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PHOTOMETRIC  
TEST REPORT

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## Photometric Test Report

Report Number: POTS/GJ13027	Report Date: 30-01-2013	Prepared By: G John
Test Laboratory: Photometric and Optical Testing Services, Cotswold Business Centre, 42 A P Ellis Road, Rissington Business Park, Upper Rissington, Gloucestershire, GL54 2QB		
Company Registration Number: Registered in England & Wales No. OC352911		
Registered Address: Thistle Down Barn, Holcot Lane, Sywell, Northampton, NN6 0BG		

### Client Details

Company: Astro Lighting	Email: technical@astrolighting.co.uk
Address: Astro Lighting Limited, G2 River Way, Harlow CM20 2DP, Great Britain	

### Details of Product Tested

Manufacturer: Astro Lighting	Source Type: Domestic light
Model: TALLIN 1200	Serial Number: 1116004
Lamp Type: CFL	
Power Supply Used: Uninterruptible AC power supply	
Voltage(AC V) = 240.6	Current (mA)= 205
Power (Watts)= 48.7	Power factor= 0.9841

### Integrating Sphere Test

Date of Test: 19-12-2012	Ambient Temperature: 25°C
Measurement Filename: TALLIN 1200	
Instrument Used: Labsphere model CSLMS LED 4060 integrating sphere spectroradiometer	
Integrating Sphere Size: 1m	Measurement Geometry ( $2\pi / 4\pi$ ): $4\pi$
Sample Orientation: Horizontal	Auxiliary Correction Applied: YES
Comments:	
Date of Last Calibration (Operating Hours): 08-11-2012 (02:36)	Spectral Flux Standard Lamp Used: SCL-1400
Standard Lamp Serial Number: K75	Traceable: to NIST standards
Calibration Certificate Number: DM-02008-001	Calibration Certificate Date: 19 <sup>th</sup> February 2010
Calibration Lamp Uncertainty: $\pm 0.67\%$ ( $k=2$ )	
<b>Results</b>	
Flux (lumens): 1543.5	Bare Lamp flux (lumens): 4460
CIE 1931 Chromaticity Cx: 0.4463	CIE 1931 Chromaticity Cy: 0.4168
CRI (%): 82.56	CCT (K): 2952
LOR(%)= 34.6	

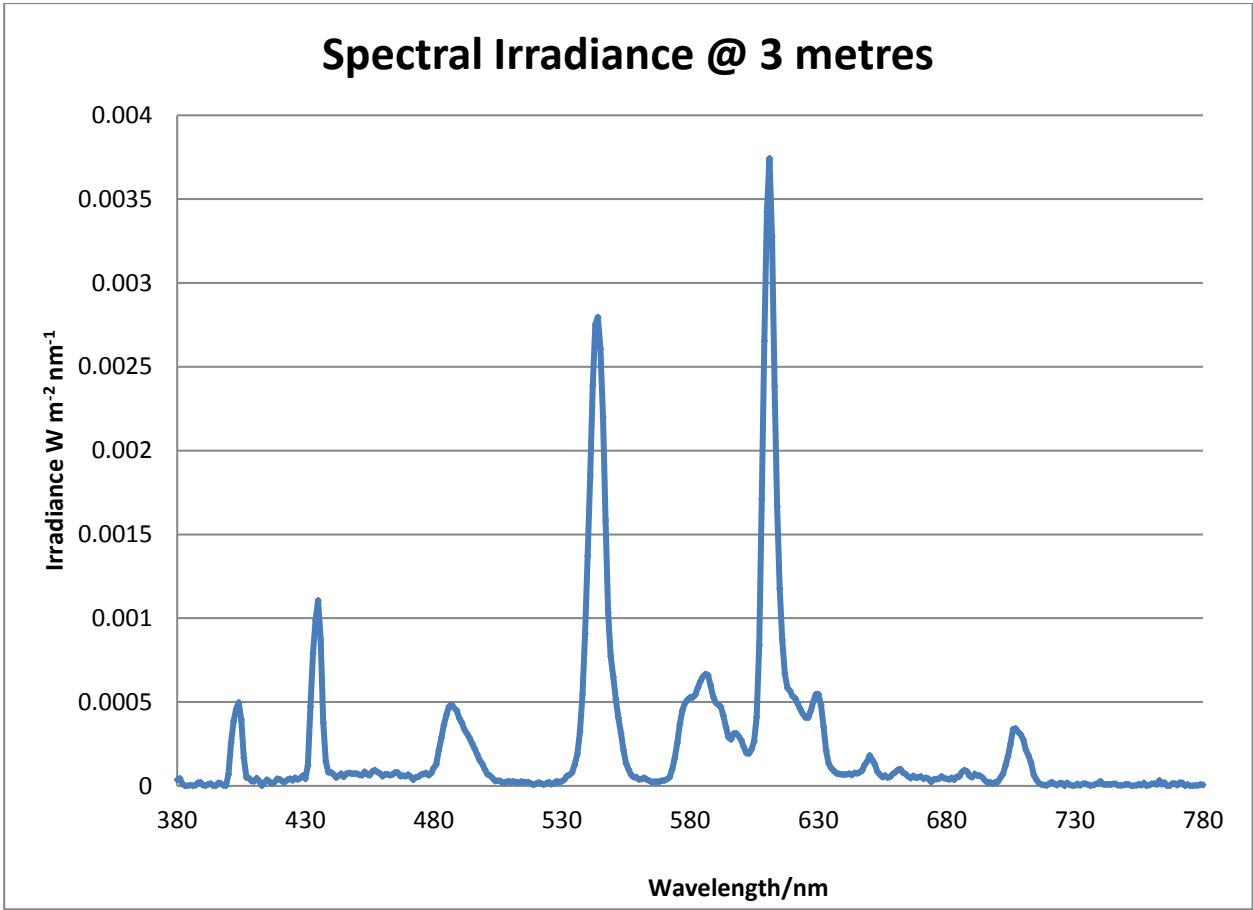


Figure 1: Spectral Irradiance

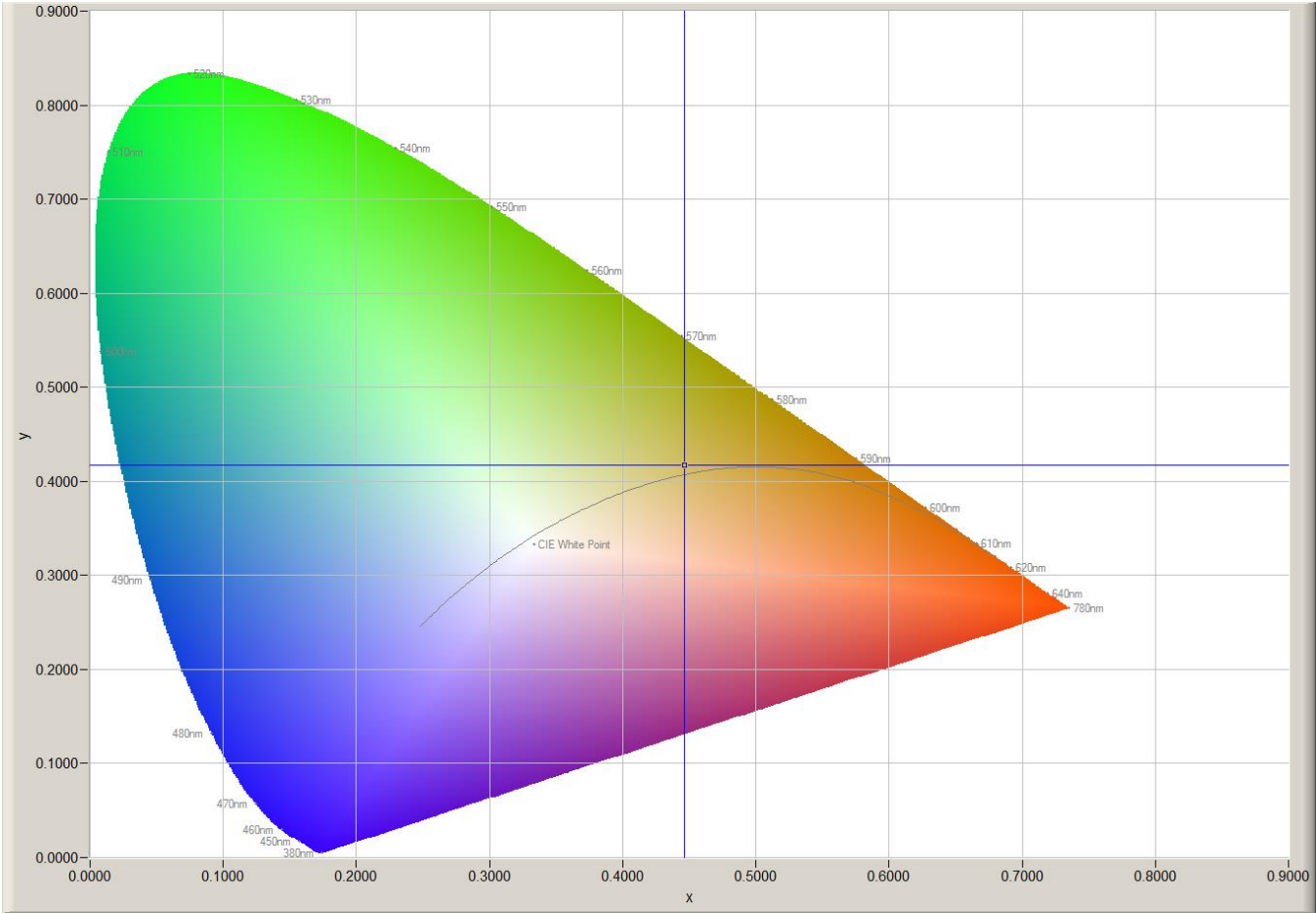


Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 19-12-2012		Ambient Temperature: 25°C
Measurement Filename: TALLIN 1200		
Instrument Used: Radiant Imaging NFMS0800 Goniometer with ProMetric PM-1423F-1 Imaging Photometer		
Photometer Working Distance: 3m		Measurement Geometry: Near-Field
Comments:		
Reference Photometer Used: Specbos1201		Reference Photometer Serial Number: 2911670
Traceable: to NPL standards, UKAS Accredited		Calibration Certificate Number: 121104
Calibration Certificate Date: 25 <sup>th</sup> October 2011		Sample Stabilisation Time (minutes):19
Reference Photometer Calibration Uncertainty: $\pm 2.4\%$ ( $k=2$ , 20-200 lux, CIE illuminant A source)		
Scan Set Up		
Direction	Range	Increment
Inclination Zone 1	0-180°	3°
Azimuth	0-360°	10°
Results		
Integrated Luminous Flux (lumens):1543.5	Peak Intensity (3° Spot, candelas): 297.6	Efficacy (lumens/Watt): 31.68
Beam Angle (50% of max intensity C0-180, degrees): 108.6		
Photometric Filename (IES LM-63-2002): TALLIN 1200		
IES File – Absolute or Relative Format? Relative		
Photometric Filename (EULUMDAT): TALLIN 1200		
EULUMDAT File – Absolute or Relative Format? Relative		

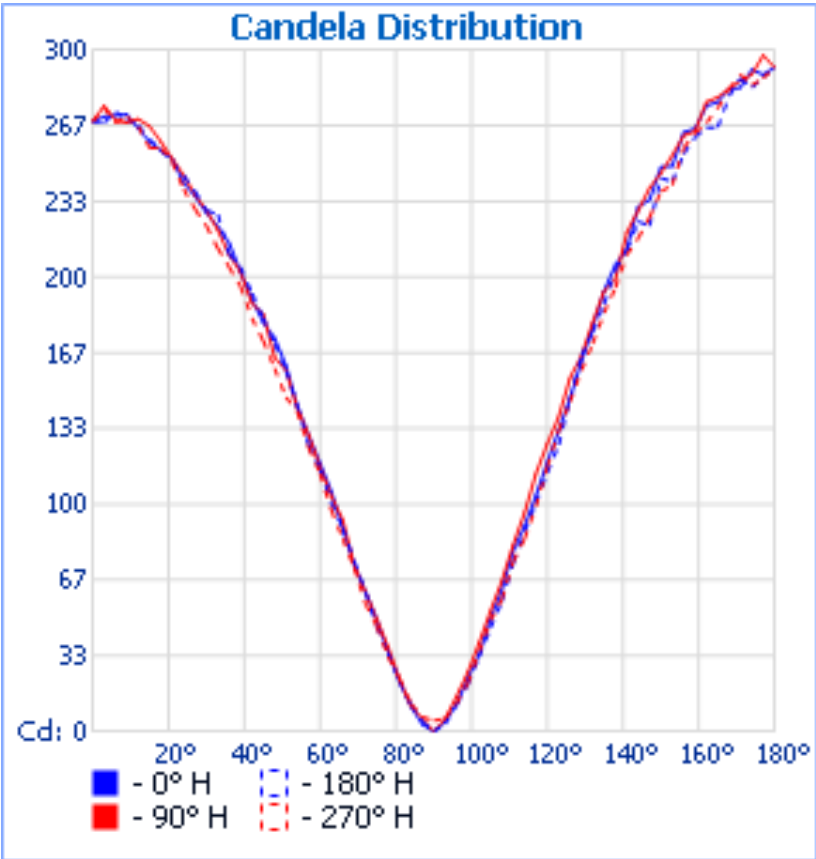


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

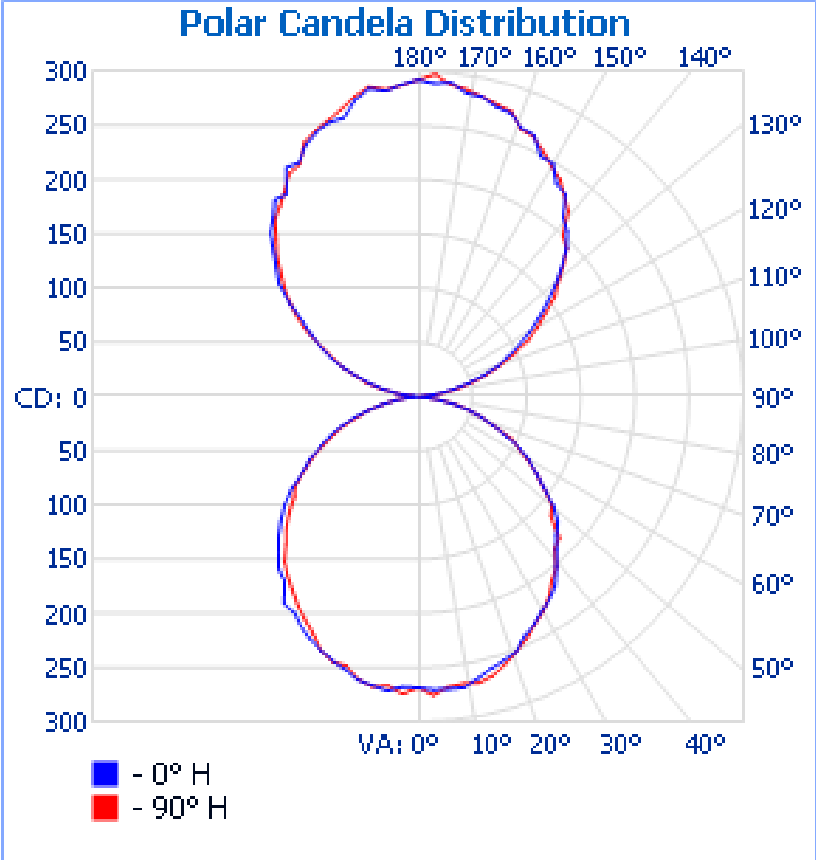


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

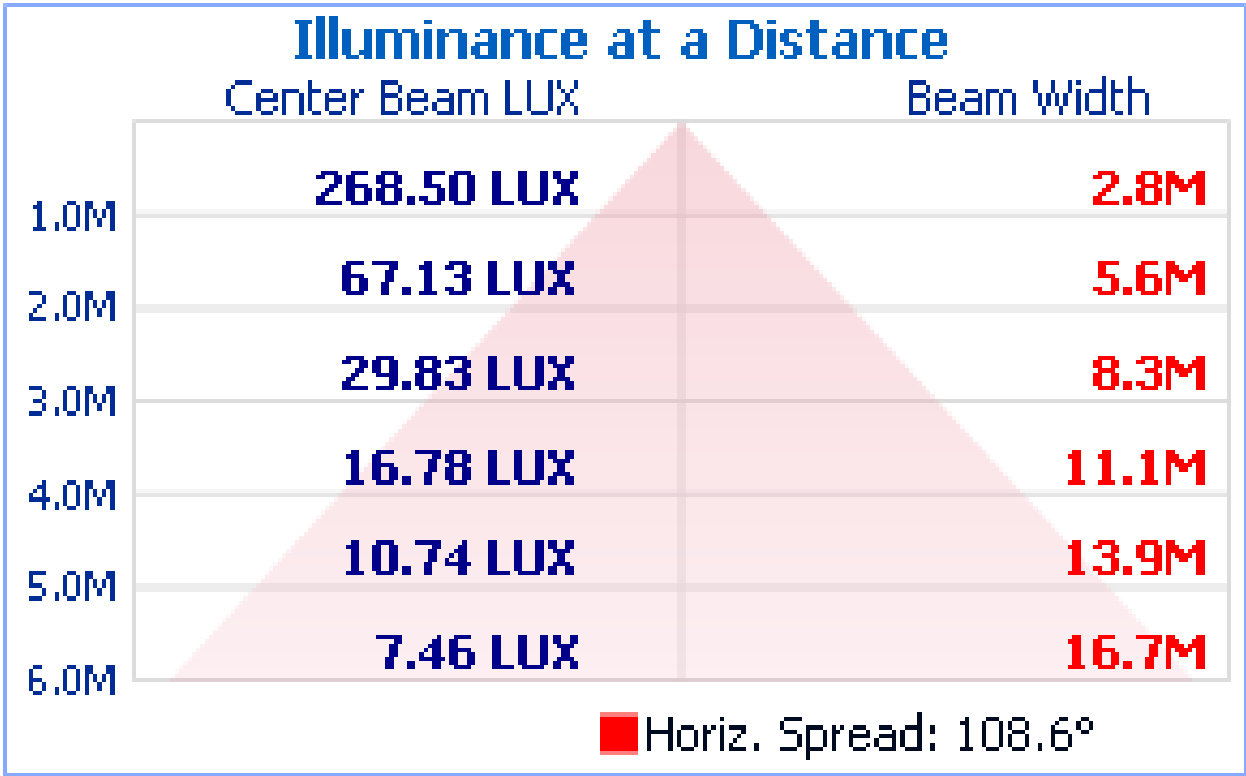


Figure 4. Illuminance cone diagram.

Reflectance of											
Ceiling		0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
Walls		0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3
Floor Cavity		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Room dimension		Viewed crosswise					Viewed endwise				
x	y										
2H	2H	10.6	11.5	11.6	12.5	13.7	10.3	11.1	11.2	12.1	13.4
	3H	12.0	12.8	13.0	13.8	15.1	11.8	12.5	12.7	13.5	14.8
	4H	12.6	13.3	13.6	14.3	15.6	12.3	13.0	13.3	14.0	15.4
	6H	13.0	13.6	14.0	14.6	16.0	12.7	13.4	13.7	14.4	15.7
	8H	13.0	13.7	14.0	14.7	16.0	12.8	13.4	13.8	14.4	15.8
	12H	13.0	13.6	14.0	14.6	16.0	12.8	13.4	13.8	14.4	15.8
4H	2H	11.2	12.0	12.2	13.0	14.3	10.9	11.7	11.9	12.7	14.0
	3H	12.8	13.4	13.8	14.4	15.8	12.6	13.2	13.6	14.2	15.5
	4H	13.5	14.1	14.5	15.1	16.4	13.3	13.8	14.3	14.8	16.2
	6H	13.9	14.4	15.0	15.5	16.8	13.7	14.2	14.7	15.2	16.6
	8H	14.0	14.5	15.1	15.5	16.9	13.8	14.3	14.8	15.3	16.7
	12H	14.1	14.5	15.1	15.5	16.9	13.9	14.3	14.9	15.3	16.7
8H	4H	13.7	14.2	14.7	15.2	16.6	13.5	13.9	14.5	15.0	16.3
	6H	14.2	14.6	15.3	15.6	17.0	14.0	14.4	15.0	15.4	16.8
	8H	14.4	14.8	15.5	15.8	17.2	14.2	14.6	15.3	15.6	17.0
	12H	14.5	14.8	15.5	15.8	17.2	14.3	14.6	15.4	15.7	17.1
12H	4H	13.7	14.1	14.8	15.2	16.6	13.5	13.9	14.5	14.9	16.3
	6H	14.3	14.6	15.4	15.7	17.1	14.1	14.4	15.1	15.5	16.8
	8H	14.5	14.7	15.5	15.8	17.2	14.3	14.5	15.3	15.6	17.0

Table 1. UGR values  
Photometric and Optical Testing Services Test Report POTS/GJ13027

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5
3	270.6	271.1	271.6	272.7	272.2	272.7	274.3	274.8	275.4	275.4	275.9	275.9	275.4	273.7	271.1	270.0	270.0	268.5	267.9
6	271.1	268.5	270.6	273.3	272.7	271.1	271.1	266.9	264.8	269.0	274.8	276.4	272.7	270.0	266.3	266.3	274.3	277.0	272.7
9	271.6	267.9	273.3	271.1	269.6	271.1	271.6	268.5	269.0	267.9	267.9	268.5	271.6	271.1	270.0	270.0	268.5	275.4	269.6
12	265.3	269.6	265.9	265.9	264.8	267.9	267.9	266.3	266.9	269.6	269.0	264.8	265.9	269.0	264.2	268.5	266.9	265.9	266.9
15	259.5	262.6	256.8	265.3	260.5	261.0	263.2	264.2	258.9	266.3	259.9	258.5	265.3	261.0	260.5	255.2	260.5	253.6	260.5
18	255.8	259.9	252.5	260.5	255.8	264.2	254.8	260.5	261.0	259.5	262.6	256.8	258.5	253.1	256.8	254.8	254.8	252.1	255.8
21	252.1	249.4	252.1	247.8	256.2	250.5	255.8	249.9	255.8	252.1	246.7	254.2	251.5	244.7	252.5	246.7	255.8	238.7	250.5
24	241.4	247.3	245.1	248.8	242.5	241.4	243.6	249.4	243.0	244.7	243.0	247.8	243.0	242.5	241.4	235.0	242.5	237.7	244.7
27	235.6	245.7	234.6	235.0	246.7	237.3	237.7	243.0	234.0	236.2	237.3	234.6	231.3	236.7	235.6	238.7	238.7	229.9	237.7
30	228.2	233.0	233.0	230.9	226.2	235.6	233.0	227.2	230.9	229.3	227.2	230.9	227.6	226.2	227.6	226.6	226.6	222.9	229.3
33	222.4	223.5	218.7	222.9	225.1	222.4	216.1	220.2	220.8	220.8	218.7	219.8	217.1	217.7	219.2	220.8	212.8	207.0	227.6
36	215.0	215.0	213.8	219.8	210.1	214.4	213.8	213.4	211.3	209.7	209.1	208.7	208.7	203.9	212.8	214.4	206.4	202.3	210.1
39	202.3	206.0	207.6	200.7	201.3	205.0	202.7	197.5	203.9	202.3	205.4	198.6	197.5	200.7	202.7	199.6	192.2	195.9	204.4
42	190.1	192.8	190.6	194.9	195.9	191.6	191.2	187.9	191.6	188.5	189.5	189.5	186.9	191.2	186.9	185.8	181.7	182.7	192.8
45	180.1	180.5	183.2	176.8	181.7	181.7	181.1	180.5	176.4	183.8	178.0	175.3	177.4	177.4	179.5	172.7	169.4	174.7	182.1
48	173.1	167.9	172.7	171.6	168.9	168.4	170.6	170.6	167.3	164.6	162.0	171.6	172.1	170.0	160.5	164.2	160.9	164.2	170.6
51	160.9	158.3	152.5	159.3	152.5	155.2	156.2	157.8	157.8	158.9	159.3	157.2	158.3	157.2	151.5	146.7	147.2	151.9	158.9
54	143.0	143.0	145.7	145.7	143.0	146.1	146.1	146.7	142.4	142.4	143.0	143.0	143.0	136.0	139.8	133.4	137.7	140.8	143.5
57	130.3	130.3	127.6	135.0	135.0	134.6	128.6	134.6	130.3	130.3	129.7	130.9	129.2	129.7	122.9	120.2	122.9	127.2	126.0
60	118.1	116.5	116.5	119.2	121.2	116.5	114.9	115.9	119.2	116.5	113.4	117.1	113.8	109.7	111.1	108.0	110.1	114.9	115.4
63	105.4	107.4	106.4	106.0	99.0	102.7	105.4	102.3	103.7	103.3	107.0	106.0	101.1	98.0	100.0	100.6	103.3	100.0	100.6
66	89.5	91.6	88.9	92.2	86.8	90.0	89.5	90.5	92.6	93.2	88.9	89.5	85.2	82.5	85.2	87.4	87.4	85.2	89.5
69	73.7	73.1	72.6	75.1	74.1	76.3	78.8	76.3	76.3	73.1	73.7	74.7	72.6	73.7	74.1	70.4	71.4	74.1	75.1
72	61.4	62.5	61.9	63.0	60.3	59.9	61.9	60.3	64.6	61.4	62.5	62.5	60.9	61.4	60.3	57.6	60.9	60.9	61.4
75	49.2	46.5	49.2	47.7	45.5	48.8	48.2	50.8	48.8	49.2	48.8	48.8	49.2	48.2	46.5	44.5	46.1	46.5	46.1
78	35.0	33.3	33.3	36.6	33.9	35.0	35.0	36.0	36.0	37.0	35.4	35.0	35.0	33.3	35.4	35.0	32.3	32.3	34.4
81	21.6	20.6	23.3	23.3	22.2	22.2	22.2	24.9	22.2	22.8	24.9	23.3	24.9	23.3	24.3	23.3	23.3	22.2	22.2
84	11.1	11.1	11.1	12.7	12.7	12.7	13.2	12.7	12.2	11.1	13.8	12.7	12.2	12.7	11.7	13.2	11.1	10.5	11.7
87	3.1	3.7	4.7	5.3	4.7	4.7	6.4	3.7	4.7	5.8	4.7	4.7	3.7	4.3	4.7	4.3	3.7	4.7	4.3

90	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
93	4.3	5.3	5.3	4.7	4.7	4.3	4.7	5.8	5.8	5.3	5.8	6.4	5.8	5.3	4.3	4.3	3.1	4.3	3.1
96	11.7	12.7	10.5	12.7	12.7	13.2	13.2	14.2	15.9	15.4	15.4	14.8	13.2	14.2	11.1	13.2	11.1	10.5	11.7
99	23.3	21.2	23.9	22.8	22.2	24.9	24.3	24.9	27.0	25.9	24.3	27.0	25.9	24.3	25.5	23.9	23.3	20.2	20.6
102	33.9	35.0	36.6	35.0	36.6	37.0	37.6	38.7	37.6	39.1	38.7	39.1	36.6	36.0	36.6	36.6	33.3	30.7	32.9
105	49.2	46.5	48.2	49.8	49.2	50.8	52.5	53.5	52.5	52.9	50.8	52.9	52.5	53.9	48.8	49.2	46.1	46.1	45.5
108	62.5	60.9	62.5	64.0	60.3	67.7	64.6	65.7	66.2	66.2	68.8	70.4	67.7	66.7	63.6	63.0	59.9	61.9	57.2
111	79.4	77.4	77.8	72.6	75.7	80.5	77.4	80.0	79.4	82.1	82.5	81.5	84.2	81.5	76.8	77.4	72.6	73.1	74.1
114	90.5	90.5	89.5	88.9	91.6	89.5	95.3	94.8	94.3	96.3	95.3	93.7	95.9	91.6	87.4	90.5	90.5	87.9	87.9
117	103.7	101.7	104.3	102.3	106.0	104.3	107.0	108.5	108.5	113.4	111.7	112.2	111.1	106.4	108.0	110.1	104.8	105.4	100.6
120	118.6	120.2	122.3	115.4	117.5	119.6	124.5	124.9	128.2	126.6	124.5	122.9	126.6	126.6	124.9	120.8	120.2	114.4	113.8
123	132.3	131.3	130.3	127.6	129.7	135.0	134.0	140.8	139.8	138.3	139.8	136.0	138.7	141.4	138.3	136.6	137.1	132.3	126.0
126	146.7	142.4	145.1	140.8	145.1	149.8	149.8	150.4	156.2	155.6	148.8	155.2	153.1	150.4	148.8	150.4	152.5	147.2	146.1
129	162.6	158.9	157.2	157.8	157.8	162.0	167.9	168.4	171.6	165.2	164.2	170.0	166.7	168.9	163.6	164.2	157.2	164.6	165.2
132	178.0	168.9	163.6	168.9	171.0	178.0	178.0	179.5	184.8	180.1	177.4	181.1	174.7	182.1	179.5	176.8	180.5	173.7	175.8
135	193.8	181.1	175.8	181.1	185.8	193.3	193.3	189.1	193.8	193.8	194.3	193.3	193.8	190.1	191.2	186.9	189.5	186.9	187.9
138	205.4	193.3	189.1	196.5	202.7	200.2	200.2	203.3	203.9	199.0	203.3	204.4	208.7	203.9	200.2	200.7	201.3	199.6	203.3
141	212.4	201.7	201.3	212.8	213.4	207.0	206.4	215.0	217.7	219.8	218.1	217.7	211.8	215.0	213.4	209.1	215.0	214.4	211.8
144	230.9	218.7	211.3	228.8	223.9	215.5	221.4	226.2	225.1	229.3	226.6	225.6	228.2	223.5	223.5	224.5	221.4	222.4	224.5
147	234.0	222.4	227.2	231.9	235.0	227.2	231.9	236.2	231.3	239.3	236.7	236.2	236.2	231.9	233.6	232.5	233.0	233.6	222.4
150	248.4	229.9	241.0	251.0	237.3	240.4	248.4	241.4	250.5	245.7	248.8	246.2	243.0	243.6	237.7	238.3	239.3	238.7	243.6
153	248.8	245.7	254.2	254.2	242.5	255.2	251.5	254.8	256.2	253.6	257.9	253.6	255.8	249.9	252.5	248.8	239.9	248.4	242.0
156	263.6	244.7	263.2	253.1	258.9	263.2	261.0	259.9	262.2	262.2	261.0	261.0	265.3	254.8	257.3	256.8	253.6	259.9	254.2
159	265.3	265.9	270.0	257.3	263.6	271.6	267.3	269.6	269.6	264.2	266.9	271.6	268.5	269.0	266.9	261.6	262.2	261.6	261.6
162	275.4	269.0	272.2	263.2	277.4	272.2	272.7	275.4	274.8	277.0	273.3	275.9	273.3	276.4	272.2	274.8	266.9	271.1	265.9
165	277.0	272.2	279.1	275.9	281.1	278.5	280.7	283.4	281.1	279.1	278.5	283.4	281.7	283.4	281.7	274.3	273.7	274.8	265.9
168	282.8	282.2	279.6	284.4	281.1	283.8	278.5	284.8	285.9	282.8	283.8	285.4	283.8	283.8	285.4	285.9	279.6	280.7	279.6
171	283.4	285.9	282.8	289.6	287.1	289.1	290.2	287.1	284.4	286.5	285.9	285.9	284.8	291.8	289.1	284.4	284.4	282.2	287.5
174	291.2	289.6	283.8	284.4	289.1	290.8	290.2	293.3	292.2	289.1	287.1	288.5	289.1	288.1	285.9	288.1	289.1	286.5	283.4



<b>177</b>	289.1	288.5	288.5	290.2	290.2	291.2	293.3	295.5	297.0	297.6	297.0	296.5	296.0	294.9	293.3	291.8	290.2	288.5	288.1
<b>180</b>	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2

Table 2a. Luminous intensity values, azimuth 0-180°

	<b>190</b>	<b>200</b>	<b>210</b>	<b>220</b>	<b>230</b>	<b>240</b>	<b>250</b>	<b>260</b>	<b>270</b>	<b>280</b>	<b>290</b>	<b>300</b>	<b>310</b>	<b>320</b>	<b>330</b>	<b>340</b>	<b>350</b>
<b>0</b>	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5	268.5
<b>3</b>	268.5	271.1	273.7	275.4	277.0	276.4	275.4	274.3	274.3	273.7	273.7	273.7	275.4	276.4	275.9	272.7	271.1
<b>6</b>	271.1	273.3	270.6	268.5	269.0	272.7	273.7	271.6	267.9	263.6	265.3	271.1	271.1	269.0	267.3	271.6	274.3
<b>9</b>	267.3	271.1	271.6	272.2	270.0	266.9	265.3	269.6	270.6	265.9	269.0	270.6	269.0	268.5	269.6	268.5	270.0
<b>12</b>	261.0	262.6	258.5	268.5	262.2	262.2	268.5	266.3	266.3	265.9	262.2	268.5	262.2	262.2	269.6	262.2	270.6
<b>15</b>	261.0	260.5	252.5	258.5	261.6	256.8	257.9	254.2	256.8	261.6	262.2	256.8	257.3	261.0	261.6	257.9	259.5
<b>18</b>	253.6	252.5	255.2	245.1	254.2	248.8	255.8	256.2	256.8	250.5	252.5	255.8	257.3	255.8	247.3	260.5	256.2
<b>21</b>	249.4	245.1	249.9	244.1	247.3	242.0	249.4	241.4	250.5	244.7	250.5	248.4	249.4	245.1	249.9	248.4	242.0
<b>24</b>	238.3	232.5	244.7	230.3	240.4	234.0	238.7	238.3	238.7	237.3	239.9	243.6	235.6	243.6	240.4	242.5	244.1
<b>27</b>	234.0	227.2	237.7	232.5	228.2	235.0	229.9	228.2	229.9	234.6	230.9	229.9	237.7	227.2	232.5	236.7	235.6
<b>30</b>	229.3	219.8	227.6	227.6	214.4	222.4	228.2	221.4	222.4	223.5	223.9	222.4	217.7	231.3	229.9	222.9	222.9
<b>33</b>	223.9	213.8	217.1	220.2	211.3	208.7	214.4	214.4	212.8	208.1	212.8	212.4	219.2	217.1	211.3	217.7	220.8
<b>36</b>	215.5	202.3	205.0	209.7	210.1	199.6	205.4	210.1	204.4	205.0	202.3	202.7	202.3	210.7	209.7	207.0	215.0
<b>39</b>	206.4	196.5	191.2	197.0	194.3	191.6	186.4	194.3	195.9	192.2	197.0	199.0	194.9	189.5	200.2	202.7	203.3
<b>42</b>	192.8	189.1	181.1	180.1	189.5	188.5	179.0	182.7	182.1	187.5	187.9	182.1	185.8	186.4	189.1	186.4	192.8
<b>45</b>	183.2	183.2	173.1	169.4	173.1	174.3	167.3	170.6	172.1	171.6	171.6	169.4	173.1	174.7	182.7	179.0	180.5
<b>48</b>	175.3	165.2	160.9	158.9	160.5	162.6	163.0	159.9	159.9	157.8	162.0	164.6	159.3	166.3	165.2	166.3	170.6
<b>51</b>	160.5	153.5	150.4	147.2	149.4	149.8	146.7	150.9	147.2	150.9	147.8	150.4	146.1	149.8	151.9	153.1	161.5
<b>54</b>	145.1	147.2	136.6	135.6	133.4	135.6	138.7	136.6	140.8	139.3	138.3	135.6	139.8	139.3	137.1	144.5	146.1
<b>57</b>	128.2	136.0	126.6	125.5	121.8	121.2	122.3	124.9	124.9	125.5	128.2	130.9	127.6	129.2	126.0	130.3	129.7
<b>60</b>	117.5	116.5	111.1	112.8	110.1	107.0	111.7	110.1	113.4	114.4	114.4	108.0	110.7	118.6	111.1	112.2	114.4
<b>63</b>	101.7	105.4	100.0	98.6	96.9	92.2	99.0	98.6	97.4	98.0	98.0	99.0	101.1	98.6	100.0	106.4	103.7

66	87.9	85.2	86.8	87.9	87.4	84.8	86.8	86.8	84.8	86.8	85.8	85.8	84.8	85.8	91.1	86.8	90.5
69	76.3	71.4	71.0	74.1	73.7	68.8	73.7	73.1	72.0	71.0	72.6	74.7	71.4	71.0	70.4	71.0	73.7
72	63.6	60.3	59.9	63.0	60.3	60.3	57.2	60.9	56.2	58.2	58.8	61.4	58.8	58.8	60.3	59.3	59.9
75	47.1	46.5	46.5	49.2	45.5	48.2	45.1	45.1	46.1	47.1	45.5	47.1	48.2	47.7	46.5	47.7	46.5
78	33.3	33.3	34.4	33.9	36.0	33.3	32.9	32.9	32.9	32.3	31.7	32.3	32.9	33.9	32.3	35.0	33.9
81	21.6	23.3	22.8	21.6	22.8	22.8	23.3	21.2	23.3	21.6	20.6	20.2	21.6	21.2	20.6	22.2	20.6
84	12.2	12.7	13.2	11.1	12.7	12.7	12.7	12.2	12.2	13.2	11.1	12.7	10.5	10.1	11.1	10.5	11.1
87	5.3	4.3	4.3	5.3	6.4	5.3	5.3	6.4	6.4	6.4	5.3	4.7	4.7	4.3	3.7	3.7	4.7
90	0.0	1.6	0.0	3.1	4.3	3.7	4.7	4.3	4.7	4.7	4.3	3.7	2.7	2.1	0.0	0.0	1.6
93	4.7	5.3	4.7	4.7	5.3	6.4	5.3	6.4	5.8	5.3	5.3	4.7	3.7	3.7	4.7	3.7	5.3
96	11.1	11.1	12.7	12.7	12.7	11.7	11.1	12.7	12.2	12.2	11.7	10.5	10.5	10.5	10.5	10.5	13.2
99	21.2	22.2	23.9	24.3	22.8	21.2	23.3	22.8	21.2	20.6	21.2	22.2	22.2	21.2	21.6	21.2	21.2
102	32.9	33.9	35.0	35.4	35.4	35.0	33.9	34.4	35.0	32.9	30.7	31.7	31.7	34.4	32.3	32.3	33.9
105	43.4	45.5	46.1	47.1	48.2	43.4	48.2	48.2	48.8	46.5	45.1	44.0	46.5	45.1	45.1	44.0	47.7
108	59.3	57.2	59.9	60.3	58.2	59.9	58.2	59.9	58.2	56.6	57.2	57.6	62.5	59.9	57.2	58.2	61.9
111	69.9	72.6	74.1	75.7	71.4	73.1	71.4	70.4	74.7	75.1	69.9	71.4	73.1	73.1	72.0	71.4	74.7
114	91.6	88.9	92.6	90.0	87.4	86.8	89.5	88.9	84.8	83.1	85.2	84.8	85.8	86.8	89.5	89.5	91.1
117	102.7	104.3	105.4	105.4	107.4	101.7	100.6	103.7	99.0	99.0	98.0	100.0	99.6	102.7	102.7	107.4	101.7
120	113.4	115.4	121.2	119.6	115.9	117.1	120.2	118.6	116.5	114.4	113.4	113.4	112.8	114.4	116.5	121.8	118.1
123	129.2	132.3	129.7	134.6	133.4	130.3	131.3	130.9	132.3	126.6	124.9	128.2	127.6	130.9	128.6	137.7	131.9
126	151.9	151.9	143.5	144.0	144.0	140.3	145.7	142.0	145.1	142.4	139.3	136.0	139.8	139.8	144.5	150.9	147.8
129	168.9	160.9	158.9	156.8	155.6	150.4	151.5	157.8	158.9	159.3	155.6	150.9	155.6	157.8	159.3	165.7	164.6
132	177.4	176.4	173.1	172.1	164.2	167.9	173.7	172.7	170.6	168.9	170.0	165.2	165.2	167.3	174.3	181.1	182.7
135	187.9	189.1	192.2	183.8	177.4	176.8	177.4	178.4	184.2	179.5	178.0	181.7	184.8	182.7	180.1	182.1	193.8
138	204.4	197.0	193.3	193.3	189.5	186.9	192.8	196.5	195.3	191.2	187.5	189.5	194.3	192.2	185.4	198.0	206.4
141	213.4	211.8	205.0	198.6	200.2	203.9	208.7	207.0	209.7	203.3	200.2	204.4	207.0	208.1	199.6	204.4	210.7

144	219.8	216.1	221.4	216.5	215.0	210.1	216.1	215.5	217.1	220.2	213.4	214.4	218.1	222.4	217.1	210.7	226.2
147	228.8	228.8	220.2	220.8	229.3	225.1	229.9	228.2	226.2	225.6	226.2	220.8	223.9	233.6	226.2	220.2	236.7
150	235.0	229.3	234.6	238.7	229.9	235.0	239.9	239.9	237.7	234.0	242.0	230.9	229.3	242.5	239.9	231.9	247.8
153	244.7	251.0	239.3	241.0	245.1	241.4	247.3	249.9	240.4	254.8	243.6	250.5	240.4	237.3	249.4	243.6	247.8
156	251.5	249.4	245.1	254.2	248.4	251.0	255.8	252.1	256.8	255.2	255.8	252.5	252.1	251.5	262.6	248.4	254.2
159	263.6	255.2	255.2	257.9	258.9	257.9	266.9	267.9	263.2	258.9	263.6	258.5	263.6	259.5	258.9	261.0	257.3
162	264.8	265.9	261.0	267.9	269.6	266.3	269.6	267.3	267.9	270.6	273.7	264.8	267.3	268.5	271.1	271.1	271.6
165	273.3	273.7	272.7	275.4	268.5	275.9	271.6	271.1	274.3	278.0	275.4	271.1	272.2	272.7	271.6	270.0	272.2
168	281.1	275.9	285.9	282.2	281.7	280.7	276.4	277.4	282.8	280.1	281.7	277.4	282.2	281.1	274.8	282.8	277.4
171	288.1	279.1	279.1	280.7	277.4	285.4	283.8	283.4	289.1	286.5	279.6	283.8	282.2	279.6	282.2	287.5	283.8
174	283.8	287.5	289.6	289.6	287.5	284.8	284.8	283.8	284.4	285.9	284.4	288.1	291.2	289.1	287.1	283.8	285.4
177	287.5	287.1	284.4	284.4	286.5	288.5	289.6	289.1	287.5	286.5	287.5	289.6	291.2	291.8	292.2	290.8	289.6
180	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2	292.2

Table 2b. Luminous intensity values, azimuth 190-350°

Signature:



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Print Name:

GH JOHN

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Date:

30-01-2013

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Partner / Director

*Duly authorised to sign on behalf of:*

Photometric and Optical Testing Services LLP