

astro

PHOTOMETRIC
TEST REPORT

Report Number	GNC-20549
Customer	Astro Lighting Limited
Contact	David Green
Product Type	LED Illuminated mirror
Test Purpose	Generation of photometric data
Quote Reference	Q-LUX18-22157
Works Order Number	WO-11196
Test Item Reference	TI-14620
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	26/02/2018
Reviewed by	Menno Schakel
Number of products tested	1

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Signed:




8454 Avlon 1200 LED 0/1-10V

Date: 26/02/2018

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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° 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	Avlon 1200 LED 0-10V
Part/Serial Number	1359011
Type of Product	LED Illuminated mirror
Base Type	Not Applicable - Luminaire
Driver Type	External AC transformer
Test Time	30 mins
Operating Orientation	Horizontal
Test Orientation	Horizontal
Ambient Temperature	25.6°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	15.2% RH
Averaging Applied	NONE



Driver Details		
Manufacturer	Inventronics	
Model	LUC-010S035DSM	
Part/Serial #	N/A	
Rated Voltage	100-277V	
Output	Current	0.350 A
	Voltage	38.0 V

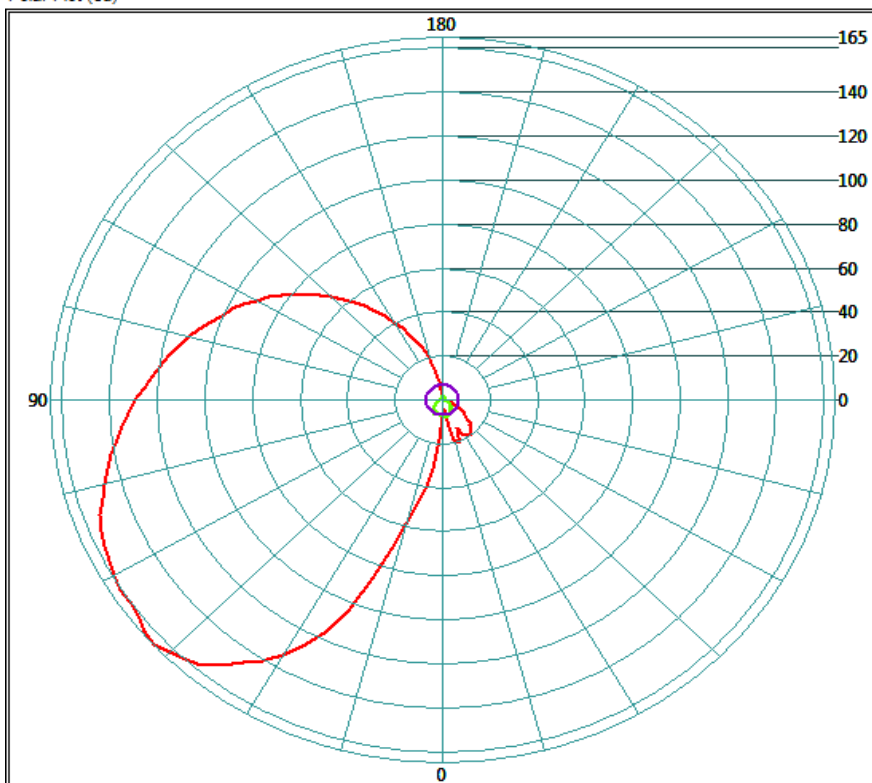
Photometric Measurements	
Luminous Flux	464 lm
Luminous Efficacy	32 lm/W

Dimension	Sample	Luminous Opening
Diameter/Width	1200 mm	1145 mm
Length	15 mm	0 mm
Height/Depth	600 mm	30 mm

Electrical Measurements	
Frequency	60 Hz
Voltage	119.9 V
Current	0.123 A
Power	14.5 W
Power Factor	0.982
Apparent Power	14.8 VA

Goniophotometric Measurements		
Beam Angle	Horizontal	99°
	Vertical	71°
On-axis Intensity		7 cd
Peak Intensity		165 cd
Peak Direction	Horizontal	360°
	Vertical	50°

Polar Plot (cd)

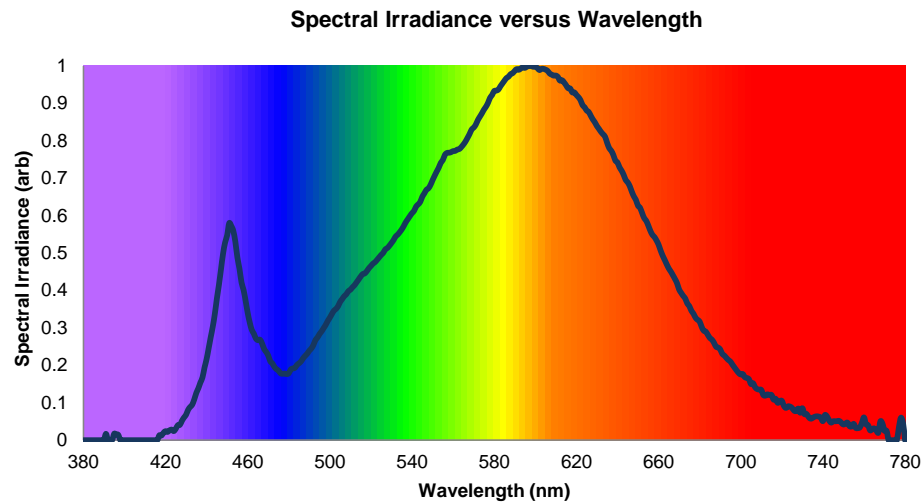


0.00	Red
180.00	Red
90.00	Green
270.00	Green
0.00	Purple

Appendices

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.

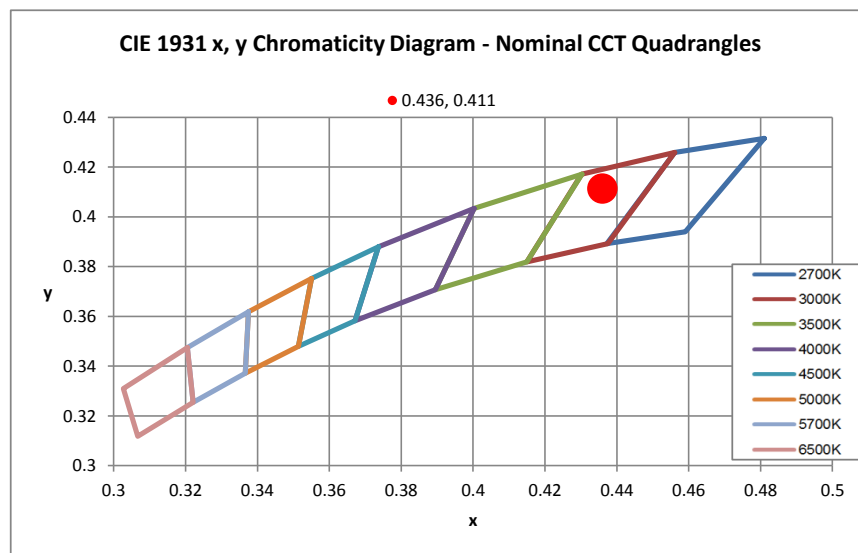
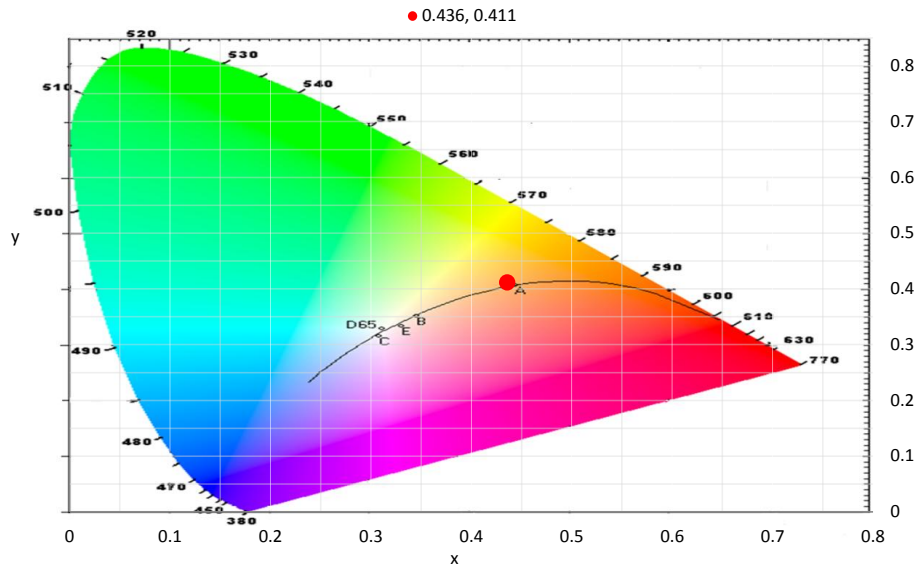


Colour Rendering Index Detail			
R1	78	R8	59
R2	88	R9	5
R3	96	R10	72
R4	78	R11	75
R5	77	R12	61
R6	83	R13	80
R7	85	R14	98

Colorimetric Details	
CCT	3071K
CRI (Ra)	80

Chromaticity Coordinates		
CIE 1931	x	0.4360
	y	0.4113
CIE 1960	u	0.2469
	v	0.3494
CIE 1976	u'	0.2469
	v'	0.5240
Duv		0.0030

CIE 1931 Colour Chart



Spectral Power Distribution

λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units
380	0.00E+00	430	6.79E-02	480	1.79E-01	530	5.27E-01
381	0.00E+00	431	8.11E-02	481	1.89E-01	531	5.35E-01
382	0.00E+00	432	8.88E-02	482	1.92E-01	532	5.44E-01
383	0.00E+00	433	9.49E-02	483	1.93E-01	533	5.49E-01
384	0.00E+00	434	1.09E-01	484	2.01E-01	534	5.56E-01
385	0.00E+00	435	1.26E-01	485	2.06E-01	535	5.63E-01
386	0.00E+00	436	1.39E-01	486	2.11E-01	536	5.73E-01
387	0.00E+00	437	1.54E-01	487	2.19E-01	537	5.83E-01
388	0.00E+00	438	1.68E-01	488	2.26E-01	538	5.91E-01
389	0.00E+00	439	1.94E-01	489	2.31E-01	539	5.99E-01
390	0.00E+00	440	2.17E-01	490	2.39E-01	540	6.07E-01
391	1.71E-02	441	2.46E-01	491	2.45E-01	541	6.13E-01
392	0.00E+00	442	2.75E-01	492	2.54E-01	542	6.25E-01
393	0.00E+00	443	3.03E-01	493	2.68E-01	543	6.30E-01
394	0.00E+00	444	3.37E-01	494	2.75E-01	544	6.37E-01
395	1.72E-02	445	3.78E-01	495	2.84E-01	545	6.51E-01
396	1.58E-02	446	4.15E-01	496	2.91E-01	546	6.60E-01
397	1.43E-02	447	4.57E-01	497	3.00E-01	547	6.69E-01
398	0.00E+00	448	4.98E-01	498	3.08E-01	548	6.73E-01
399	0.00E+00	449	5.28E-01	499	3.19E-01	549	6.82E-01
400	0.00E+00	450	5.47E-01	500	3.28E-01	550	6.95E-01
401	0.00E+00	451	5.80E-01	501	3.37E-01	551	7.07E-01
402	0.00E+00	452	5.73E-01	502	3.46E-01	552	7.18E-01
403	0.00E+00	453	5.59E-01	503	3.51E-01	553	7.28E-01
404	0.00E+00	454	5.30E-01	504	3.58E-01	554	7.41E-01
405	0.00E+00	455	4.88E-01	505	3.70E-01	555	7.49E-01
406	0.00E+00	456	4.58E-01	506	3.77E-01	556	7.62E-01
407	0.00E+00	457	4.21E-01	507	3.85E-01	557	7.68E-01
408	0.00E+00	458	4.01E-01	508	3.90E-01	558	7.68E-01
409	0.00E+00	459	3.72E-01	509	3.98E-01	559	7.70E-01
410	0.00E+00	460	3.40E-01	510	4.02E-01	560	7.73E-01
411	0.00E+00	461	3.14E-01	511	4.09E-01	561	7.73E-01
412	0.00E+00	462	2.95E-01	512	4.14E-01	562	7.77E-01
413	0.00E+00	463	2.85E-01	513	4.22E-01	563	7.78E-01
414	0.00E+00	464	2.72E-01	514	4.30E-01	564	7.83E-01
415	0.00E+00	465	2.67E-01	515	4.37E-01	565	7.90E-01
416	0.00E+00	466	2.69E-01	516	4.44E-01	566	7.98E-01
417	1.31E-02	467	2.58E-01	517	4.46E-01	567	8.08E-01
418	1.23E-02	468	2.44E-01	518	4.52E-01	568	8.18E-01
419	1.96E-02	469	2.36E-01	519	4.60E-01	569	8.30E-01
420	2.43E-02	470	2.26E-01	520	4.66E-01	570	8.35E-01
421	2.20E-02	471	2.11E-01	521	4.72E-01	571	8.43E-01
422	2.65E-02	472	2.05E-01	522	4.76E-01	572	8.55E-01
423	2.83E-02	473	1.96E-01	523	4.82E-01	573	8.64E-01
424	2.41E-02	474	1.90E-01	524	4.89E-01	574	8.73E-01
425	3.05E-02	475	1.86E-01	525	4.95E-01	575	8.83E-01
426	4.02E-02	476	1.79E-01	526	5.01E-01	576	8.91E-01
427	4.09E-02	477	1.77E-01	527	5.10E-01	577	9.02E-01
428	5.19E-02	478	1.78E-01	528	5.14E-01	578	9.15E-01
429	6.06E-02	479	1.76E-01	529	5.20E-01	579	9.23E-01
						580	9.33E-01

Spectral Power Distribution

λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units	λ (nm)	Arb units
581	9.34E-01	631	8.32E-01	681	3.03E-01	731	6.98E-02
582	9.37E-01	632	8.24E-01	682	2.93E-01	732	7.03E-02
583	9.46E-01	633	8.18E-01	683	2.90E-01	733	6.24E-02
584	9.53E-01	634	8.11E-01	684	2.82E-01	734	5.73E-02
585	9.61E-01	635	7.94E-01	685	2.73E-01	735	5.96E-02
586	9.68E-01	636	7.80E-01	686	2.69E-01	736	6.26E-02
587	9.72E-01	637	7.73E-01	687	2.60E-01	737	6.38E-02
588	9.78E-01	638	7.62E-01	688	2.50E-01	738	6.30E-02
589	9.81E-01	639	7.47E-01	689	2.48E-01	739	6.02E-02
590	9.87E-01	640	7.42E-01	690	2.43E-01	740	5.08E-02
591	9.92E-01	641	7.29E-01	691	2.31E-01	741	6.73E-02
592	9.90E-01	642	7.20E-01	692	2.26E-01	742	6.34E-02
593	9.94E-01	643	7.09E-01	693	2.20E-01	743	5.31E-02
594	9.97E-01	644	6.96E-01	694	2.14E-01	744	4.69E-02
595	9.95E-01	645	6.89E-01	695	2.10E-01	745	5.07E-02
596	9.99E-01	646	6.79E-01	696	2.02E-01	746	5.05E-02
597	1.00E+00	647	6.64E-01	697	1.94E-01	747	5.11E-02
598	1.00E+00	648	6.51E-01	698	1.86E-01	748	5.16E-02
599	9.98E-01	649	6.42E-01	699	1.80E-01	749	4.65E-02
600	9.99E-01	650	6.27E-01	700	1.75E-01	750	4.17E-02
601	9.95E-01	651	6.21E-01	701	1.77E-01	751	4.48E-02
602	9.89E-01	652	6.07E-01	702	1.68E-01	752	4.69E-02
603	9.92E-01	653	5.94E-01	703	1.66E-01	753	3.74E-02
604	9.92E-01	654	5.86E-01	704	1.63E-01	754	3.66E-02
605	9.90E-01	655	5.74E-01	705	1.50E-01	755	4.37E-02
606	9.87E-01	656	5.60E-01	706	1.52E-01	756	3.29E-02
607	9.80E-01	657	5.49E-01	707	1.42E-01	757	3.22E-02
608	9.77E-01	658	5.43E-01	708	1.37E-01	758	3.43E-02
609	9.74E-01	659	5.34E-01	709	1.35E-01	759	4.65E-02
610	9.75E-01	660	5.23E-01	710	1.34E-01	760	6.10E-02
611	9.71E-01	661	5.07E-01	711	1.21E-01	761	4.23E-02
612	9.61E-01	662	4.93E-01	712	1.19E-01	762	4.00E-02
613	9.62E-01	663	4.82E-01	713	1.23E-01	763	2.61E-02
614	9.56E-01	664	4.70E-01	714	1.21E-01	764	2.98E-02
615	9.49E-01	665	4.59E-01	715	1.21E-01	765	3.16E-02
616	9.40E-01	666	4.50E-01	716	1.08E-01	766	2.57E-02
617	9.40E-01	667	4.41E-01	717	1.11E-01	767	2.01E-02
618	9.29E-01	668	4.31E-01	718	9.98E-02	768	5.04E-02
619	9.30E-01	669	4.20E-01	719	1.04E-01	769	4.42E-02
620	9.23E-01	670	4.03E-01	720	1.05E-01	770	2.50E-02
621	9.17E-01	671	3.94E-01	721	9.21E-02	771	2.51E-02
622	9.09E-01	672	3.86E-01	722	8.61E-02	772	0.00E+00
623	8.96E-01	673	3.79E-01	723	9.06E-02	773	0.00E+00
624	8.90E-01	674	3.65E-01	724	8.97E-02	774	0.00E+00
625	8.81E-01	675	3.58E-01	725	8.60E-02	775	0.00E+00
626	8.77E-01	676	3.46E-01	726	7.89E-02	776	0.00E+00
627	8.67E-01	677	3.38E-01	727	7.77E-02	777	3.43E-02
628	8.57E-01	678	3.27E-01	728	8.44E-02	778	6.02E-02
629	8.49E-01	679	3.22E-01	729	7.31E-02	779	4.66E-02
630	8.40E-01	680	3.17E-01	730	8.56E-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 (°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 -----