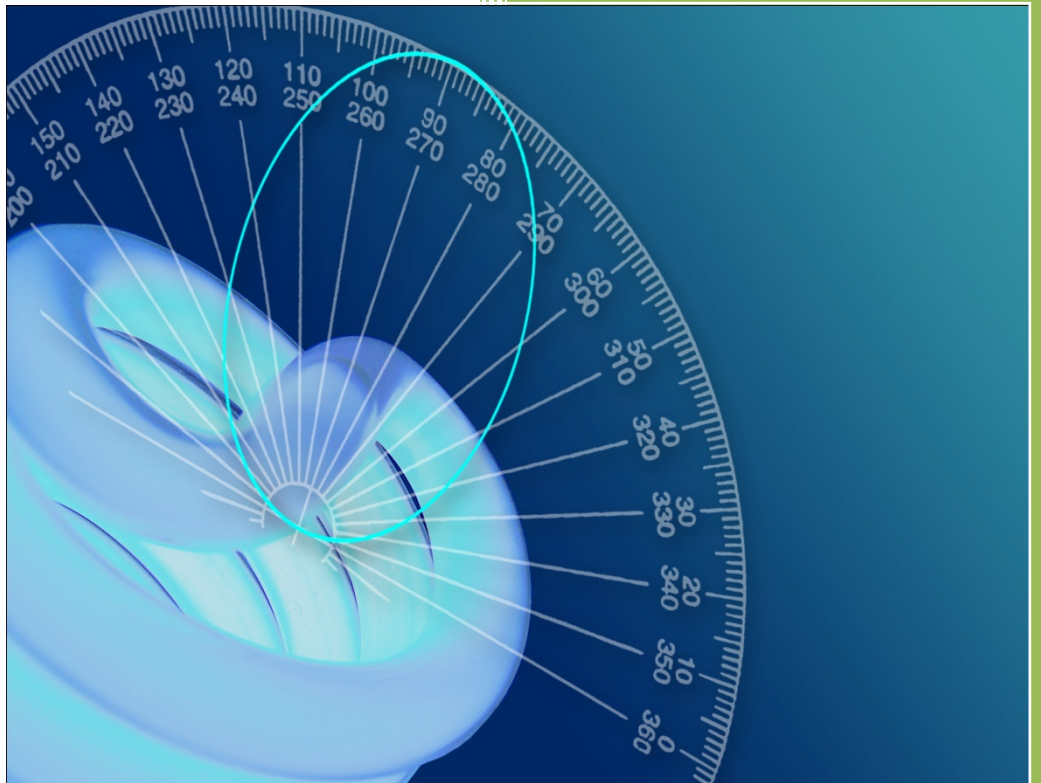


Photometric Test Report



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/DC18015	Report Date: 16/01/2018	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: Harwood House, Park Road, Melton Mowbray, Leicestershire LE13 1TX		

Client Details

Company: Lighting Illumination Technology Experience Limited	Email: davehorsfield@lite-ltd.co.uk
Address: Unit 2 Farrington Place, Burnley, BB11 5TY	

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: Lighting Illumination Technology Experience	Source Type: LED
Model: WHITE NO OPTIC	Luminaire Type: SPOTLIGHT
Power Supply Used: Kikusui PCR1000M Voltage Stabiliser S/N SM01191	

Integrating Sphere Test

Date of Test: 12/01/2018	Ambient Temperature: 25°C
Measurement Filename: WHITE NO OPTIC	
Instrument Used: Labsphere model CSLMS HALOGEN 4060 integrating sphere spectroradiometer	
Integrating Sphere Size: 1m	Measurement Geometry ($2\pi / 4\pi$): 2π
Sample Orientation: Facing Downwards	Auxiliary Correction Applied: YES
Comments:	
Date of Last Calibration (Operating Hours): 09-01-2018 (05:32)	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): 197	
CIE 1931 Chromaticity Cx: 0.3760	CIE 1931 Chromaticity Cy: 0.3700
CRI (%): 77.72	CCT (K): 4073

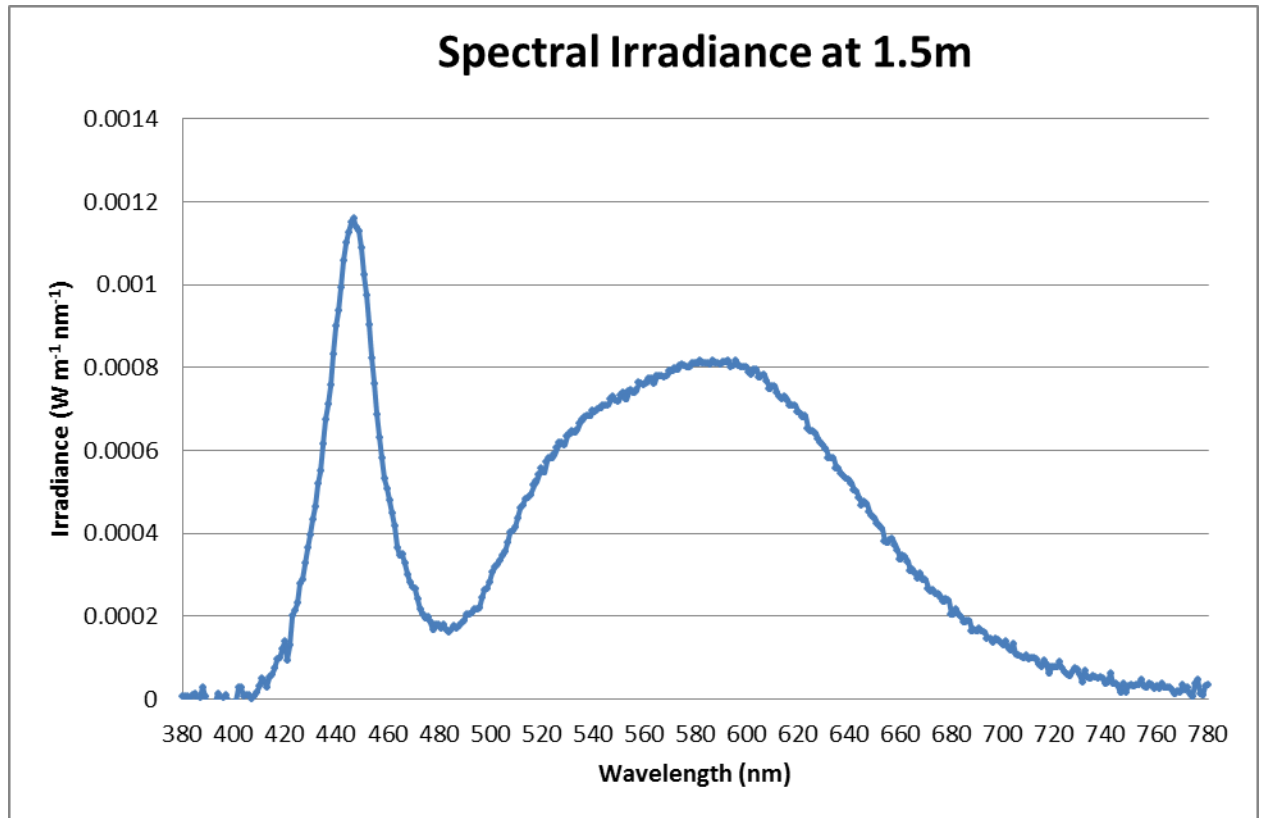


Figure 1: Spectral Irradiance

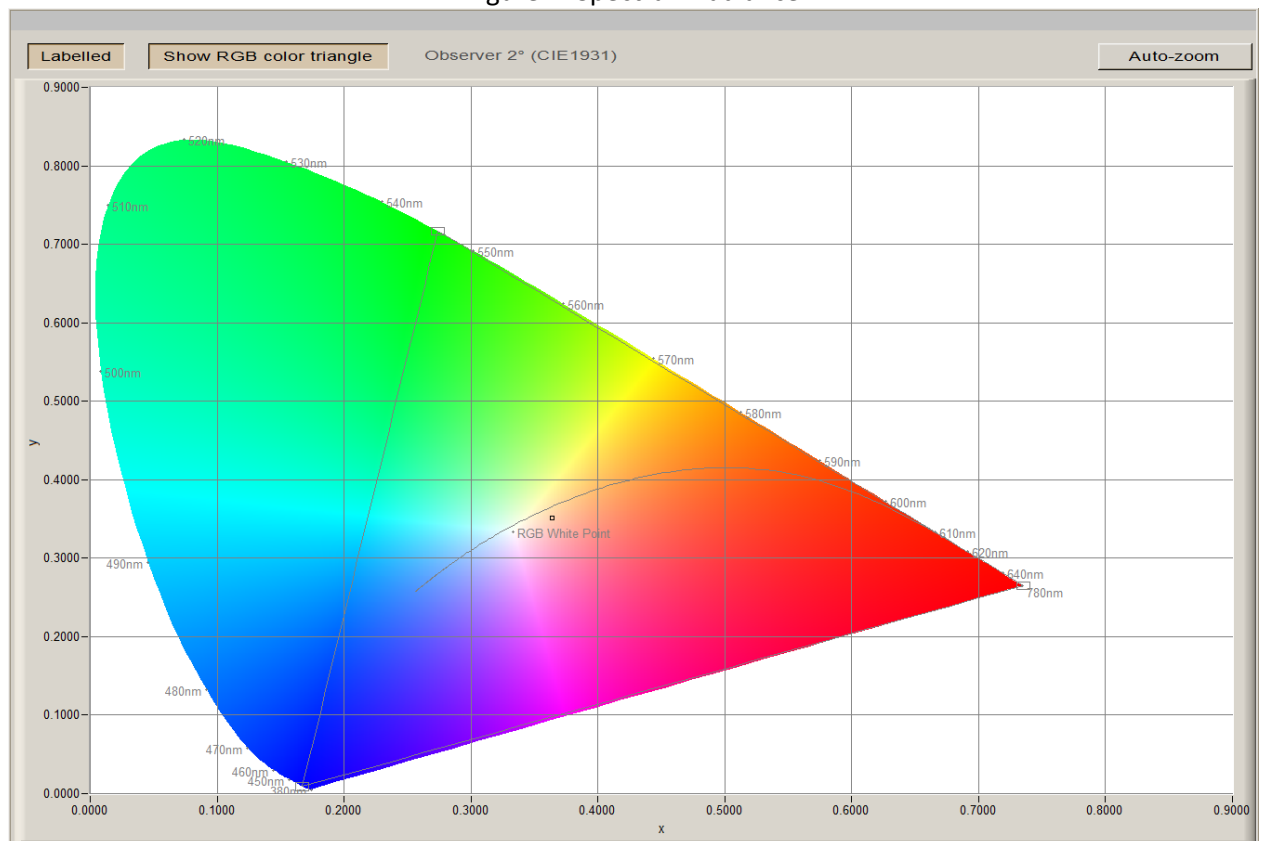


Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 04/01/2018		Ambient Temperature: 25°C
Measurement Filename: WHITE NO OPTIC		
Instrument Used: Radiant Imaging NFMS0800 Goniometer with ProMetric PM-1200N-1 Imaging Photometer		
Photometer Working Distance: 1.5m		Measurement Geometry: Near-Field
Comments: Power supply from ballast into LEDs given as 4.7W, and this figure used to calculate lamp efficacy.		
Reference Photometer Used: Specbos1211		Reference Photometer Serial Number: 2014754
Traceable: to NIST standards		
Calibration Certificate Date: 02 November 2017		Sample Stabilisation Time (minutes): 45
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):197	Peak Intensity (3° Spot, candelas): 120.8	Efficacy (lumens/Watt): 41.9
Beam Angle (50% of max intensity C0-180, degrees): 75.3		
Photometric Filename (IES LM-63-2002): WHITE NO OPTIC		
IES File – Absolute or Relative Format? Absolute		
Photometric Filename (EULUMDAT): WHITE NO OPTIC		
EULUMDAT File – Absolute or Relative Format? Absolute		

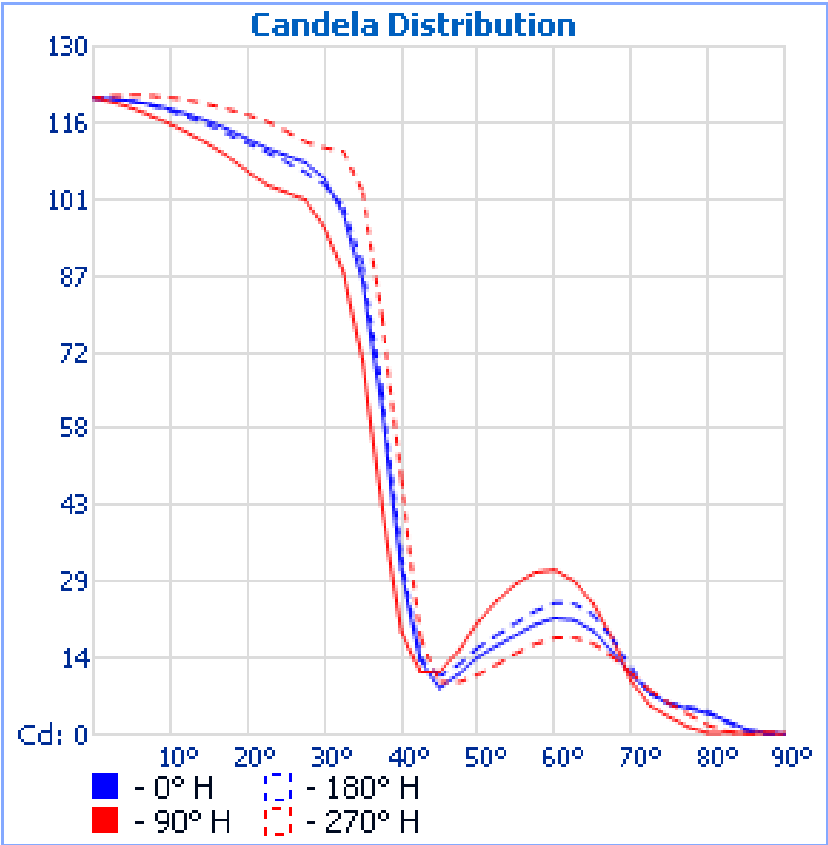


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

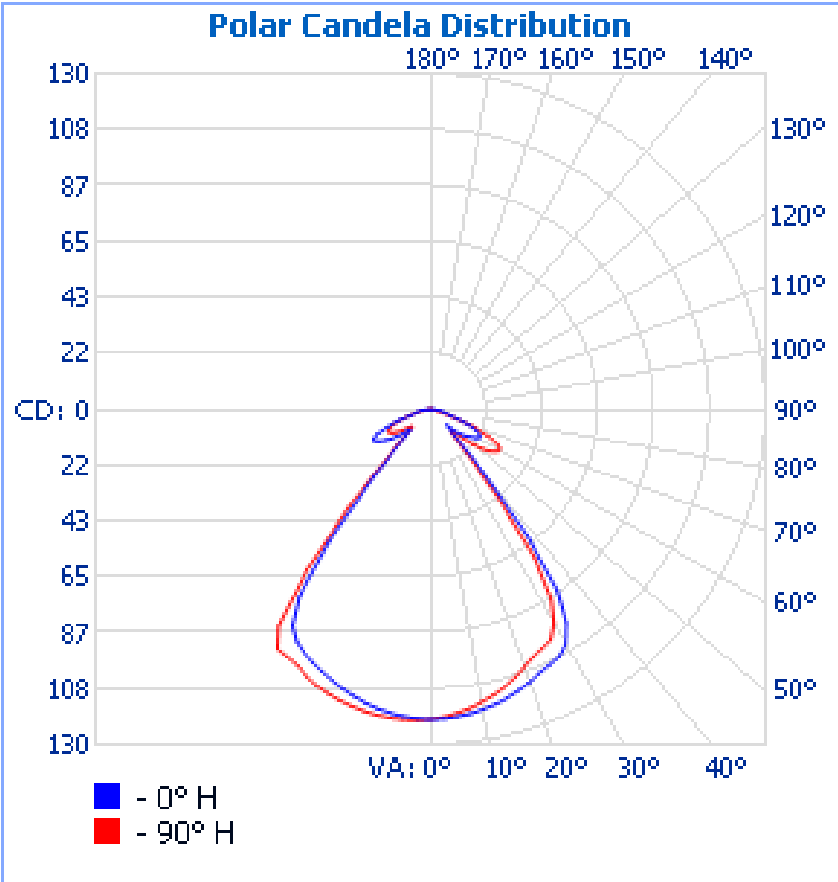


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

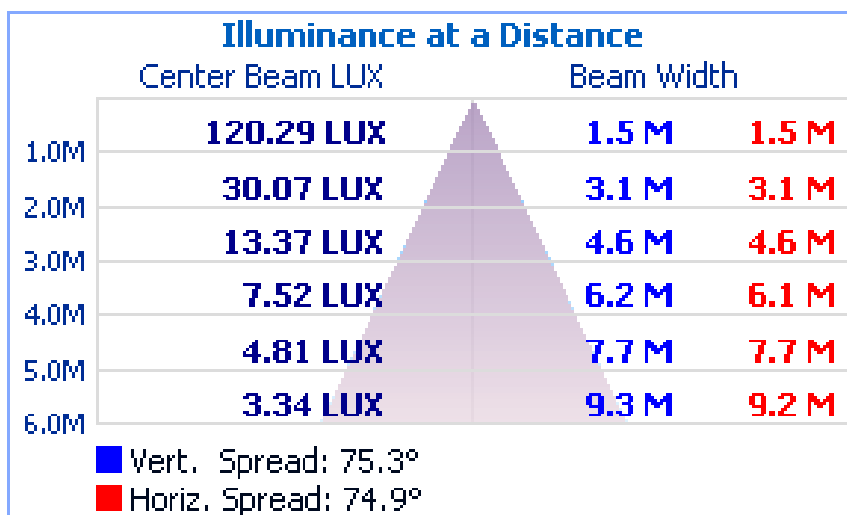


Figure 5. Cone diagram for mounting height of 6 metres.

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	21.5	22.8	21.8	23.2	23.5	21.3	22.7	21.7	23.0	23.3
	3H	23.1	24.4	23.5	24.7	25.1	23.1	24.3	23.4	24.6	25.0
	4H	23.4	24.6	23.8	24.9	25.3	23.4	24.5	23.8	24.9	25.3
	6H	23.7	24.8	24.1	25.1	25.5	23.5	24.5	23.9	24.9	25.3
	8H	23.8	24.8	24.2	25.2	25.6	23.4	24.5	23.9	24.8	25.2
	12H	23.8	24.8	24.2	25.1	25.6	23.4	24.4	23.8	24.7	25.2
4H	2H	22.3	23.4	22.6	23.8	24.1	22.2	23.3	22.6	23.7	24.0
	3H	23.9	24.8	24.3	25.2	25.6	23.9	24.9	24.3	25.3	25.7
	4H	24.3	25.1	24.7	25.5	26.0	24.4	25.2	24.8	25.6	26.1
	6H	24.6	25.3	25.1	25.8	26.2	24.4	25.2	24.9	25.6	26.1
	8H	24.7	25.4	25.2	25.9	26.3	24.4	25.1	24.9	25.6	26.0
	12H	24.8	25.4	25.3	25.9	26.4	24.4	25.0	24.9	25.5	26.0
8H	4H	24.4	25.1	24.9	25.5	26.0	24.5	25.2	25.0	25.6	26.1
	6H	24.8	25.4	25.3	25.9	26.4	24.6	25.2	25.1	25.6	26.1
	8H	25.1	25.6	25.6	26.1	26.6	24.6	25.1	25.1	25.6	26.1
	12H	25.1	25.5	25.7	26.1	26.6	24.6	25.0	25.1	25.5	26.0
12H	4H	24.4	25.0	24.8	25.4	26.0	24.5	25.1	25.0	25.6	26.1
	6H	24.9	25.3	25.4	25.9	26.4	24.6	25.1	25.2	25.7	26.1
	8H	25.1	25.5	25.6	26.0	26.5	24.6	25.0	25.1	25.5	26.1

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	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
2.5	120	120	120	120	120	120	120	120	119	119	119	119	120	120	120	120	120	120	120
5	120	119	119	119	119	119	119	118	118	118	118	118	118	119	119	119	119	119	120
7.5	119	119	118	118	118	118	117	117	117	117	117	117	117	117	117	118	118	118	119
10	118	118	117	117	117	116	116	115	115	115	115	115	115	116	116	116	117	117	118
12.5	117	117	116	116	115	115	114	114	114	113	113	114	114	114	114	115	115	116	117
15	116	115	115	114	114	113	112	112	112	111	111	112	112	112	112	113	114	114	115
17.5	114	114	113	113	112	111	111	110	110	109	109	109	109	110	110	111	112	113	113
20	113	112	111	111	110	109	109	107	107	106	106	106	107	107	108	109	110	111	112
22.5	111	110	109	108	108	107	106	105	105	104	103	103	104	105	106	107	108	109	110
25	109	108	107	106	106	105	104	103	103	102	102	101	101	103	103	104	106	107	108
27.5	108	107	106	105	104	103	102	103	102	101	100	100	99	101	101	103	105	106	106
30	105	104	104	102	102	101	100	100	98	96	96	98	96	97	99	101	103	103	104
32.5	98	96	95	95	93	92	92	90	88	87	87	87	88	89	92	96	95	97	100
35	86	83	77	75	74	77	74	74	72	70	68	67	70	73	76	78	81	84	89
37.5	62	58	53	51	47	47	49	44	45	43	41	42	47	48	52	55	58	63	65
40	31	30	31	29	25	24	23	23	22	20	20	21	23	27	28	29	29	29	34
42.5	14	13	12	11	12	13	13	13	12	12	12	13	13	13	13	13	13	14	15
45	9	9	9	9	10	12	12	13	12	12	12	13	12	13	12	12	12	11	11
47.5	12	11	11	12	13	14	15	16	16	16	16	15	15	16	15	14	14	13	13
50	15	15	14	15	16	17	18	19	20	21	20	19	19	19	19	19	17	17	16
52.5	17	17	17	17	18	19	21	23	24	25	24	23	23	23	23	22	21	20	19
55	19	19	18	18	19	21	24	26	27	29	28	26	26	26	27	25	23	22	21
57.5	21	21	19	18	19	23	26	28	30	31	30	28	28	29	29	28	26	24	23
60	22	22	19	18	18	23	27	29	31	31	30	29	29	29	30	29	27	26	25
62.5	22	21	17	16	16	22	27	29	29	29	28	28	27	28	29	28	27	26	25
65	20	19	15	14	14	19	23	25	25	25	24	23	23	24	25	24	24	24	23
67.5	16	15	12	11	12	15	18	18	19	18	18	17	17	18	19	18	18	19	18
70	11	11	9	9	9	11	12	12	11	10	10	10	11	11	12	12	12	13	13
72.5	8	8	7	7	7	7	8	7	6	5	6	6	7	7	7	7	7	8	8
75	6	6	6	5	5	5	5	4	4	3	4	4	5	5	5	5	6	6	6

77.5	5	5	5	5	5	4	3	2	2	1	1	2	3	4	5	5	5	5	5
80	4	4	4	4	3	2	1	0	0	0	0	0	1	2	3	4	4	4	4
82.5	3	3	3	2	1	1	1	0	0	0	0	0	1	1	1	2	2	2	2
85	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
87.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
2.5	120	120	120	120	121	121	121	121	121	121	121	121	121	120	120	120	120
5	120	120	120	120	121	121	121	121	121	121	121	121	121	120	120	120	120
7.5	119	119	120	120	120	120	121	121	121	121	121	121	120	120	120	119	119
10	118	119	119	119	120	120	120	120	120	120	120	120	120	119	119	119	118
12.5	117	118	118	119	119	119	120	120	120	120	120	119	119	119	118	118	118
15	116	116	117	118	118	118	119	119	119	119	119	119	118	118	117	117	116
17.5	114	115	116	116	117	117	118	118	118	118	118	118	117	117	116	116	115
20	113	113	114	115	115	116	116	117	117	117	116	116	116	115	115	114	114
22.5	111	111	112	113	114	114	115	116	116	116	115	115	114	114	113	113	112
25	109	110	110	111	112	113	114	114	114	114	114	113	112	112	111	111	111
27.5	107	108	108	109	110	111	112	112	112	112	113	111	110	110	110	111	110
30	105	106	108	108	109	111	111	111	111	111	111	112	110	109	110	109	107
32.5	101	102	106	106	107	109	108	109	110	109	107	110	108	107	107	102	100
35	91	92	93	94	97	99	99	102	103	101	99	99	98	95	92	89	89
37.5	69	70	70	72	75	79	80	80	79	79	77	75	74	72	69	67	64
40	34	38	42	42	47	49	52	51	48	45	41	42	43	44	40	37	31
42.5	15	14	14	16	17	19	19	19	18	17	17	17	17	16	14	14	13
45	11	11	10	10	10	11	11	11	10	9	10	10	9	10	10	10	9
47.5	12	12	11	11	11	11	11	11	10	9	9	10	10	10	10	10	11

50	16	14	14	13	13	13	12	12	11	12	11	12	12	12	13	13	14
52.5	18	17	16	15	15	15	15	14	13	14	14	14	14	14	15	16	17
55	20	19	18	17	17	17	17	16	15	15	15	15	15	17	18	18	18
57.5	22	21	20	19	19	19	19	18	17	16	17	17	17	17	18	20	20
60	23	22	21	20	20	20	20	19	18	18	17	18	18	18	19	21	22
62.5	23	21	21	20	20	20	20	20	18	18	17	17	17	18	19	20	21
65	21	19	18	18	19	19	19	18	17	17	16	16	16	17	18	19	19
67.5	17	15	15	15	16	16	16	16	15	14	14	14	14	14	15	15	16
70	12	11	11	12	12	13	12	12	12	11	11	11	11	11	12	12	12
72.5	7	7	7	7	8	9	8	9	8	8	8	8	8	8	8	8	8
75	6	6	6	6	6	7	7	6	6	6	6	6	6	7	6	6	6
77.5	5	5	5	5	5	5	4	4	4	4	4	4	5	5	5	5	5
80	4	4	4	3	2	2	2	2	2	2	2	2	2	3	4	4	4
82.5	2	2	2	1	1	0	1	1	1	1	1	1	1	1	2	3	3
85	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
87.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Zone	Lumens	% Total
0-5	2.9	1.40%
05-10	8.5	4.30%
10-15	13.8	7.00%
15-20	18.7	9.40%
20-25	23.1	11.60%
25-30	26.9	13.60%
30-35	28.5	14.40%
35-40	20.1	10.10%
40-45	6.7	3.40%
45-50	5.2	2.60%
50-55	7.9	4.00%
55-60	10.2	5.10%
60-65	10.7	5.40%
65-70	8	4.00%
70-75	4.1	2.10%
75-80	2.2	1.10%
80-85	0.8	0.40%
85-90	0.2	0.10%

Table 3. Zonal Flux Table

Effective Floor Cavity Reflectance: 20%																		
RCC %:	80				70				50			30			10			0
RW %:	70	50	30	0	70	50	30	0	50	30	20	50	30	20	50	30	20	0
RCR: 0	1.19	1.19	1.19	1.19	1.16	1.16	1.16	1	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	1
1	1.11	1.07	1.04	1.01	1.08	1.05	1.02	0.89	1.01	0.98	0.96	0.97	0.95	0.93	0.94	0.92	0.9	0.88
2	1.03	0.96	0.91	0.86	1.01	0.95	0.89	0.79	0.91	0.87	0.83	0.88	0.84	0.81	0.85	0.82	0.8	0.78
3	0.96	0.87	0.8	0.75	0.93	0.86	0.79	0.7	0.83	0.77	0.73	0.8	0.76	0.72	0.78	0.74	0.71	0.69
4	0.89	0.79	0.72	0.66	0.87	0.78	0.71	0.63	0.76	0.7	0.65	0.73	0.68	0.64	0.71	0.67	0.63	0.61
5	0.83	0.72	0.65	0.59	0.81	0.71	0.64	0.57	0.69	0.63	0.58	0.68	0.62	0.58	0.66	0.61	0.57	0.55
6	0.78	0.67	0.59	0.53	0.76	0.66	0.59	0.52	0.64	0.58	0.53	0.62	0.57	0.52	0.61	0.56	0.52	0.5
7	0.73	0.62	0.54	0.49	0.72	0.61	0.54	0.47	0.59	0.53	0.48	0.58	0.52	0.48	0.57	0.52	0.48	0.46
8	0.69	0.57	0.5	0.45	0.67	0.56	0.49	0.44	0.55	0.49	0.44	0.54	0.48	0.44	0.53	0.48	0.44	0.42
9	0.65	0.53	0.46	0.41	0.64	0.53	0.46	0.4	0.52	0.45	0.41	0.51	0.45	0.41	0.5	0.44	0.41	0.39
10	0.61	0.5	0.43	0.38	0.6	0.49	0.43	0.38	0.48	0.42	0.38	0.47	0.42	0.38	0.47	0.41	0.38	0.36

Table 4. Utilisation Factor Table

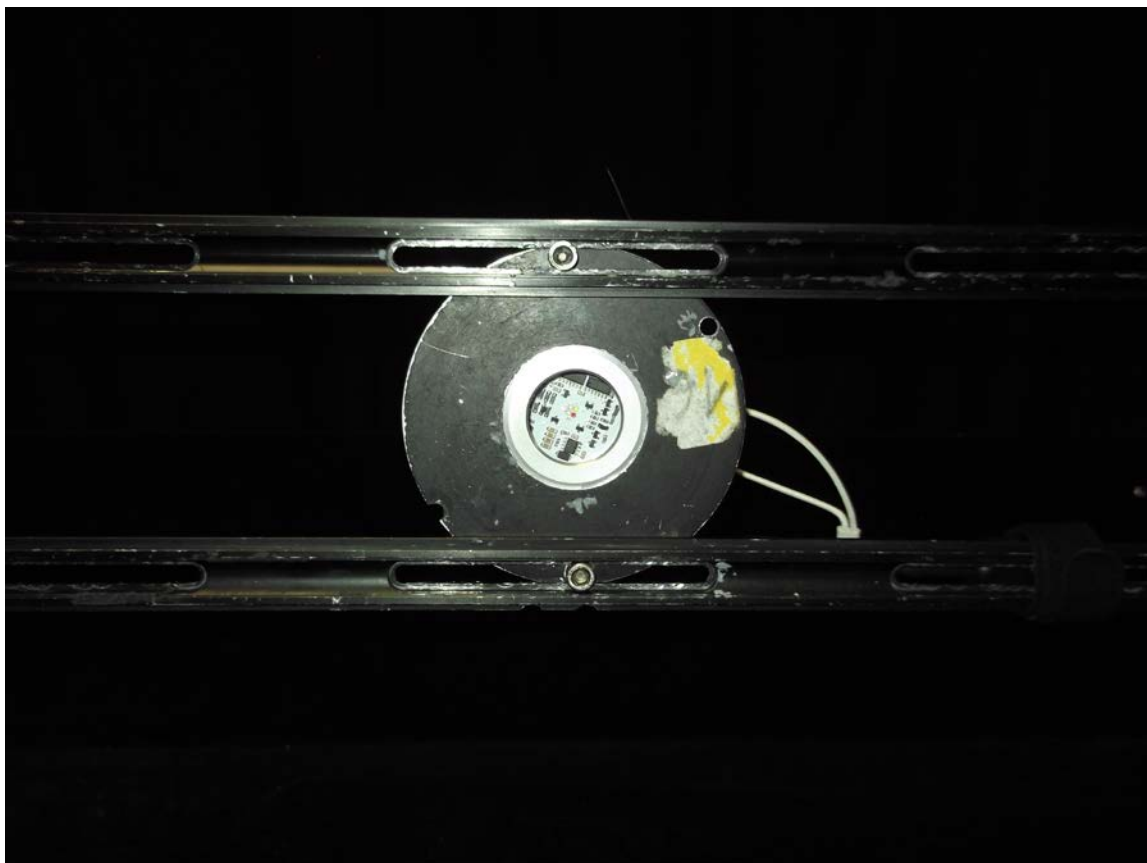


Photo 1: Luminaire on goniometer mount

Signature:

Print Name:

D CHAMBERS

Date:

16/01/2018

Technical Manager

Duly authorised to sign on behalf of:

Photometric and Optical Testing Services LLP