

astro

PHOTOMETRIC
TEST REPORT

Report Number	TRN-16798
Customer	Astro Lighting Limited
Contact	Stuart Wells
Product Type	LED Wall light
Test Purpose	Generation of Photometric Data
Sales Order Ref	Q-LUX16-20616
Works Order Number	WO-7445
Test Item Reference	TI-11657
LAB Test Method Reference	TES-10050
Test Standards	LM-79-08
Lab Location Reference	LUX-TSI
Tested by	Mike Sewell
Date of Test	4/25/2016
Analysed by	Andrew Thomas
Number of products tested	1

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Date: 7/1/2016



Edge 560 + suitable Driver

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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 ±15°

VBD - Vertical Base Down ±15°

HBU - Base Up +/- 90° (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 +/- 75° (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°C +/- 1°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. The Integrating Sphere Spectrometer System is calibrated using total spectral flux lamp calibrated by NPL.

Test Equipment

UL LSI Custom Far-Field Type C Moving Mirror Goniophotometer measures intensity as a function of angle. 1m Integrating Sphere Spectrometer System for Total Spectral Flux.

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	Edge 560 LED 3000K Dimmable
Part/Serial Number	1352001
Type of Product	LED Wall light
Base Type	Not Applicable - Luminaire
Driver Type	External DC
Test Time	30 mins
Operating Orientation	Horizontal
Test Orientation	Base Down
Ambient Temperature	25.3°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	31.8% RH
Averaging Applied	NONE

Photometric Measurements	
Luminous Flux	479 lm
Luminous Efficacy	31 lm/W

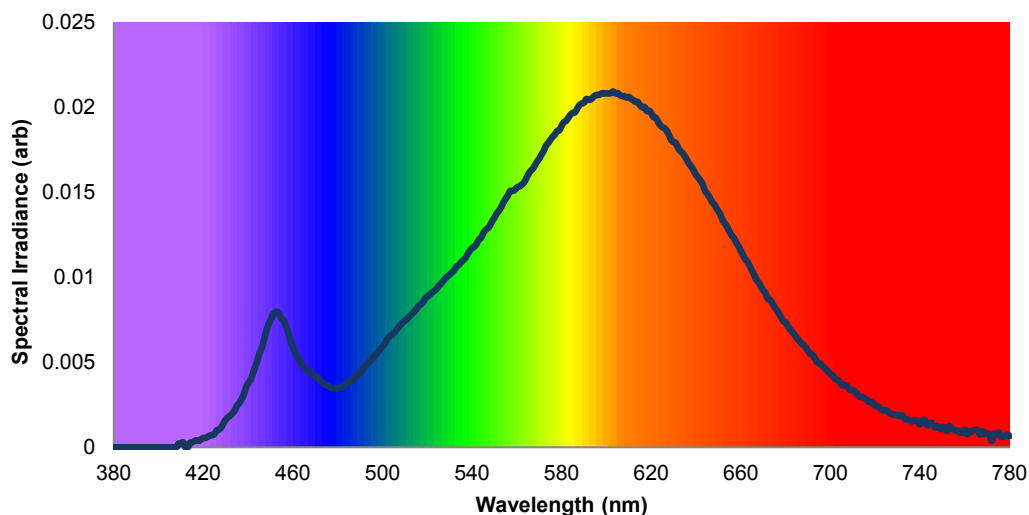
Dimension	Sample	Luminous Opening
Diameter/Width	205 mm	205 mm
Length	560 mm	560 mm
Height/Depth	55 mm	54 mm



Driver Details		
Manufacturer	Relco	
Model	PowerLED-DIM 18W	
Part/Serial #	RN1408	
Rating	220-240	
Output	Current	0.700 A
	Voltage	28.000 V

Electrical Measurements	
Frequency	50 Hz
Voltage	239.810 V
Current	0.067 A
Power	15.5 W
Power Factor	0.966
Peak Power VA	16.0

Spectral Irradiance versus Wavelength



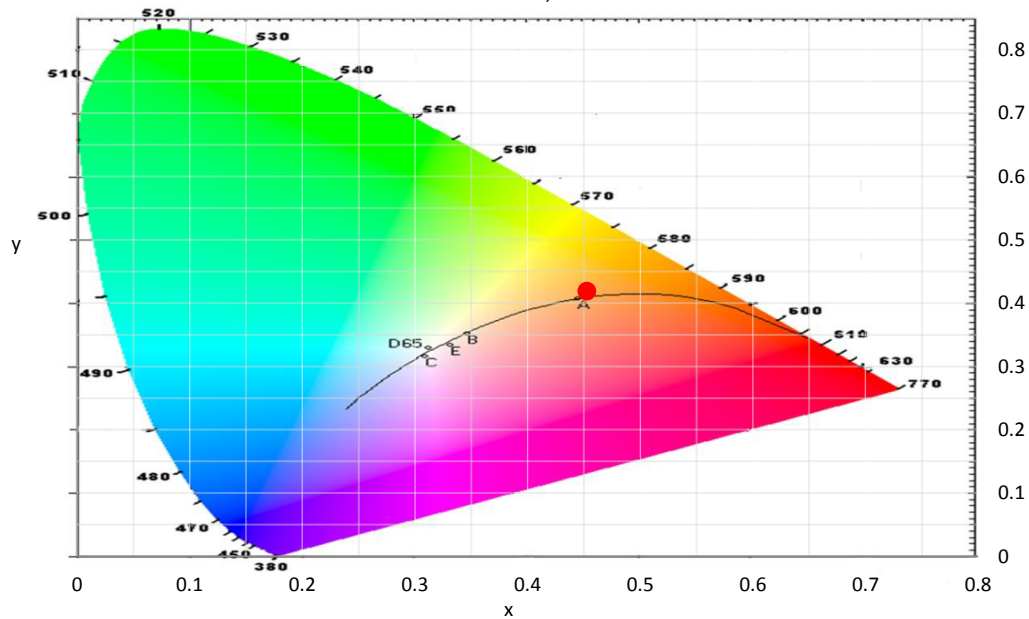
Colour Rendering Index Detail			
R1	77.1	R8	58.3
R2	87.7	R9	4.8
R3	97.1	R10	71.8
R4	76.8	R11	73.4
R5	76.3	R12	63.0
R6	83.7	R13	79.0
R7	84.2	R14	98.3

Colorimetric Details	
CCT	2866K
CRI (Ra)	80

Chromaticity Coordinates		
CIE 1931	x	0.4526
	y	0.4187
CIE 1960	u	0.2543
	v	0.3529
CIE 1976	u'	0.2543
	v'	0.5293
Duv		0.0032

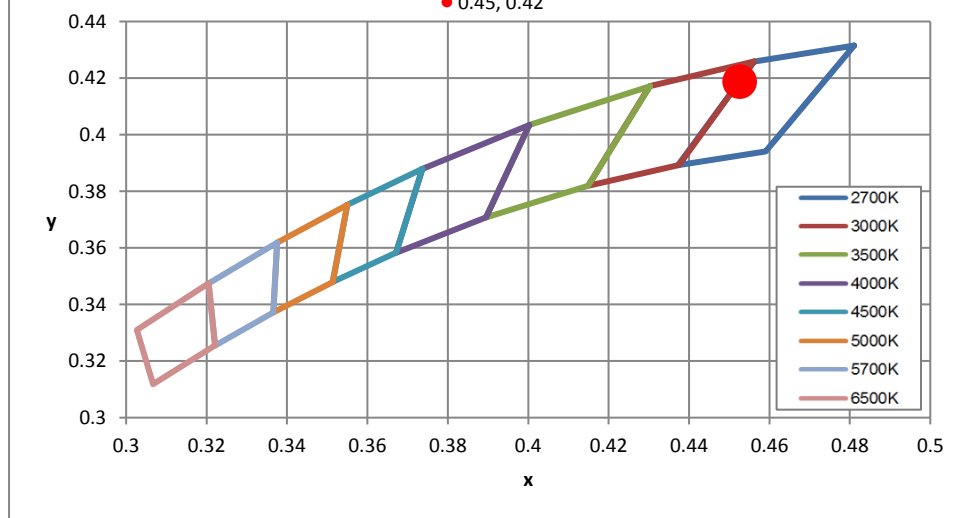
CIE 1931 Colour Chart

• 0.45, 0.42



CIE 1931 x, y Chromaticity Diagram - Nominal CCT Quadrangles

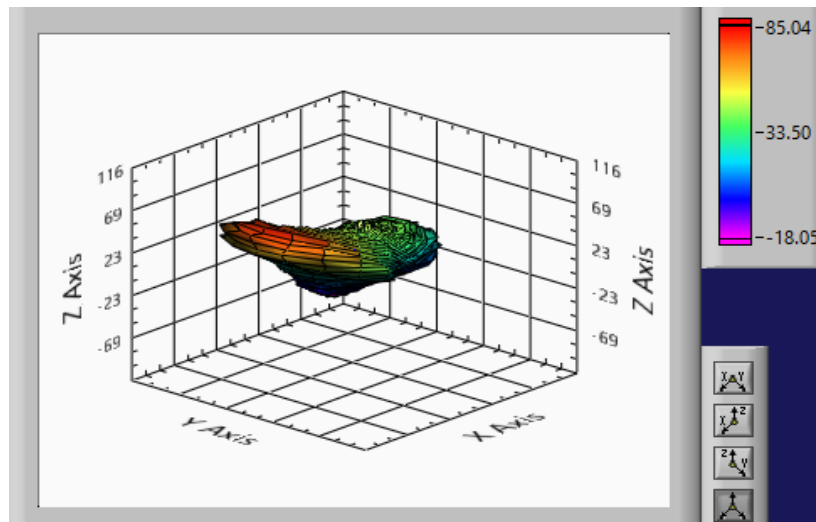
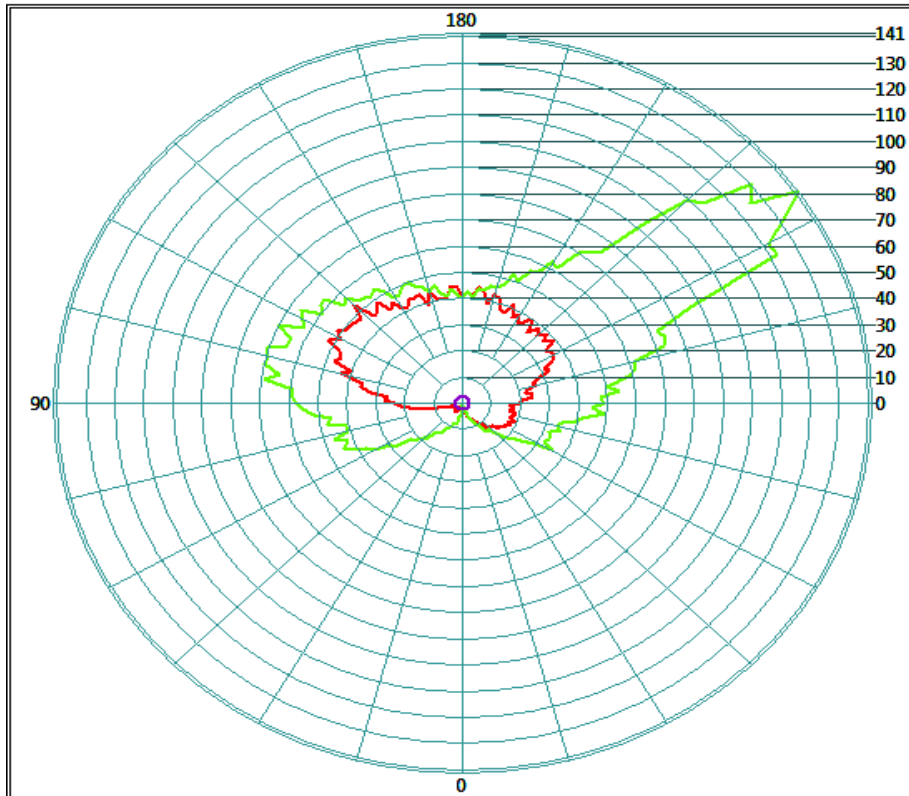
• 0.45, 0.42



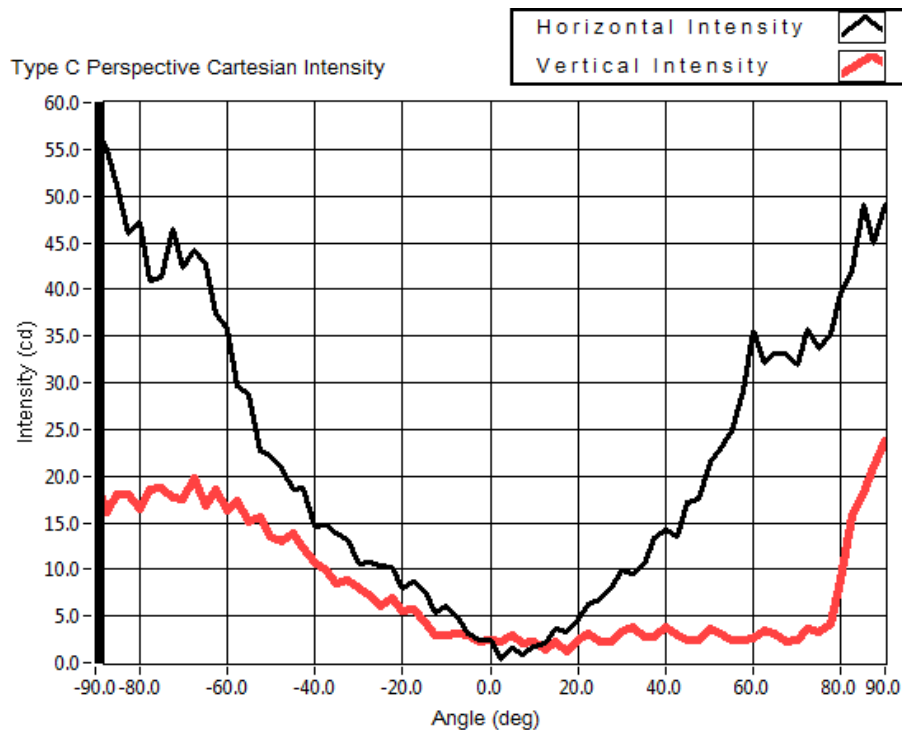
Goniophotometric Measurements

Beam Angle	Horizontal	N/A
	Vertical	N/A
On-axis Intensity		3 cd
Peak Intensity		141 cd
Peak Direction	Horizontal	270°
	Vertical	125°

Polar Plot (cd)



Mounting Height (m)	Beam Cone Width (m)	Orthogonal Beam Cone Width (m)	Projected Illuminance (lux)
0.5	NaN	NaN	10.0
1	NaN	NaN	2.5
2	NaN	NaN	0.6
3	NaN	NaN	0.3
4	NaN	NaN	0.2
5	NaN	NaN	0.1
6	NaN	NaN	0.1
8	NaN	NaN	0.0
10	NaN	NaN	0.0
20	NaN	NaN	0.0



Spectral Power Distribution

λ (nm)	W	λ (nm)	W	λ (nm)	W	λ (nm)	W
380	0.000000	430	1.63E-03	480	3.44E-03	530	1.02E-02
381	0.00E+00	431	1.77E-03	481	3.54E-03	531	1.03E-02
382	0.00E+00	432	1.86E-03	482	3.55E-03	532	1.04E-02
383	0.00E+00	433	2.00E-03	483	3.64E-03	533	1.06E-02
384	0.00E+00	434	2.18E-03	484	3.78E-03	534	1.07E-02
385	0.00E+00	435	2.44E-03	485	3.86E-03	535	1.09E-02
386	0.00E+00	436	2.60E-03	486	3.88E-03	536	1.10E-02
387	0.00E+00	437	2.82E-03	487	4.02E-03	537	1.11E-02
388	0.00E+00	438	3.10E-03	488	4.16E-03	538	1.14E-02
389	0.00E+00	439	3.51E-03	489	4.26E-03	539	1.16E-02
390	0.00E+00	440	3.77E-03	490	4.41E-03	540	1.17E-02
391	0.00E+00	441	3.95E-03	491	4.53E-03	541	1.18E-02
392	0.00E+00	442	4.31E-03	492	4.73E-03	542	1.20E-02
393	0.00E+00	443	4.68E-03	493	4.91E-03	543	1.22E-02
394	0.00E+00	444	5.05E-03	494	5.01E-03	544	1.23E-02
395	0.00E+00	445	5.51E-03	495	5.14E-03	545	1.26E-02
396	0.00E+00	446	5.82E-03	496	5.30E-03	546	1.28E-02
397	0.00E+00	447	6.27E-03	497	5.47E-03	547	1.29E-02
398	0.00E+00	448	6.79E-03	498	5.62E-03	548	1.31E-02
399	0.00E+00	449	7.21E-03	499	5.78E-03	549	1.33E-02
400	0.00E+00	450	7.48E-03	500	5.92E-03	550	1.35E-02
401	0.00E+00	451	7.81E-03	501	6.08E-03	551	1.38E-02
402	0.00E+00	452	7.92E-03	502	6.34E-03	552	1.39E-02
403	0.00E+00	453	7.98E-03	503	6.51E-03	553	1.41E-02
404	0.00E+00	454	7.78E-03	504	6.60E-03	554	1.44E-02
405	0.00E+00	455	7.55E-03	505	6.73E-03	555	1.46E-02
406	0.00E+00	456	7.45E-03	506	6.86E-03	556	1.48E-02
407	0.00E+00	457	7.09E-03	507	7.04E-03	557	1.51E-02
408	0.00E+00	458	6.72E-03	508	7.19E-03	558	1.51E-02
409	2.21E-04	459	6.22E-03	509	7.35E-03	559	1.51E-02
410	2.41E-04	460	5.88E-03	510	7.44E-03	560	1.53E-02
411	2.88E-04	461	5.52E-03	511	7.56E-03	561	1.53E-02
412	0.00E+00	462	5.28E-03	512	7.70E-03	562	1.54E-02
413	0.00E+00	463	5.13E-03	513	7.83E-03	563	1.55E-02
414	2.63E-04	464	4.83E-03	514	7.95E-03	564	1.58E-02
415	2.95E-04	465	4.71E-03	515	8.11E-03	565	1.60E-02
416	3.66E-04	466	4.63E-03	516	8.30E-03	566	1.62E-02
417	4.09E-04	467	4.47E-03	517	8.41E-03	567	1.64E-02
418	3.81E-04	468	4.39E-03	518	8.53E-03	568	1.66E-02
419	4.71E-04	469	4.24E-03	519	8.74E-03	569	1.68E-02
420	5.50E-04	470	4.16E-03	520	8.86E-03	570	1.70E-02
421	5.57E-04	471	4.15E-03	521	8.96E-03	571	1.72E-02
422	6.29E-04	472	3.95E-03	522	9.10E-03	572	1.74E-02
423	6.92E-04	473	3.80E-03	523	9.20E-03	573	1.78E-02
424	7.27E-04	474	3.74E-03	524	9.30E-03	574	1.79E-02
425	7.87E-04	475	3.65E-03	525	9.49E-03	575	1.81E-02
426	1.01E-03	476	3.59E-03	526	9.60E-03	576	1.83E-02
427	1.05E-03	477	3.50E-03	527	9.77E-03	577	1.84E-02
428	1.18E-03	478	3.48E-03	528	9.92E-03	578	1.86E-02
429	1.42E-03	479	3.49E-03	529	1.01E-02	579	1.87E-02
						580	1.89E-02

Spectral Power Distribution

λ (nm)	W	λ (nm)	W	λ (nm)	W	λ (nm)	W
581	1.91E-02	631	1.79E-02	681	7.12E-03	731	1.85E-03
582	1.92E-02	632	1.76E-02	682	6.94E-03	732	1.88E-03
583	1.94E-02	633	1.74E-02	683	6.78E-03	733	1.72E-03
584	1.96E-02	634	1.73E-02	684	6.62E-03	734	1.63E-03
585	1.97E-02	635	1.71E-02	685	6.44E-03	735	1.62E-03
586	1.97E-02	636	1.69E-02	686	6.28E-03	736	1.55E-03
587	1.99E-02	637	1.67E-02	687	6.12E-03	737	1.55E-03
588	2.01E-02	638	1.65E-02	688	6.02E-03	738	1.61E-03
589	2.02E-02	639	1.63E-02	689	5.86E-03	739	1.53E-03
590	2.03E-02	640	1.60E-02	690	5.68E-03	740	1.35E-03
591	2.05E-02	641	1.59E-02	691	5.51E-03	741	1.54E-03
592	2.04E-02	642	1.57E-02	692	5.43E-03	742	1.61E-03
593	2.05E-02	643	1.55E-02	693	5.27E-03	743	1.33E-03
594	2.06E-02	644	1.51E-02	694	5.01E-03	744	1.31E-03
595	2.07E-02	645	1.49E-02	695	4.95E-03	745	1.45E-03
596	2.07E-02	646	1.47E-02	696	4.85E-03	746	1.27E-03
597	2.08E-02	647	1.45E-02	697	4.72E-03	747	1.17E-03
598	2.08E-02	648	1.43E-02	698	4.59E-03	748	1.23E-03
599	2.08E-02	649	1.41E-02	699	4.45E-03	749	1.08E-03
600	2.08E-02	650	1.39E-02	700	4.31E-03	750	1.19E-03
601	2.08E-02	651	1.36E-02	701	4.25E-03	751	1.17E-03
602	2.08E-02	652	1.33E-02	702	4.05E-03	752	9.63E-04
603	2.09E-02	653	1.31E-02	703	3.96E-03	753	1.24E-03
604	2.08E-02	654	1.29E-02	704	3.89E-03	754	1.14E-03
605	2.08E-02	655	1.27E-02	705	3.67E-03	755	1.06E-03
606	2.07E-02	656	1.24E-02	706	3.67E-03	756	9.68E-04
607	2.07E-02	657	1.23E-02	707	3.64E-03	757	9.73E-04
608	2.07E-02	658	1.20E-02	708	3.49E-03	758	8.52E-04
609	2.06E-02	659	1.18E-02	709	3.36E-03	759	8.88E-04
610	2.06E-02	660	1.16E-02	710	3.36E-03	760	1.04E-03
611	2.05E-02	661	1.13E-02	711	3.26E-03	761	7.80E-04
612	2.04E-02	662	1.11E-02	712	3.13E-03	762	9.14E-04
613	2.03E-02	663	1.09E-02	713	2.99E-03	763	9.30E-04
614	2.03E-02	664	1.06E-02	714	2.98E-03	764	1.00E-03
615	2.01E-02	665	1.04E-02	715	2.90E-03	765	1.05E-03
616	2.00E-02	666	1.01E-02	716	2.84E-03	766	9.28E-04
617	2.00E-02	667	9.85E-03	717	2.68E-03	767	7.37E-04
618	1.98E-02	668	9.70E-03	718	2.67E-03	768	9.42E-04
619	1.98E-02	669	9.46E-03	719	2.59E-03	769	8.05E-04
620	1.97E-02	670	9.23E-03	720	2.45E-03	770	8.23E-04
621	1.94E-02	671	9.08E-03	721	2.42E-03	771	7.37E-04
622	1.94E-02	672	8.75E-03	722	2.32E-03	772	3.77E-04
623	1.92E-02	673	8.67E-03	723	2.23E-03	773	7.89E-04
624	1.90E-02	674	8.51E-03	724	2.19E-03	774	7.42E-04
625	1.88E-02	675	8.26E-03	725	2.17E-03	775	8.82E-04
626	1.88E-02	676	8.08E-03	726	2.07E-03	776	6.95E-04
627	1.86E-02	677	7.87E-03	727	1.98E-03	777	6.08E-04
628	1.84E-02	678	7.63E-03	728	1.95E-03	778	6.70E-04
629	1.81E-02	679	7.42E-03	729	1.92E-03	779	7.65E-04
630	1.80E-02	680	7.35E-03	730	1.90E-03	780	6.57E-04

Measurement Uncertainty

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

Parameter	Uncertainty
Total Luminous Flux (%)	± 3.25
Luminous Intensity (%)	± 3.25
Correlated Color Temperature (K)	± 100
CRI	± 2
Chromaticity x	± 0.005
Chromaticity y	± 0.005
Temperature (°C)	± 0.5
Voltage DC TY720 (%)	± 0.02
Current DC TY720 (%)	± 0.10
Voltage AC WT210 (%)	± 0.0585
Current AC WT210 (%)	± 0.0251
Power AC WT210 (%)	± 0.2261
Frequency (50/60 Hz) WT210 (%)	± 0.0040
Power Factor WT210 (%)	± 0.0601

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.

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 -----