astro

PHOTOMETRIC TEST REPORT

Photometric Test Report

Report Number: POTS/DC14291	Report Date: 21/11/2014	Prepared By: D CHAMBERS
Test Laboratory: Photometric and Optical Testing Services, Cheltenham Film and Photographic Studios, Hatherley Lane, Cheltenham, Gloucestershire, GL51 6PN		
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	

Test Method(s) Used

POTS Standard Operating Procedure:	INTEGRATING SPHERE PROCEDURE POTS016
POTS Standard Operating Procedure:	NFMS OPERATION GUIDE
Standard:	LM79 08

Details of Product Tested

Manufacturer: ASTRO LIGHTING	Source Type: LED
Model: 1350001 - Serifos 170 LED	Luminaire Type:
Power Supply Used: Kikusui PCR1000M Voltage Stabiliser S/N SM01191	
Voltage(AC V) = 230	Current (mA)= 52
Power (Watts)= 6.32	Power factor= 0.528

Integrating Sphere Test

Date of Test: 18/11/2014	Ambient Temperature:25°C
Measurement Filename: SERIFOS 170	
Instrument Used: Labsphere model CSLMS HALOGEN 4060 integrating sphere spectroradiometer	
Integrating Sphere Size: 1m	Measurement Geometry (2π / 4π): 2π
Sample Orientation: Horizontal	Auxiliary Correction Applied: YES
Comments:	
Date of Last Calibration (Operating Hours): 28-10-2014 (03:42)	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: 19th February 2010
Calibration Lamp Uncertainty: ± 0.67% (*k=2)*	

Results

Flux (lumens): 286.5	
CIE 1931 Chromaticity Cx: 0.4341	CIE 1931 Chromaticity Cy: 0.4057
CRI (%):83.56	CCT (K): 3060

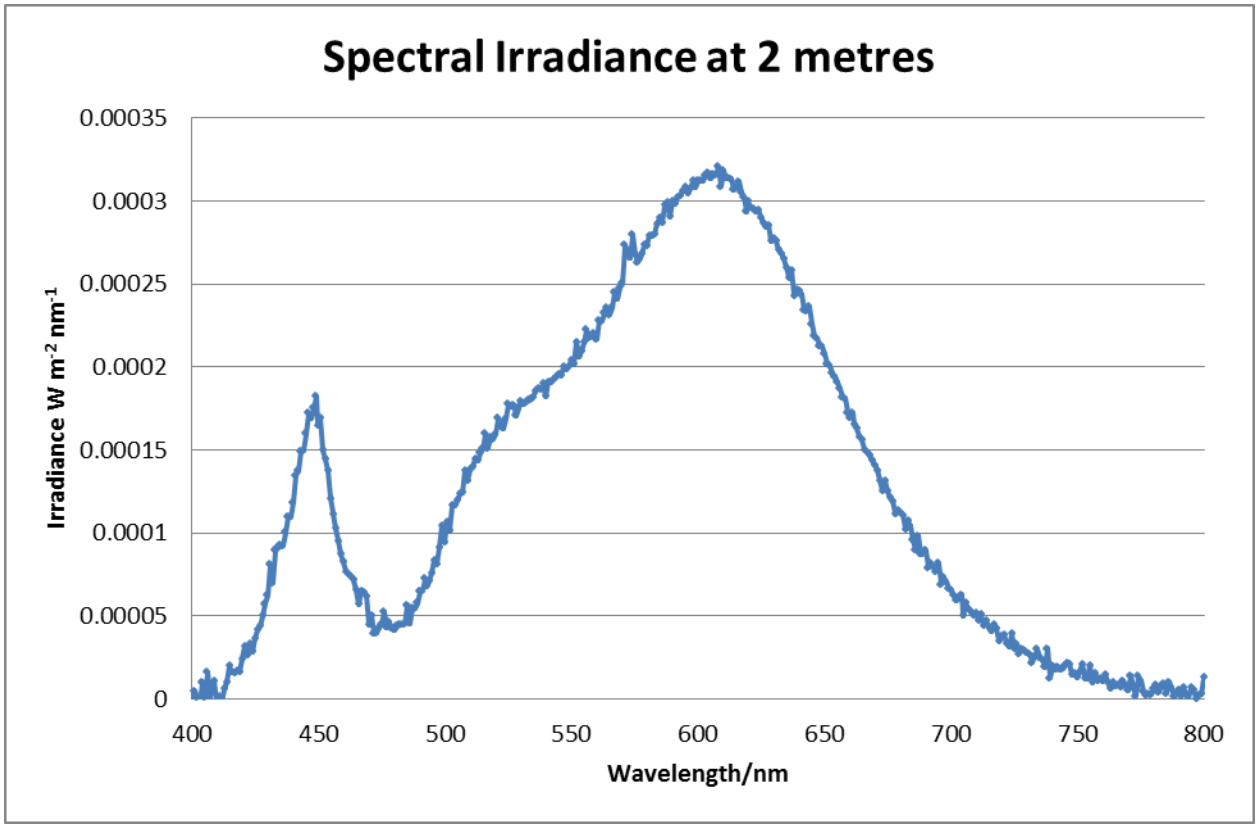

Figure 1: Spectral Irradiance

Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 20/11/2014	Ambient Temperature: 25°C	
Measurement Filename: SERIFOS 170		
Instrument Used: Radiant Imaging NFMS0800 Goniometer with ProMetric PM-1200N-1 Imaging Photometer		
Photometer Working Distance: 2m	Measurement Geometry: Near-Field	
Comments:		
Reference Photometer Used: Specbos1211	Reference Photometer Serial Number: 2014754	
Traceable: to NIST standards	Calibration Certificate Number: 2129 WK-L 2014-02	
Calibration Certificate Date: 13 February 2014	Sample Stabilisation Time (minutes):45	
Reference Photometer Calibration Uncertainty: ± 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):286.5	Peak Intensity (3° Spot, candelas): 68.2	Efficacy (lumens/Watt): 45.3
Beam Angle (50% of max intensity C0-180, degrees): 91.7		
Photometric Filename (IES LM-63-2002): SERIFOS 170		
IES File – Absolute or Relative Format? ABSOLUTE		
Photometric Filename (EULUMDAT): SERIFOS 170		
EULUMDAT File – Absolute or Relative Format? ABSOLUTE		

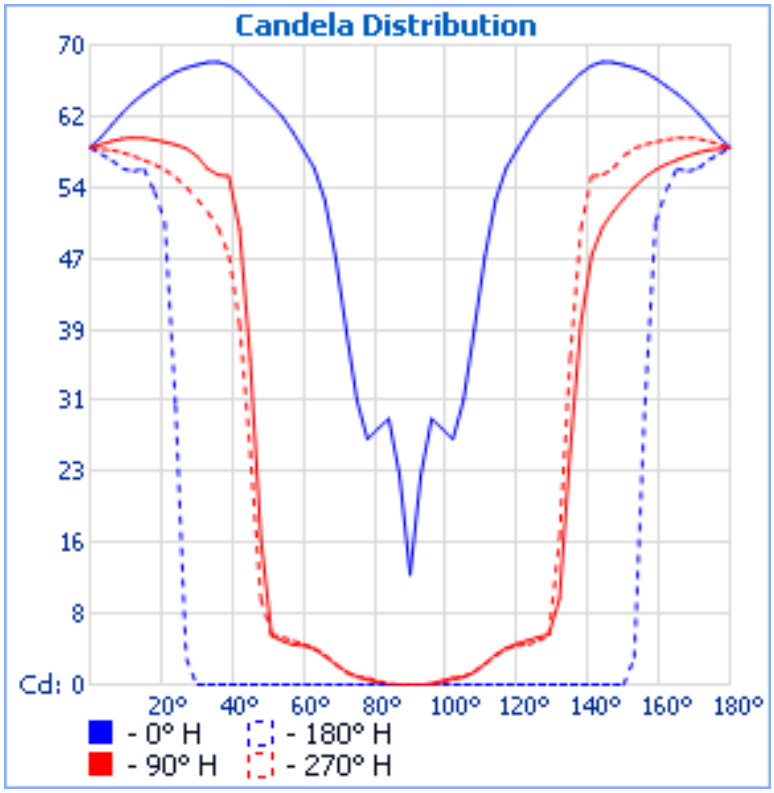

Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

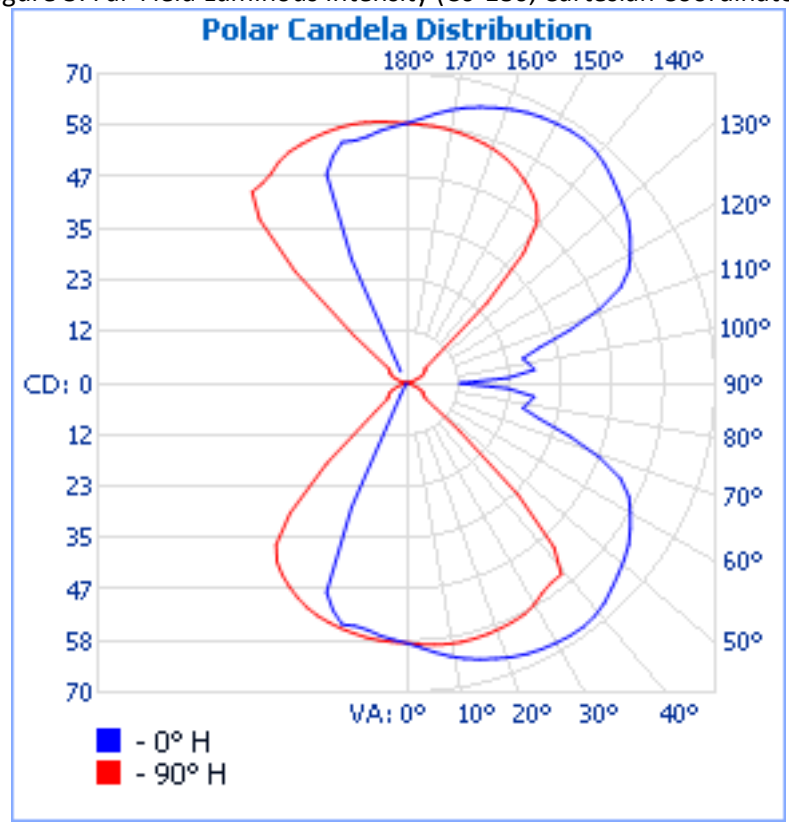

Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

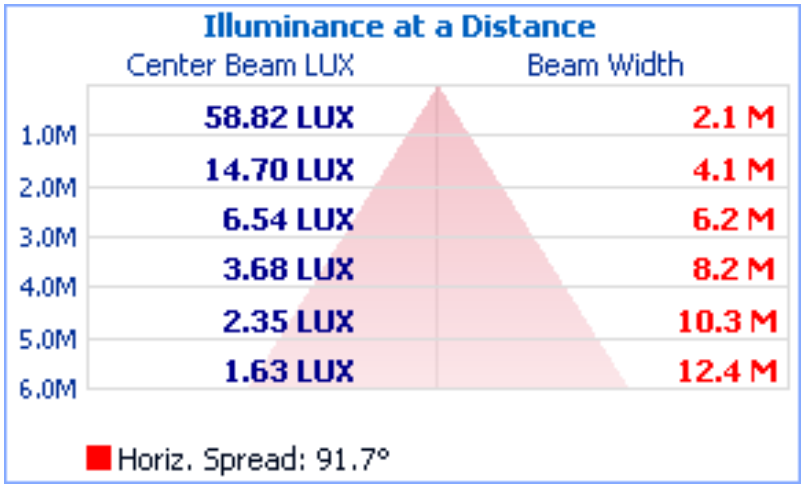

Figure 5. Cone diagram for mounting height of 6 metres.

Reflectance of											
Ceiling		0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
Wall		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				View endwise (C0)					View crosswise (C90)		
x	y										
2H	2H	16.0	16.9	17.0	17.8	19.1	<10.0	<10.0	<10.0	<10.0	10.2
	3H	17.8	18.6	18.8	19.6	20.9	<10.0	<10.0	<10.0	<10.0	10.1
	4H	18.5	19.2	19.5	20.2	21.5	<10.0	<10.0	<10.0	<10.0	<10.0
	6H	19.1	19.8	20.1	20.8	22.1	<10.0	<10.0	<10.0	<10.0	<10.0
	8H	19.5	20.2	20.5	21.2	22.5	<10.0	<10.0	<10.0	<10.0	<10.0
	12H	20.0	20.6	21.0	21.6	22.9	<10.0	<10.0	<10.0	<10.0	<10.0
4H	2H	16.2	16.9	17.2	17.9	19.2	<10.0	<10.0	<10.0	10.2	11.5
	3H	18.2	18.8	19.2	19.8	21.1	<10.0	<10.0	<10.0	10.1	11.5
	4H	19.0	19.5	20.0	20.5	21.9	<10.0	<10.0	<10.0	10.1	11.4
	6H	19.8	20.3	20.8	21.3	22.6	<10.0	<10.0	<10.0	<10.0	11.3
	8H	20.5	21.0	21.5	22.0	23.3	<10.0	<10.0	<10.0	<10.0	11.2
	12H	21.3	21.7	22.3	22.7	24.1	<10.0	<10.0	<10.0	<10.0	11.2
8H	4H	18.9	19.4	19.9	20.4	21.7	<10.0	<10.0	10.3	10.8	12.1
	6H	19.8	20.2	20.9	21.3	22.6	<10.0	<10.0	10.3	10.7	12.1
	8H	20.8	21.1	21.9	22.2	23.6	<10.0	<10.0	10.3	10.7	12.0
	12H	21.9	22.2	22.9	23.2	24.6	<10.0	<10.0	10.2	10.6	11.9
12H	4H	18.9	19.3	19.9	20.3	21.7	<10.0	<10.0	10.6	11.0	12.4
	6H	19.9	20.2	20.9	21.3	22.6	<10.0	10.0	10.8	11.1	12.5
	8H	20.8	21.1	21.8	22.1	23.5	<10.0	<10.0	10.7	11.1	12.4

Distance between luminaires: 0.25

Due to missing symmetry characteristics the values apply only to the indicated line of sight.

Table 1. UGR values

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
3	60	60	60	60	60	60	60	59	59	59	59	59	59	59	58	58	58	58	58
6	61	61	61	61	61	61	60	60	60	60	59	59	59	59	58	58	58	58	57
9	63	63	63	62	62	62	61	61	60	60	59	59	59	58	58	57	57	57	57
12	64	64	64	63	63	62	62	61	60	60	60	59	59	58	57	57	57	56	56
15	65	65	65	64	64	63	62	62	61	60	59	59	58	57	57	57	57	57	57
18	66	66	66	65	65	64	63	62	61	60	59	58	57	57	58	58	56	55	54
21	66	67	67	66	65	64	63	62	61	59	59	58	57	58	58	54	53	51	51
24	67	67	67	67	66	65	63	62	61	59	58	57	57	57	51	47	42	34	31
27	68	68	68	67	66	65	64	62	60	59	57	57	55	50	41	23	9	5	3
30	68	68	68	67	66	65	64	62	60	58	56	56	51	34	16	4	1	0	0
33	68	68	68	67	66	65	63	61	58	57	56	50	34	14	3	0	0	0	0
36	68	68	67	67	66	64	62	60	58	56	53	40	18	4	1	0	0	0	0
39	68	67	67	66	65	63	61	59	58	56	47	24	6	1	1	0	0	0	0
42	67	67	66	65	64	62	59	58	55	50	30	8	1	1	1	0	0	0	0
45	66	66	65	63	62	60	58	54	50	36	11	2	1	1	0	0	0	0	0
48	65	64	63	62	60	57	55	48	37	16	4	2	1	1	0	0	0	0	0
51	63	63	61	60	57	54	52	38	17	5	4	2	1	1	0	0	0	0	0
54	62	61	59	57	55	51	47	22	7	5	3	2	1	1	0	0	0	0	0
57	60	60	57	55	52	49	42	11	6	4	3	2	1	0	0	0	0	0	0
60	59	58	55	54	49	45	27	9	6	4	3	2	1	0	0	0	0	0	0
63	57	55	53	52	46	39	18	8	6	4	2	1	0	0	0	0	0	0	0
66	53	49	50	49	41	29	13	7	5	3	2	1	0	0	0	0	0	0	0
69	47	43	45	44	33	19	10	6	4	2	1	0	0	0	0	0	0	0	0
72	39	36	38	37	26	12	8	6	3	1	0	0	0	0	0	0	0	0	0
75	31	32	30	29	21	11	7	5	2	1	0	0	0	0	0	0	0	0	0
78	27	28	27	25	18	11	7	4	2	1	0	0	0	0	0	0	0	0	0
81	28	38	35	24	18	12	7	3	1	0	0	0	0	0	0	0	0	0	0
84	29	44	37	25	18	11	5	2	0	0	0	0	0	0	0	0	0	0	0
87	23	37	32	24	15	9	4	1	0	0	0	0	0	0	0	0	0	0	0
90	12	13	13	10	6	3	1	1	0	0	0	0	0	0	0	0	0	0	0
93	23	33	26	17	11	6	2	0	0	0	0	0	0	0	0	0	0	0	0

96	29	41	32	20	15	8	4	1	0	0	0	0	0	0	0	0	0	0	0
99	28	37	32	20	16	10	5	2	1	0	0	0	0	0	0	0	0	0	0
102	27	29	27	21	16	11	7	3	1	1	0	0	0	0	0	0	0	0	0
105	31	32	29	24	15	11	7	4	2	1	1	0	0	0	0	0	0	0	0
108	39	37	37	31	18	12	8	5	3	1	1	0	0	0	0	0	0	0	0
111	47	43	45	38	25	14	9	6	4	2	1	0	0	0	0	0	0	0	0
114	53	49	50	44	33	19	10	8	5	3	2	1	0	0	0	0	0	0	0
117	57	53	52	47	39	24	13	8	6	4	3	1	0	0	0	0	0	0	0
120	59	57	54	49	44	33	15	9	6	5	3	2	1	0	0	0	0	0	0
123	60	59	55	51	47	39	17	9	7	5	4	2	1	0	0	0	0	0	0
126	62	61	58	53	49	44	33	14	7	5	4	2	1	1	0	0	0	0	0
129	63	62	60	56	52	48	41	31	13	5	4	2	1	1	0	0	0	0	0
132	65	64	62	59	55	51	47	40	30	9	4	2	2	1	0	0	0	0	0
135	66	66	64	61	57	53	51	47	41	26	6	3	2	1	1	0	0	0	0
138	67	67	65	62	60	56	53	51	48	40	19	3	2	1	1	0	0	0	0
141	68	68	66	64	61	58	55	52	51	47	32	11	2	1	1	0	0	0	0
144	68	68	67	65	62	60	57	54	52	50	41	19	4	1	1	0	0	0	0
147	68	68	67	65	63	61	58	56	53	52	49	38	19	3	1	0	0	0	0
150	68	68	67	66	64	62	59	57	55	53	52	50	39	18	4	1	0	0	0
153	68	67	67	66	64	62	60	58	56	54	53	54	50	40	28	12	5	3	3
156	67	67	66	65	64	62	61	58	57	56	54	55	53	52	47	38	34	32	31
159	66	66	65	64	64	62	61	59	58	56	56	55	54	55	55	52	52	52	51
162	66	65	65	64	63	62	61	59	58	57	56	56	55	54	56	56	55	55	54
165	65	64	64	63	63	62	61	59	58	57	57	57	56	55	55	56	56	56	57
168	64	63	63	62	62	61	60	59	59	58	57	57	57	56	56	55	56	56	56
171	63	62	62	62	61	61	60	59	59	58	58	58	57	57	57	56	56	56	57
174	61	61	61	61	60	60	60	59	59	59	58	58	58	58	58	57	57	57	57
177	60	60	60	60	60	59	59	59	59	59	59	58	58	58	58	58	58	58	58
180	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59

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

	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350
0	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
3	58	58	58	58	58	58	58	59	59	59	59	59	59	60	60	60	60
6	57	57	57	58	58	58	58	58	59	59	59	60	60	60	61	61	61
9	56	56	56	57	57	57	58	58	58	59	59	60	61	61	62	62	62
12	56	56	55	56	56	57	57	57	58	59	59	60	61	62	62	63	63
15	56	56	56	55	55	56	57	57	57	58	59	61	62	63	63	64	64
18	55	55	56	56	54	55	56	56	57	58	59	61	62	63	64	65	65
21	52	52	52	55	55	54	55	56	56	58	59	61	62	64	64	65	66
24	32	34	38	47	52	53	55	54	56	57	58	61	62	64	65	66	67
27	3	5	12	28	40	50	54	53	54	56	58	60	62	64	66	67	67
30	0	0	1	4	18	39	50	52	53	55	57	59	62	64	66	67	68
33	0	0	0	1	3	19	38	49	52	53	56	58	61	63	65	67	68
36	0	0	0	1	1	4	19	41	50	52	54	57	60	62	65	67	68
39	0	0	0	1	1	2	11	32	47	51	52	55	58	61	64	66	68
42	0	0	0	1	1	2	3	19	40	48	51	53	56	60	62	65	67
45	0	0	0	1	1	2	3	6	26	41	47	51	53	57	61	64	66
48	0	0	0	0	1	2	2	4	9	30	40	47	51	55	59	62	64
51	0	0	0	0	1	1	2	4	5	13	31	41	48	52	56	60	62
54	0	0	0	0	1	1	2	4	5	7	14	33	44	49	53	58	61
57	0	0	0	0	0	1	2	4	5	7	9	17	39	47	51	55	59
60	0	0	0	0	0	1	2	3	5	6	9	15	33	44	49	54	57
63	0	0	0	0	0	0	1	3	4	6	8	13	24	39	47	52	53
66	0	0	0	0	0	0	1	2	3	5	8	10	19	33	44	50	49
69	0	0	0	0	0	0	0	1	2	4	6	9	14	25	38	45	43
72	0	0	0	0	0	0	0	1	1	3	5	8	12	18	31	37	37
75	0	0	0	0	0	0	0	1	1	2	4	7	11	15	24	29	32
78	0	0	0	0	0	0	0	0	1	1	3	7	11	16	21	27	29
81	0	0	0	0	0	0	0	0	0	1	2	5	10	16	20	32	37
84	0	0	0	0	0	0	0	0	0	0	1	4	8	15	20	32	41
87	0	0	0	0	0	0	0	0	0	0	0	2	6	11	17	26	33
90	0	0	0	0	0	0	0	0	0	0	0	0	2	4	7	9	10
93	0	0	0	0	0	0	0	0	0	0	1	4	9	15	24	32	37
96	0	0	0	0	0	0	0	0	0	0	2	5	11	18	25	37	44
99	0	0	0	0	0	0	0	0	0	1	3	7	12	18	24	35	38
102	0	0	0	0	0	0	0	0	1	2	4	7	11	18	25	27	28
105	0	0	0	0	0	0	0	0	1	2	5	7	11	21	29	30	32

108	0	0	0	0	0	0	0	0	1	3	6	8	12	26	37	38	36
111	0	0	0	0	0	0	0	1	2	4	6	10	19	33	44	45	43
114	0	0	0	0	0	0	1	2	3	5	7	13	29	41	49	50	49
117	0	0	0	0	0	0	1	2	4	6	8	18	39	46	52	53	55
120	0	0	0	0	0	1	2	3	4	6	9	27	45	49	54	55	58
123	0	0	0	0	0	1	2	3	4	6	11	42	49	52	55	57	60
126	0	0	0	0	1	1	2	3	5	7	22	47	51	55	57	59	61
129	0	0	0	0	1	1	2	4	5	17	38	52	54	57	60	61	63
132	0	0	0	0	1	1	2	4	16	37	48	55	57	60	62	63	64
135	0	0	0	0	1	1	2	11	36	50	54	58	60	62	63	65	66
138	0	0	0	1	1	1	8	30	50	55	58	59	62	64	65	66	67
141	0	0	0	1	1	6	24	47	56	58	59	61	63	65	66	67	67
144	0	0	0	1	4	18	40	53	56	58	60	62	64	66	67	67	68
147	0	0	0	3	14	34	50	56	57	58	61	63	65	66	67	68	68
150	0	1	4	16	34	51	56	56	58	60	62	64	65	66	67	68	68
153	5	9	23	41	50	55	57	57	59	60	62	64	65	66	67	68	68
156	34	42	47	51	57	57	57	58	59	61	62	63	65	66	67	67	67
159	51	53	54	58	58	57	58	59	59	61	62	63	64	65	66	67	67
162	55	56	58	58	57	57	58	59	60	61	62	63	64	65	65	66	66
165	57	57	57	57	57	58	59	59	60	61	62	62	63	64	64	65	65
168	56	57	57	57	58	59	59	60	60	60	61	62	62	63	63	64	64
171	57	57	57	58	58	59	59	59	60	60	61	61	62	62	62	63	63
174	58	58	58	58	59	59	59	59	60	60	60	60	61	61	61	61	61
177	58	58	58	58	59	59	59	59	59	59	59	60	60	60	60	60	60
180	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59

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

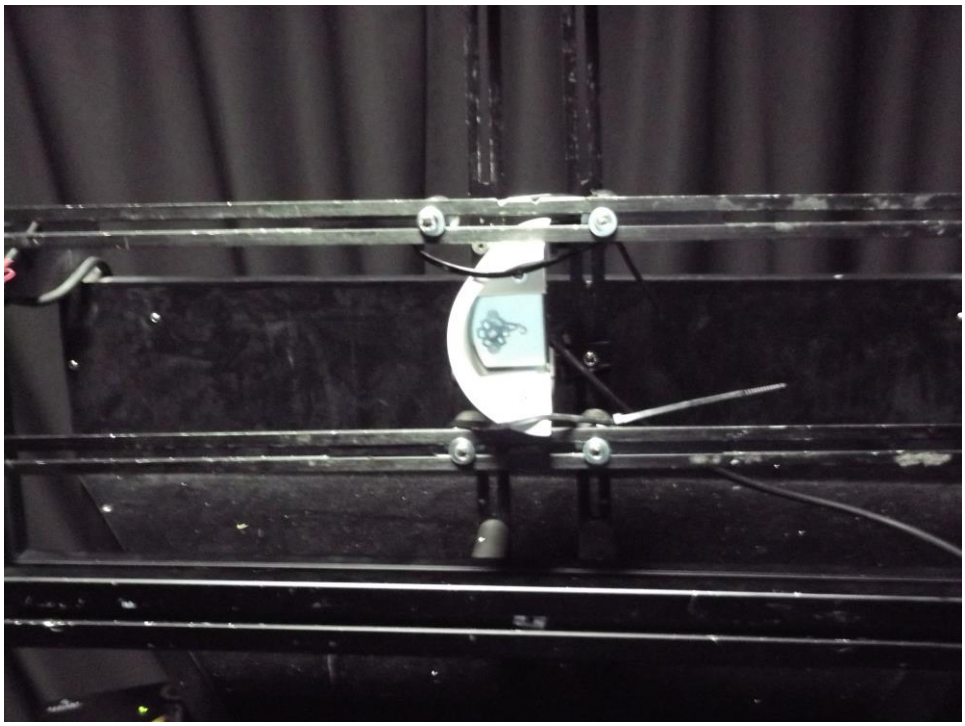

Photo 1: Luminaire on goniometer mount

Signature:

_____

Print Name:

D CHAMBERS

_____

Date:
21/11/2014

_____

Test Engineer
Duly authorised to sign on behalf of:
Photometric and Optical Testing Services LLP

Checked by:

Signature:

_____

Print Name:

G John

_____

Date: 27/11/2014

_____

Technical Director
Duly authorised to sign on behalf of:
Photometric and Optical Testing Services LLP