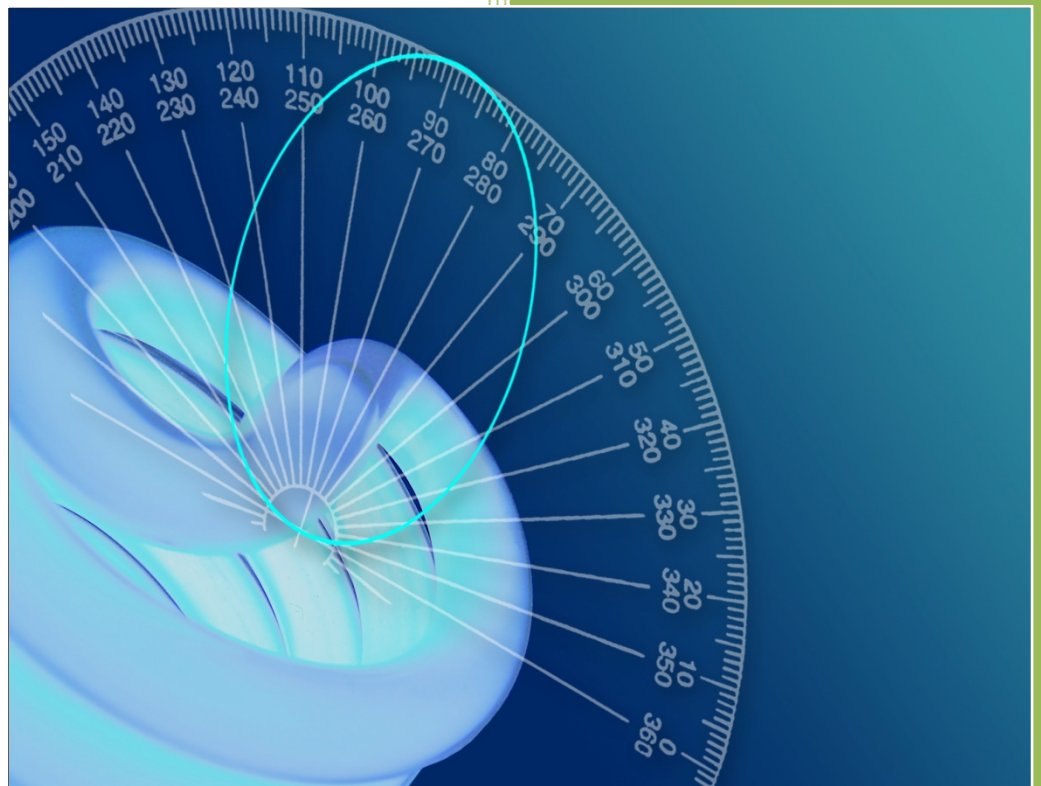


Photometric Test Report



Photometric and Optical Testing
Services
Cheltenham Film and Photographic
Studios
Hatherley Lane
Cheltenham
Gloucestershire
GL51 6PN
UK
Tel: 01242 701300

Photometric Test Report

Report Number: POTS/DC14074	Report Date: 14/03/2014	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: SH LIGHTING	Email: b.gregory@signalhouse.co.uk
Address: Cherrycourt Way, Stanbridge Road, Leighton Buzzard, Bedfordshire, LU7 4UH	

Details of Product Tested

Manufacturer: SH LIGHTING	Source Type: LED
Model: 4FT BATTEN (RUN WITH BATTERY)	Luminaire Type: DOWNLIGHT
Power Supply Used: NONE	

Integrating Sphere Test

Date of Test: 12/03/2014	Ambient Temperature: 25°C
Measurement Filename: 4FT BATTEN BATTERY	
Instrument Used: Labsphere model CSLMS HALOGEN 4060 integrating sphere spectroradiometer	
Integrating Sphere Size: 1m	Measurement Geometry ($2\pi / 4\pi$): 4π
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 th February 2010
Calibration Lamp Uncertainty: $\pm 0.67\%$ ($k=2$)	
Results	
Flux (lumens): 79.5	
CIE 1931 Chromaticity Cx: 0.3395	CIE 1931 Chromaticity Cy: 0.3559
CRI (%): 69.8	CCT (K): 5222

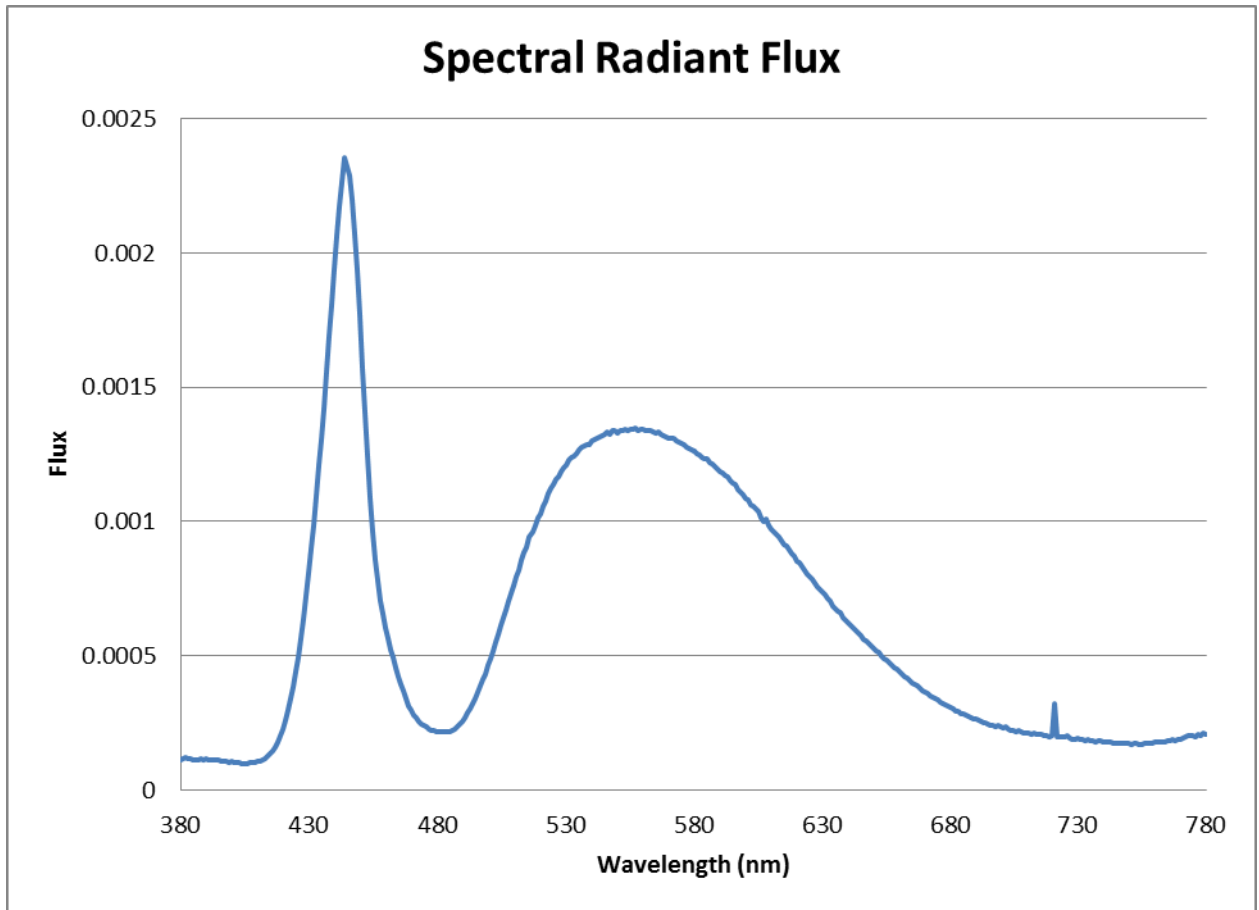


Figure 1: Spectral Irradiance

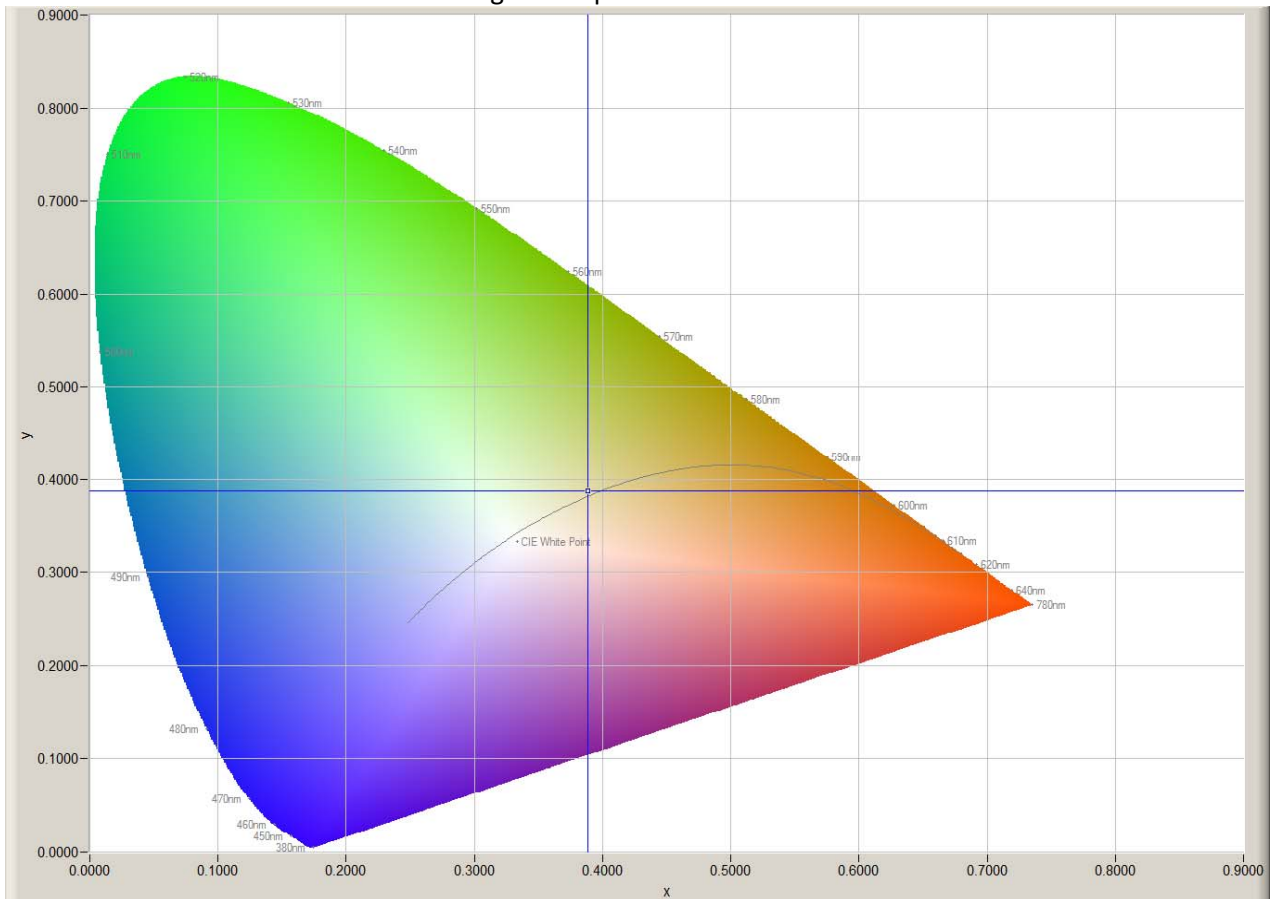


Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 25/02/2014	Ambient Temperature: 25°C	
Measurement Filename: 4FT BATTEN BATTERY		
Instrument Used: Radiant Imaging NFMS0800 Goniometer with ProMetric PM-1200N-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: 13201	
Calibration Certificate Date: 15 th March 2013	Sample Stabilisation Time (minutes): 15	
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	0-90°	3°
Azimuth	0-360°	10°
Results		
Integrated Luminous Flux (lumens):79.5	Peak Intensity (3° Spot, candelas):30.7	Efficacy (lumens/Watt): N/A
Beam Angle (50% of max intensity C0-180, degrees): 103.1		
Photometric Filename (IES LM-63-2002): 4FT BATTEN BATTERY		
IES File – Absolute or Relative Format? ABSOLUTE		
Photometric Filename (EULUMDAT): 4FT BATTEN BATTERY		
EULUMDAT File – Absolute or Relative Format? ABSOLUTE		

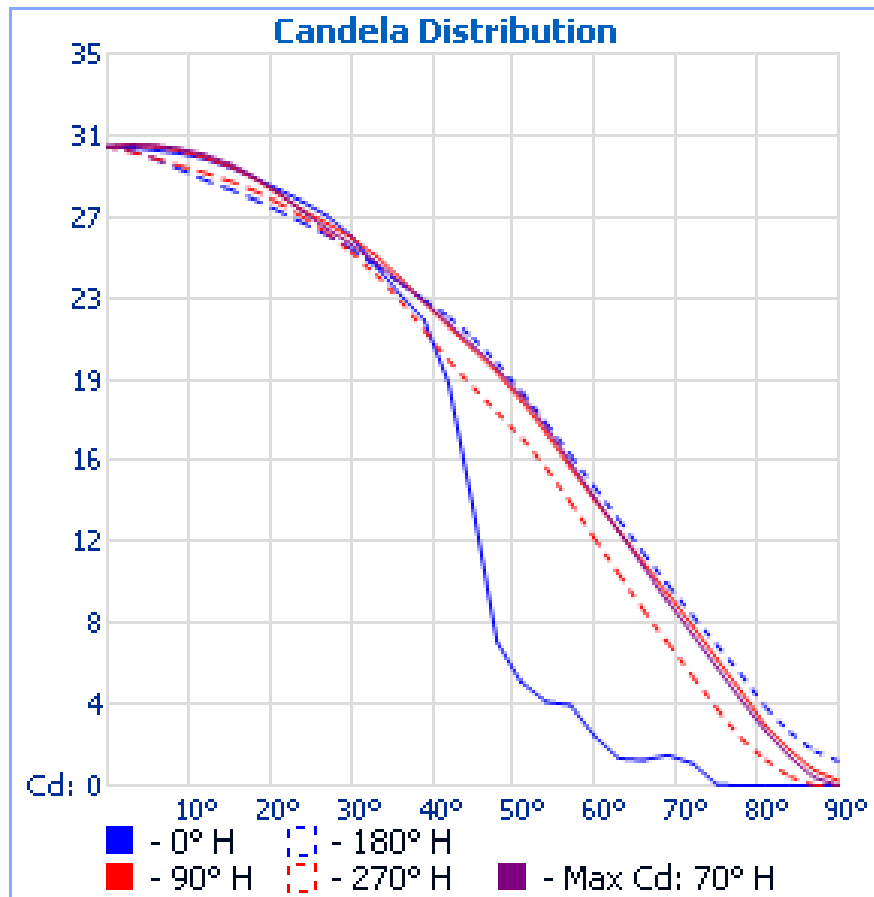


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

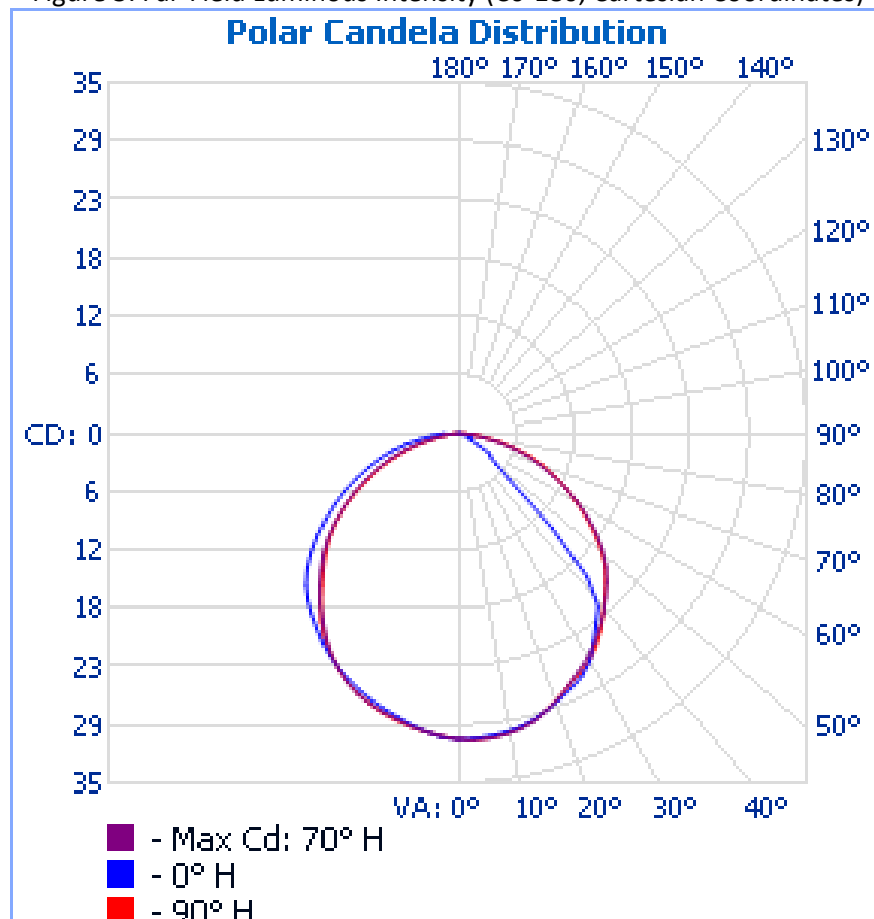


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

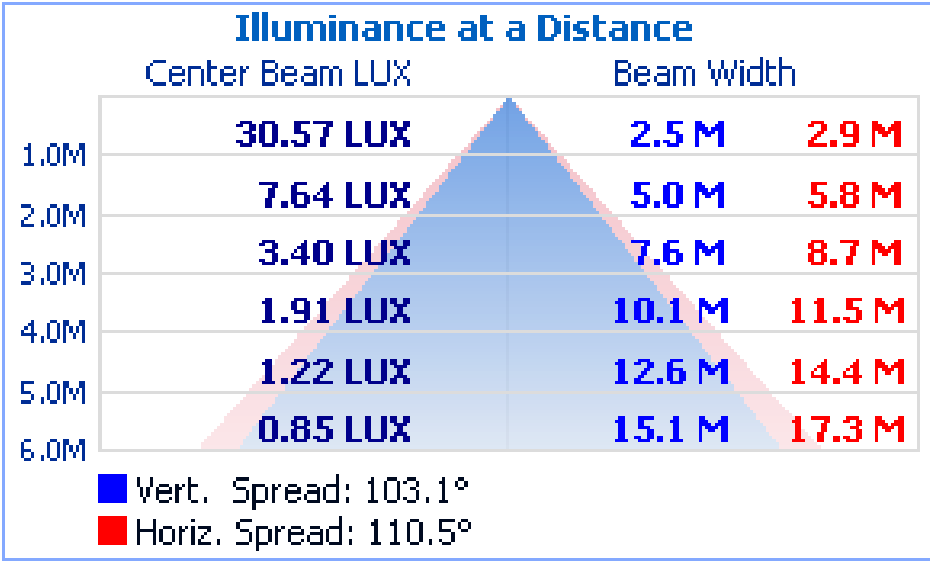


Figure 4. Cone diagram for mounting height of 6 metres.

Room dimension		Viewed crosswise					Viewed endwise				
x	y										
2H	2H	18.3	19.9	18.7	20.2	20.5	20.9	22.5	21.3	22.8	23.1
	3H	18.4	19.9	18.8	20.2	20.5	22.0	23.4	22.4	23.8	24.1
	4H	18.4	19.7	18.8	20.1	20.4	22.3	23.7	22.7	24.0	24.4
	6H	18.3	19.6	18.7	19.9	20.3	22.5	23.8	22.9	24.2	24.5
	8H	18.3	19.5	18.7	19.8	20.2	22.5	23.7	22.9	24.1	24.5
	12H	18.2	19.4	18.6	19.8	20.2	22.5	23.7	22.9	24.1	24.5
4H	2H	18.9	20.2	19.3	20.6	21.0	21.4	22.7	21.8	23.1	23.4
	3H	19.1	20.2	19.5	20.6	21.0	22.6	23.7	23.0	24.1	24.5
	4H	19.1	20.1	19.5	20.5	20.9	23.0	24.1	23.5	24.5	24.9
	6H	19.0	19.9	19.4	20.3	20.8	23.3	24.2	23.7	24.6	25.1
	8H	18.9	19.8	19.4	20.2	20.7	23.3	24.2	23.8	24.6	25.1
	12H	18.9	19.7	19.4	20.1	20.6	23.3	24.1	23.8	24.6	25.1
8H	4H	19.2	20.1	19.7	20.5	21.0	23.1	24.0	23.6	24.4	24.9
	6H	19.1	19.8	19.6	20.3	20.8	23.4	24.1	23.9	24.6	25.1
	8H	19.2	19.8	19.7	20.3	20.8	23.5	24.1	24.0	24.7	25.1
	12H	19.1	19.6	19.6	20.1	20.7	23.6	24.1	24.1	24.6	25.1
12H	4H	19.2	20.0	19.7	20.5	21.0	23.1	23.9	23.6	24.3	24.9
	6H	19.2	19.8	19.7	20.3	20.8	23.5	24.1	24.0	24.6	25.1
	8H	19.2	19.7	19.7	20.2	20.7	23.5	24.1	24.1	24.6	25.1

Table 1. UGR values

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
3	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30
6	30	30	30	31	31	31	31	31	31	31	31	30	30	30	30	30	30	30	30
9	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29
12	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	29
15	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	29	29	29	29
18	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	28	28	28
21	29	29	28	28	28	28	28	28	28	28	29	29	29	28	28	28	28	28	28
24	28	28	28	27	27	27	27	28	28	28	28	28	28	28	28	27	27	27	27
27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26
30	26	27	26	26	26	26	26	26	26	26	26	26	26	27	26	26	26	26	26
33	25	25	25	25	25	25	25	25	25	25	26	26	25	26	26	25	25	25	25
36	23	24	25	24	24	24	24	24	24	24	25	24	25	25	25	24	24	24	24
39	22	23	24	23	23	23	23	23	23	23	23	23	24	24	24	23	23	23	23
42	19	22	22	22	22	22	22	22	22	22	22	22	23	23	23	22	23	22	22
45	13	20	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
48	7	18	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
51	5	17	18	18	19	18	18	19	18	18	19	19	19	19	19	19	19	19	19
54	4	15	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
57	4	14	15	16	16	15	15	15	15	15	16	16	16	16	16	16	16	16	16
60	2	12	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
63	1	11	11	12	12	12	12	12	12	12	12	13	13	13	13	13	13	13	13
66	1	7	6	9	11	11	10	11	11	11	11	11	11	11	12	11	11	11	11
69	1	4	2	5	9	9	9	9	9	9	9	10	10	10	10	10	10	10	10
72	1	2	1	3	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8
75	0	0	0	1	5	6	5	6	6	6	6	7	7	7	7	7	7	7	7
78	0	0	0	1	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5
81	0	0	0	0	2	3	3	3	3	3	3	3	4	4	4	4	4	3	4
84	0	0	0	0	1	1	1	1	2	2	2	2	2	2	2	3	3	2	3
87	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	1	1	2
90	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
3	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	31
6	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
9	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30
12	29	29	29	29	29	29	29	29	29	29	29	30	30	30	30	30	30
15	28	28	28	28	29	29	29	29	29	29	29	29	29	29	29	29	29
18	28	28	28	28	28	28	28	29	28	28	28	28	29	29	29	29	29
21	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
24	27	27	27	27	27	27	27	27	27	27	27	27	27	27	28	28	28
27	26	26	26	26	26	26	26	26	26	27	26	26	26	27	27	27	27
30	26	26	26	26	25	25	26	25	26	26	26	25	25	26	26	26	26
33	25	25	25	25	24	24	24	24	24	24	24	24	24	24	24	25	25
36	24	24	24	24	24	23	23	23	23	23	23	23	23	23	23	24	23
39	23	23	23	23	23	22	22	22	22	21	21	22	22	21	20	19	20
42	22	22	22	22	21	21	21	21	20	20	20	20	20	19	15	12	13
45	21	21	20	20	20	20	19	19	19	19	19	19	18	15	8	3	5
48	19	20	19	19	19	18	18	18	18	17	17	17	16	10	3	2	3
51	18	18	18	17	17	17	17	17	17	16	16	16	13	7	1	1	2
54	17	17	16	16	16	15	15	15	15	15	15	14	11	3	1	1	1
57	15	15	15	14	14	14	14	14	14	13	13	13	12	3	0	0	1
60	14	14	13	13	13	12	12	12	12	12	12	11	10	2	0	0	0
63	12	12	12	11	11	11	10	10	10	10	10	10	7	0	0	0	0
66	11	11	10	10	9	9	9	9	8	8	8	8	5	0	0	0	0
69	9	9	8	8	8	7	7	7	7	7	7	7	4	1	0	0	0
72	8	8	7	7	6	6	6	5	5	5	5	5	4	1	0	0	0
75	6	6	5	5	5	4	4	4	4	4	4	3	3	0	0	0	0
78	5	5	4	4	3	3	3	2	2	2	2	2	2	0	0	0	0
81	4	3	3	2	2	2	2	1	1	1	1	1	1	0	0	0	0
84	3	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0
87	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
90	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Signature:

A handwritten signature in black ink, appearing to read 'D Chambers', is centered within a light blue rectangular box. The signature is written in a cursive style.

Print Name:

D CHAMBERS

Date:

14/03/2014

Test Engineer

Duly authorised to sign on behalf of:

Photometric and Optical Testing Services LLP