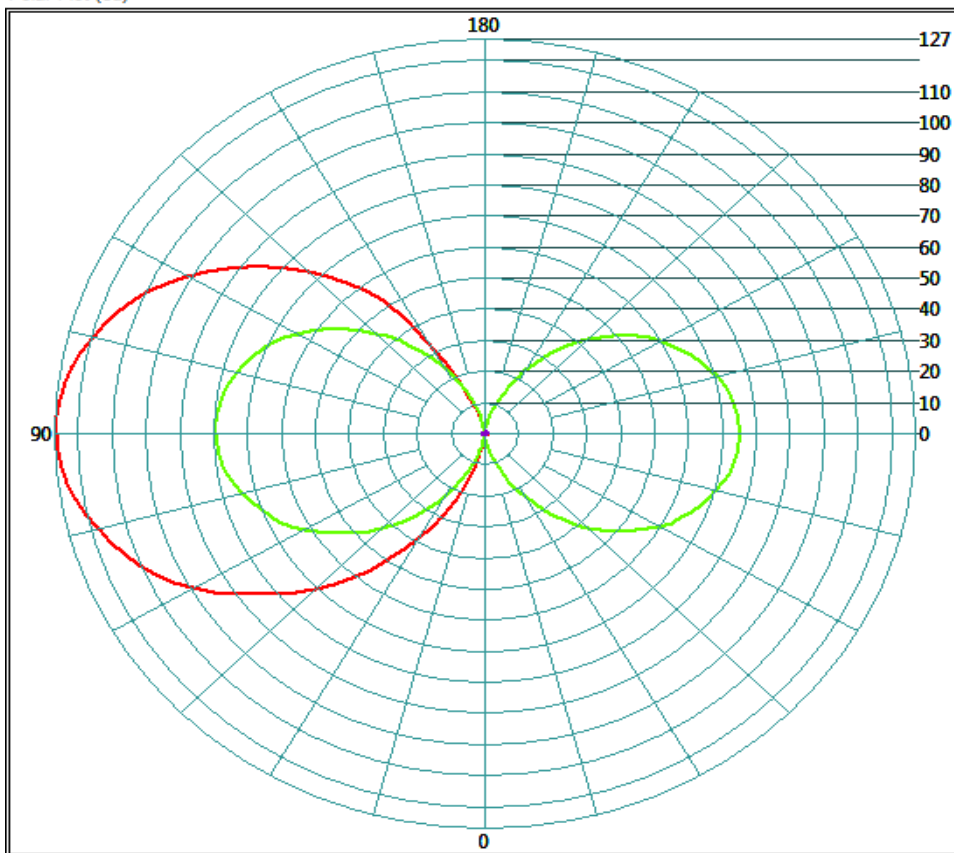
Dimension	Sample	Luminous Opening
Diameter/Width	80 mm	75 mm
Length	80 mm	70 mm
Height/Depth	370 mm	335 mm

Electrical Measurements	
Frequency	50 Hz
Voltage	230.1 V
Current	0.166 A
Power	15.1 W
Power Factor	0.397
Apparent Power	38.1 VA

Goniophotometric Measurements

Beam Angle	Horizontal	180°
	Vertical	50°
On-axis Intensity		1 cd
Peak Intensity		127 cd
Peak Direction	Horizontal	15°
	Vertical	90°

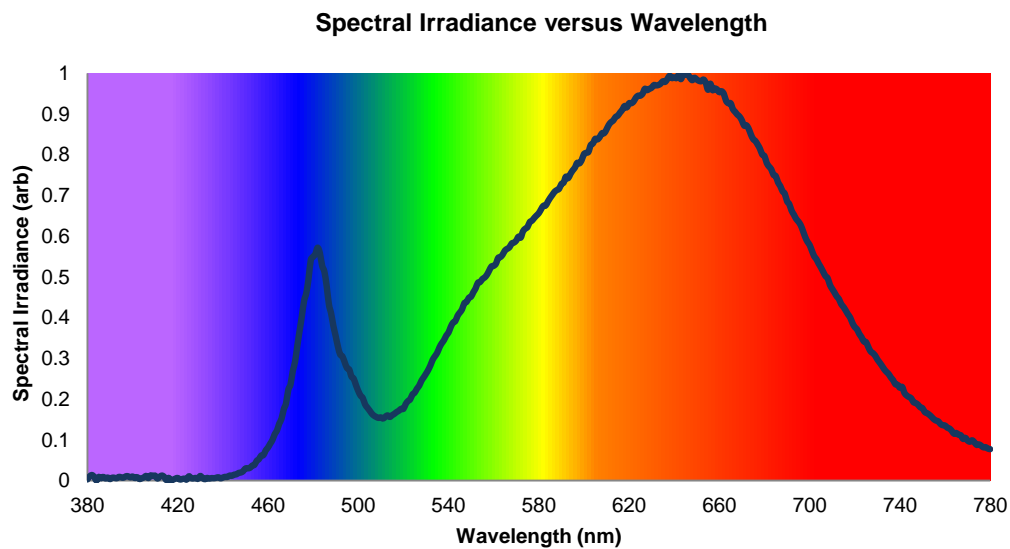
Polar Plot (cd)



Spectral Results

Integrated Spectral Measurement using spectroradiometer and 1 metre integrating sphere

The following data was determined from an integrated spectral measurement using a spectrometer. This will produce spatially averaged spectroradiometric results measured in an integrating sphere.



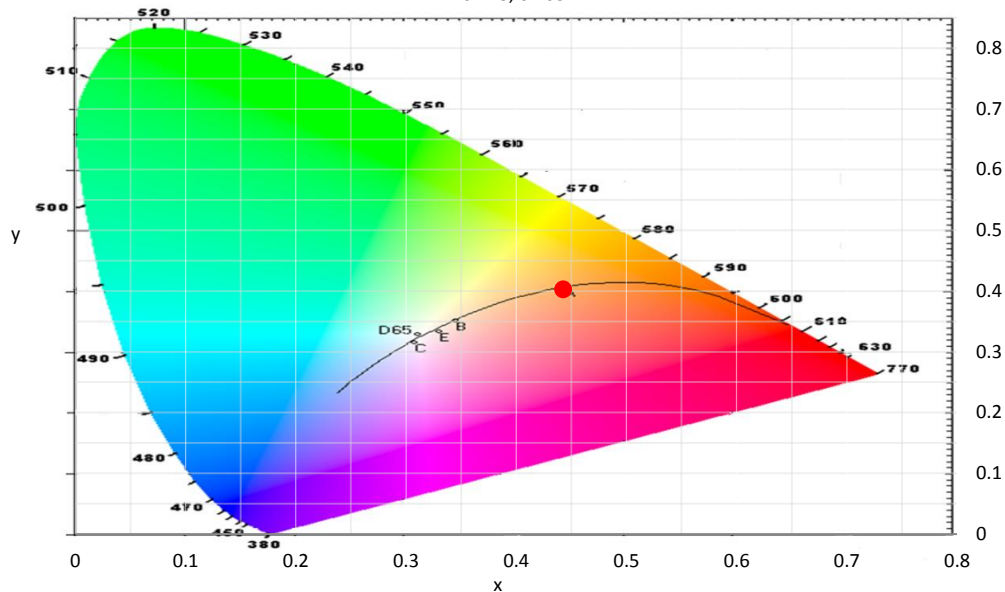
Colour Rendering Index Detail			
R1	84	R8	71
R2	91	R9	35
R3	95	R10	77
R4	83	R11	81
R5	83	R12	68
R6	87	R13	85
R7	88	R14	97

Colorimetric Details	
CCT	2888K
CRI (Ra)	85

Chromaticity Coordinates		
CIE 1931	x	0.4429
	y	0.4026
CIE 1960	u	0.2551
	v	0.3478
CIE 1976	u'	0.2551
	v'	0.5217
Duv		0.0018

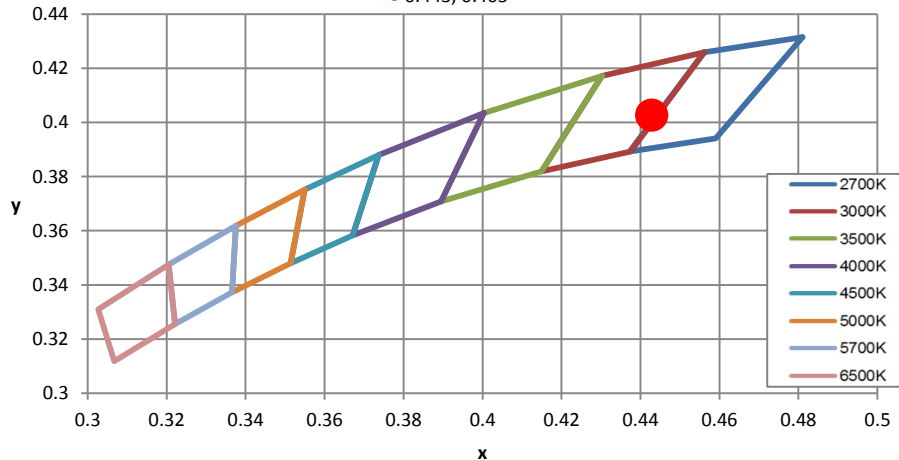
CIE 1931 Colour Chart

• 0.443, 0.403



CIE 1931 x, y Chromaticity Diagram - Nominal CCT Quadrangles

• 0.443, 0.403



Spectral Power Distribution

λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units
380	2.77E-03	430	1.13E-02	480	5.50E-01	530	2.62E-01
381	1.04E-02	431	6.44E-03	481	5.56E-01	531	2.72E-01
382	1.36E-02	432	3.26E-03	482	5.72E-01	532	2.83E-01
383	9.00E-03	433	6.47E-03	483	5.58E-01	533	2.97E-01
384	0.00E+00	434	4.74E-03	484	5.28E-01	534	3.05E-01
385	8.93E-03	435	6.13E-03	485	5.13E-01	535	3.14E-01
386	5.51E-03	436	5.74E-03	486	4.78E-01	536	3.27E-01
387	9.04E-03	437	6.76E-03	487	4.33E-01	537	3.37E-01
388	4.96E-03	438	8.11E-03	488	4.10E-01	538	3.45E-01
389	7.48E-03	439	5.51E-03	489	3.79E-01	539	3.56E-01
390	3.51E-03	440	7.29E-03	490	3.55E-01	540	3.64E-01
391	7.03E-03	441	9.16E-03	491	3.29E-01	541	3.77E-01
392	6.77E-03	442	8.77E-03	492	3.10E-01	542	3.88E-01
393	5.59E-03	443	1.22E-02	493	3.05E-01	543	3.91E-01
394	9.17E-03	444	1.16E-02	494	2.90E-01	544	4.04E-01
395	7.75E-03	445	1.45E-02	495	2.76E-01	545	4.13E-01
396	7.06E-03	446	1.53E-02	496	2.73E-01	546	4.20E-01
397	1.04E-02	447	1.87E-02	497	2.55E-01	547	4.36E-01
398	1.06E-02	448	1.98E-02	498	2.50E-01	548	4.39E-01
399	7.81E-03	449	2.30E-02	499	2.34E-01	549	4.49E-01
400	9.93E-03	450	2.97E-02	500	2.20E-01	550	4.52E-01
401	6.15E-03	451	3.01E-02	501	2.09E-01	551	4.62E-01
402	8.41E-03	452	3.10E-02	502	2.03E-01	552	4.72E-01
403	3.79E-03	453	3.66E-02	503	1.87E-01	553	4.86E-01
404	5.37E-03	454	3.85E-02	504	1.79E-01	554	4.87E-01
405	7.69E-03	455	4.83E-02	505	1.72E-01	555	4.95E-01
406	1.14E-02	456	5.26E-02	506	1.64E-01	556	4.99E-01
407	6.03E-03	457	6.15E-02	507	1.59E-01	557	5.05E-01
408	1.27E-02	458	6.26E-02	508	1.56E-01	558	5.15E-01
409	1.12E-02	459	7.40E-02	509	1.54E-01	559	5.26E-01
410	1.21E-02	460	8.10E-02	510	1.55E-01	560	5.27E-01
411	4.94E-03	461	9.05E-02	511	1.52E-01	561	5.32E-01
412	9.23E-03	462	9.97E-02	512	1.57E-01	562	5.47E-01
413	1.23E-02	463	1.14E-01	513	1.60E-01	563	5.49E-01
414	9.09E-03	464	1.23E-01	514	1.56E-01	564	5.55E-01
415	1.16E-03	465	1.40E-01	515	1.60E-01	565	5.65E-01
416	6.64E-03	466	1.52E-01	516	1.64E-01	566	5.69E-01
417	0.00E+00	467	1.75E-01	517	1.68E-01	567	5.73E-01
418	2.19E-03	468	1.89E-01	518	1.72E-01	568	5.82E-01
419	4.76E-03	469	2.23E-01	519	1.76E-01	569	5.84E-01
420	6.40E-03	470	2.36E-01	520	1.76E-01	570	5.89E-01
421	2.50E-03	471	2.69E-01	521	1.88E-01	571	5.99E-01
422	3.74E-03	472	2.92E-01	522	1.95E-01	572	5.97E-01
423	4.76E-03	473	3.31E-01	523	1.99E-01	573	6.12E-01
424	2.35E-03	474	3.67E-01	524	2.11E-01	574	6.18E-01
425	1.06E-02	475	4.03E-01	525	2.16E-01	575	6.22E-01
426	5.77E-03	476	4.41E-01	526	2.26E-01	576	6.35E-01
427	5.20E-03	477	4.61E-01	527	2.33E-01	577	6.38E-01
428	6.53E-03	478	4.97E-01	528	2.45E-01	578	6.45E-01
429	4.15E-03	479	5.42E-01	529	2.53E-01	579	6.51E-01
						580	6.57E-01

Spectral Power Distribution

λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units
581	6.66E-01	631	9.71E-01	681	7.80E-01	731	2.90E-01
582	6.75E-01	632	9.70E-01	682	7.71E-01	732	2.82E-01
583	6.75E-01	633	9.71E-01	683	7.64E-01	733	2.74E-01
584	6.85E-01	634	9.75E-01	684	7.51E-01	734	2.67E-01
585	6.94E-01	635	9.81E-01	685	7.48E-01	735	2.62E-01
586	7.01E-01	636	9.79E-01	686	7.32E-01	736	2.53E-01
587	7.09E-01	637	9.86E-01	687	7.23E-01	737	2.46E-01
588	7.13E-01	638	9.94E-01	688	7.10E-01	738	2.37E-01
589	7.16E-01	639	9.88E-01	689	7.04E-01	739	2.35E-01
590	7.28E-01	640	9.90E-01	690	6.86E-01	740	2.28E-01
591	7.32E-01	641	9.88E-01	691	6.79E-01	741	2.30E-01
592	7.46E-01	642	9.96E-01	692	6.63E-01	742	2.15E-01
593	7.42E-01	643	9.86E-01	693	6.53E-01	743	2.09E-01
594	7.53E-01	644	1.00E+00	694	6.43E-01	744	2.05E-01
595	7.61E-01	645	9.97E-01	695	6.36E-01	745	2.02E-01
596	7.68E-01	646	9.97E-01	696	6.28E-01	746	1.93E-01
597	7.80E-01	647	9.89E-01	697	6.14E-01	747	1.90E-01
598	7.79E-01	648	9.83E-01	698	5.98E-01	748	1.86E-01
599	7.87E-01	649	9.89E-01	699	5.87E-01	749	1.80E-01
600	8.02E-01	650	9.85E-01	700	5.79E-01	750	1.78E-01
601	8.05E-01	651	9.81E-01	701	5.65E-01	751	1.68E-01
602	8.07E-01	652	9.81E-01	702	5.51E-01	752	1.66E-01
603	8.24E-01	653	9.85E-01	703	5.44E-01	753	1.62E-01
604	8.28E-01	654	9.76E-01	704	5.33E-01	754	1.57E-01
605	8.39E-01	655	9.59E-01	705	5.23E-01	755	1.51E-01
606	8.38E-01	656	9.75E-01	706	5.13E-01	756	1.47E-01
607	8.44E-01	657	9.59E-01	707	5.02E-01	757	1.45E-01
608	8.53E-01	658	9.63E-01	708	4.97E-01	758	1.39E-01
609	8.53E-01	659	9.60E-01	709	4.80E-01	759	1.36E-01
610	8.62E-01	660	9.54E-01	710	4.71E-01	760	1.35E-01
611	8.73E-01	661	9.56E-01	711	4.62E-01	761	1.30E-01
612	8.80E-01	662	9.49E-01	712	4.52E-01	762	1.28E-01
613	8.84E-01	663	9.32E-01	713	4.46E-01	763	1.22E-01
614	8.93E-01	664	9.26E-01	714	4.33E-01	764	1.15E-01
615	8.96E-01	665	9.26E-01	715	4.26E-01	765	1.17E-01
616	9.04E-01	666	9.12E-01	716	4.17E-01	766	1.12E-01
617	9.10E-01	667	9.05E-01	717	4.08E-01	767	1.11E-01
618	9.20E-01	668	8.99E-01	718	4.00E-01	768	1.02E-01
619	9.16E-01	669	8.93E-01	719	3.86E-01	769	1.05E-01
620	9.26E-01	670	8.84E-01	720	3.77E-01	770	9.82E-02
621	9.26E-01	671	8.72E-01	721	3.71E-01	771	9.54E-02
622	9.31E-01	672	8.72E-01	722	3.60E-01	772	9.89E-02
623	9.40E-01	673	8.64E-01	723	3.52E-01	773	9.42E-02
624	9.45E-01	674	8.50E-01	724	3.42E-01	774	8.75E-02
625	9.45E-01	675	8.38E-01	725	3.40E-01	775	8.88E-02
626	9.50E-01	676	8.34E-01	726	3.28E-01	776	8.56E-02
627	9.62E-01	677	8.25E-01	727	3.17E-01	777	8.15E-02
628	9.59E-01	678	8.15E-01	728	3.13E-01	778	8.20E-02
629	9.62E-01	679	8.01E-01	729	3.07E-01	779	7.85E-02
630	9.64E-01	680	7.97E-01	730	2.98E-01	780	7.71E-02

Measurement Uncertainty

The following is the reported expanded uncertainty of the UL 6440T Type C Mirror Goniophotometer. Colrimetric expanded uncertainty is estimated using the 1 metre integrating sphere

Parameter	Uncertainty
Total Luminous Flux (%)	± 4.9
Luminous Intensity (%)	± 4.9
Correlated Color Temperature	± 100 K
CRI	± 2
Chromaticity x	± 0.005
Chromaticity y	± 0.005
Temperature ($^{\circ}$ 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 -----



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Test Item: TI-15352

