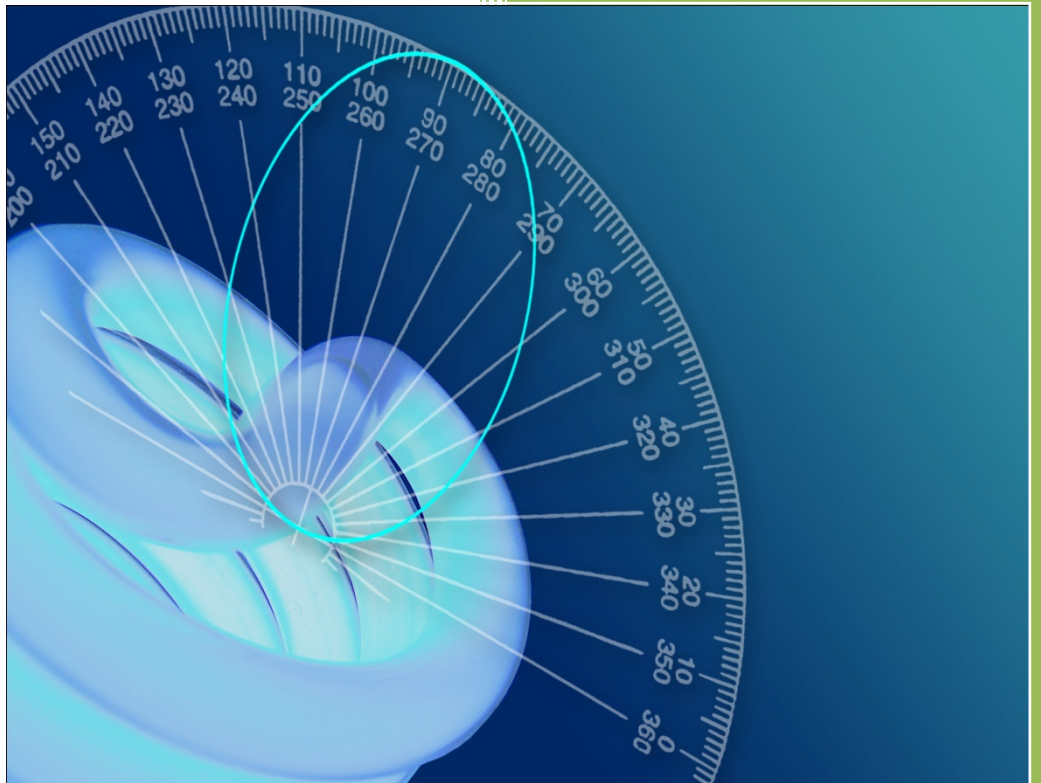


Photometric Test Report



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/DC18018	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 25 DEG 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 25 DEG 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): 160.7	
CIE 1931 Chromaticity Cx: 0.2732	CIE 1931 Chromaticity Cy: 0.2527
CRI (%): 61.39	CCT (K): 15696

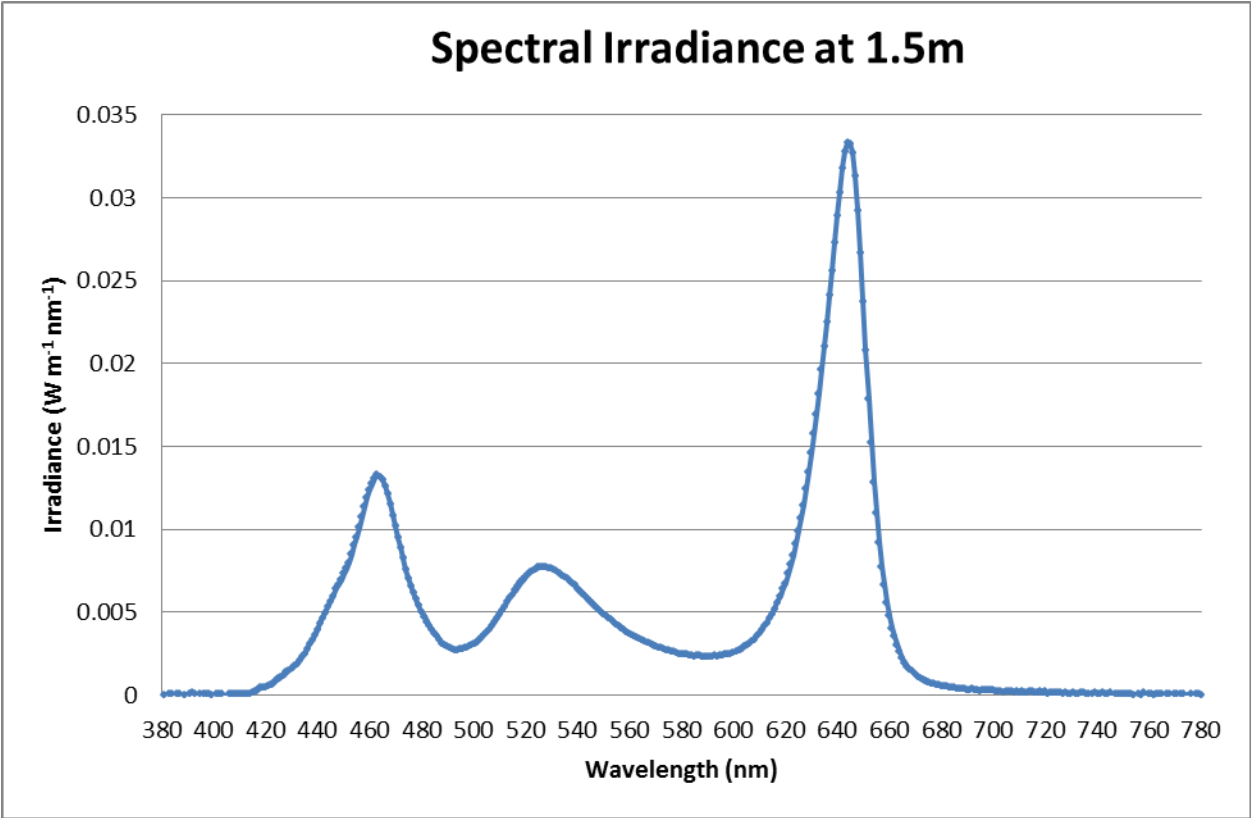


Figure 1: Spectral Irradiance

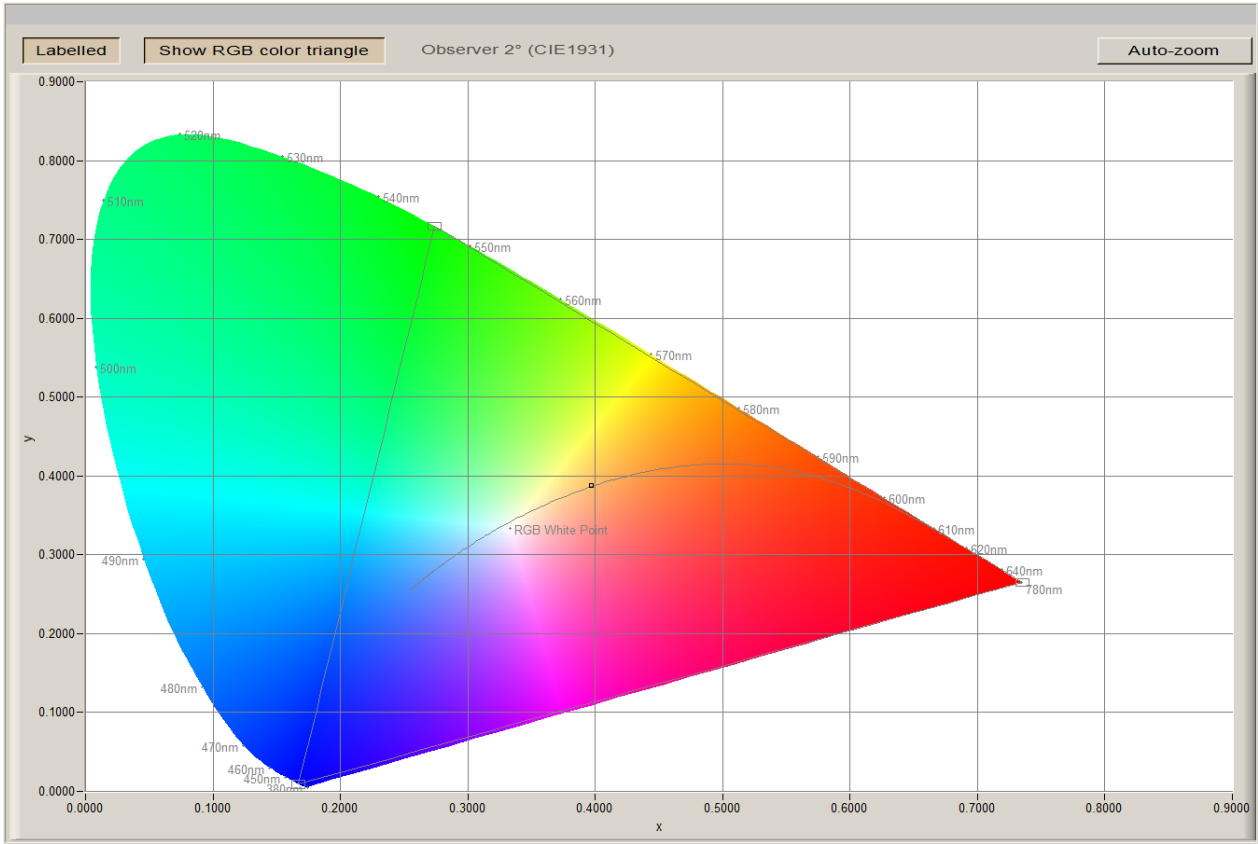


Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 05/01/2018		Ambient Temperature: 25°C
Measurement Filename: WHITE 25 DEG 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	0-20°	1°
Inclination Zone 2	22.5-50°	2.5°
Inclination Zone 3	55-90°	5°
Azimuth	0-360°	10°
Results		
Integrated Luminous Flux (lumens):160.7	Peak Intensity (3° Spot, candelas): 1084.6	Efficacy (lumens/Watt): 34.2
Beam Angle (50% of max intensity C0-180, degrees): 18.1		
Photometric Filename (IES LM-63-2002): WHITE 25 DEG OPTIC		
IES File – Absolute or Relative Format? Absolute		
Photometric Filename (EULUMDAT): WHITE 25 DEG OPTIC		
EULUMDAT File – Absolute or Relative Format? Absolute		

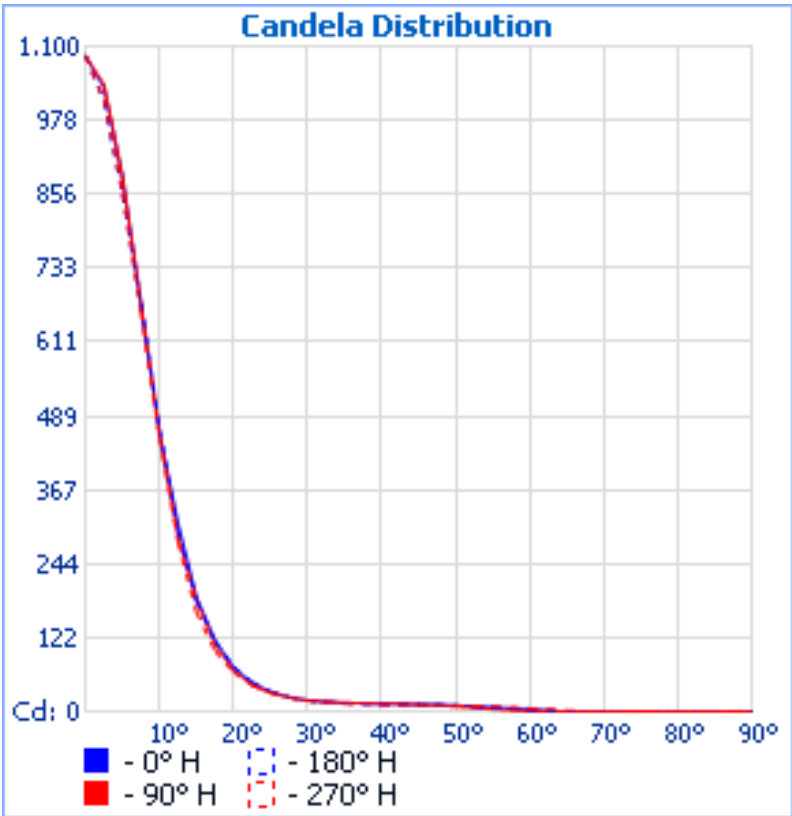


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

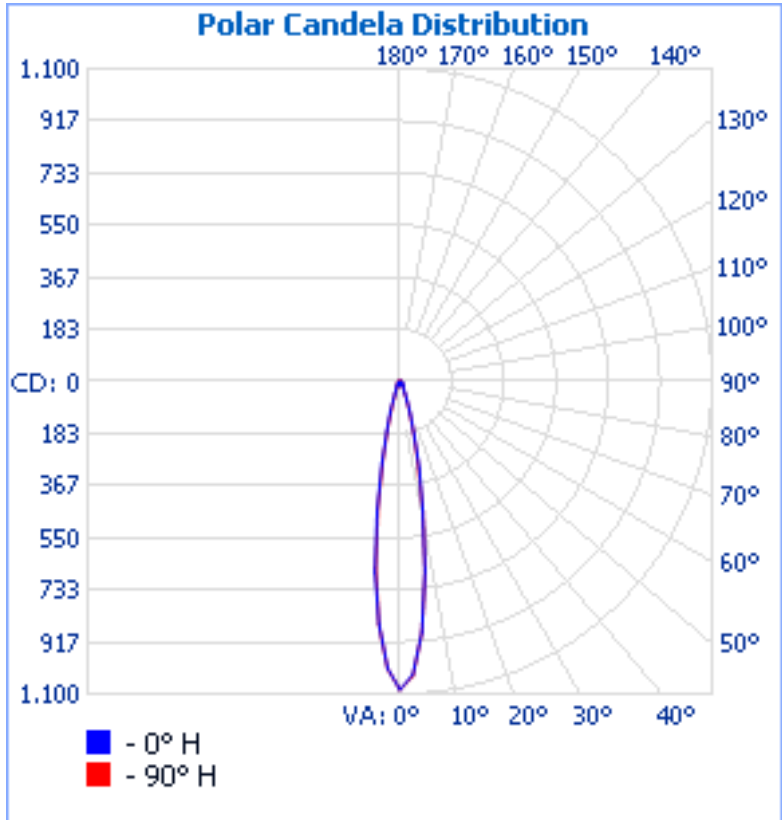


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

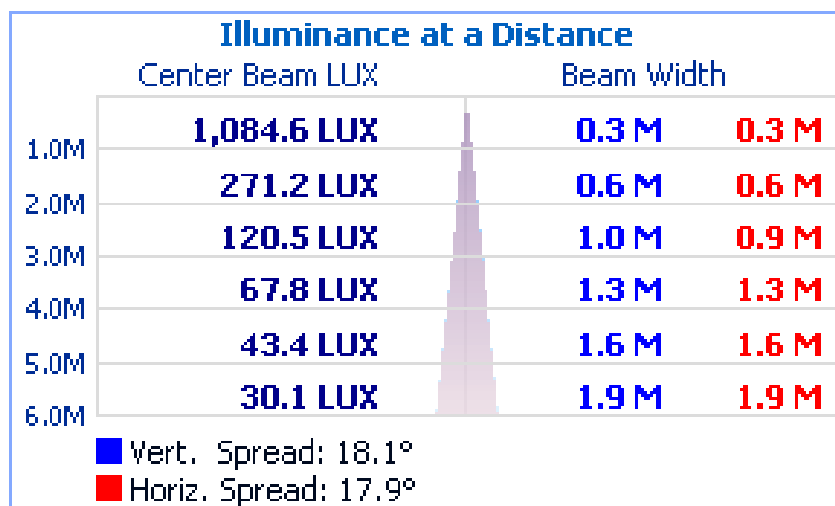


Figure 5. Cone diagram for mounting height of 6 metres.

Reflectance of		0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
Ceiling											
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	14.2	15.0	14.6	15.3	15.6	15.0	15.8	15.4	16.1	16.4
	3H	14.0	14.7	14.4	15.0	15.4	14.8	15.5	15.2	15.9	16.2
	4H	13.9	14.5	14.3	14.9	15.2	14.7	15.4	15.1	15.7	16.1
	6H	13.8	14.3	14.2	14.7	15.1	14.6	15.2	15.0	15.6	16.0
	8H	13.7	14.2	14.1	14.6	15.0	14.5	15.1	14.9	15.5	15.9
	12H	13.6	14.1	14.0	14.5	14.9	14.4	15.0	14.9	15.4	15.8
4H	2H	14.1	14.7	14.5	15.1	15.5	14.9	15.6	15.3	15.9	16.3
	3H	13.8	14.4	14.3	14.8	15.2	14.7	15.3	15.1	15.6	16.1
	4H	13.7	14.2	14.2	14.6	15.1	14.6	15.1	15.1	15.5	16.0
	6H	13.6	14.0	14.0	14.4	14.9	14.4	14.9	14.9	15.3	15.8
	8H	13.5	13.9	14.0	14.3	14.8	14.4	14.7	14.9	15.2	15.7
	12H	13.4	13.8	13.9	14.2	14.8	14.3	14.7	14.8	15.1	15.6
8H	4H	13.5	13.9	14.0	14.3	14.8	14.4	14.7	14.9	15.2	15.7
	6H	13.3	13.6	13.8	14.1	14.6	14.2	14.5	14.7	15.0	15.5
	8H	13.3	13.5	13.8	14.1	14.6	14.1	14.4	14.7	14.9	15.4
	12H	13.2	13.4	13.7	13.9	14.4	14.1	14.3	14.6	14.8	15.3
12H	4H	13.4	13.8	13.9	14.2	14.8	14.3	14.7	14.8	15.1	15.6
	6H	13.3	13.5	13.8	14.1	14.6	14.1	14.4	14.7	14.9	15.4
	8H	13.2	13.4	13.7	13.9	14.4	14.1	14.3	14.6	14.8	15.3

Distance between luminaires: 0.25

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

Table 1. UGR values

[illegible]

77.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
87.5	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

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	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085
2.5	1010	1012	1011	1010	1017	1008	1011	1009	1012	1011	1017	1016	1026	1028	1031	1034	1033
5	847	840	847	833	838	841	837	845	858	862	865	868	868	867	881	875	881
7.5	678	669	668	661	653	659	659	659	660	657	656	657	653	660	670	667	674
10	466	462	462	453	448	447	454	454	452	452	451	443	443	448	457	456	459
12.5	294	289	287	294	290	287	280	278	280	278	278	285	290	291	287	297	306
15	179	179	179	179	174	170	170	163	164	162	169	169	175	180	182	184	184
17.5	117	112	112	107	104	104	101	100	101	100	100	103	103	106	112	113	118
20	74	72	70	69	68	66	66	67	65	65	64	64	66	67	67	69	73
22.5	49	50	48	47	46	45	46	45	44	44	44	43	43	44	45	46	47
25	34	34	34	33	33	32	33	32	31	31	31	30	30	31	31	32	32
27.5	25	25	24	24	24	24	24	24	23	23	23	23	23	22	22	23	23
30	19	19	19	19	18	18	19	19	18	18	18	18	18	18	18	17	18
32.5	16	16	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
35	14	14	13	13	13	13	13	13	14	13	13	13	13	13	14	14	14
37.5	13	13	12	12	12	12	12	12	13	13	13	13	12	13	13	13	13
40	12	12	12	12	12	11	12	12	12	12	13	12	12	12	12	13	13
42.5	12	11	11	11	11	11	11	12	12	12	12	12	12	12	12	12	12
45	11	11	11	11	11	11	11	11	11	11	12	11	11	11	11	11	12
47.5	10	10	10	10	10	10	11	11	11	11	11	11	11	11	11	11	11

50	10	9	9	9	9	10	10	10	10	11	11	10	10	10	10	10	10
52.5	8	8	8	9	9	9	9	10	10	10	10	10	9	9	9	9	9
55	7	7	7	7	8	8	8	9	9	9	9	8	8	8	8	8	8
57.5	5	5	6	6	6	7	7	7	7	7	8	7	7	7	6	6	6
60	3	4	4	4	5	5	5	6	6	6	6	5	5	5	4	4	4
62.5	2	2	2	3	3	3	4	4	4	4	4	4	3	3	3	2	2
65	0	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1
67.5	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	22.9	14.00%
05-10	45.8	28.00%
10-15	35.2	21.50%
15-20	18.8	11.50%
20-25	9.9	6.10%
25-30	6.2	3.80%
30-35	4.7	2.90%
35-40	4.5	2.70%
40-45	4.5	2.70%
45-50	4.3	2.60%
50-55	3.6	2.20%
55-60	2.3	1.40%
60-65	0.9	0.60%
65-70	0.1	0.10%
70-75	0	0.00%
75-80	0	0.00%
80-85	0	0.00%
85-90	0	0.00%

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	1.15	1.12	1.1	1.09	1.12	1.1	1.09	0.96	1.06	1.05	1.04	1.03	1.02	1.01	0.99	0.98	0.98	0.96
2	1.11	1.07	1.03	1.01	1.08	1.05	1.02	0.93	1.02	0.99	0.97	0.99	0.97	0.95	0.96	0.95	0.93	0.92
3	1.07	1.02	0.98	0.95	1.05	1	0.97	0.89	0.98	0.95	0.92	0.95	0.93	0.91	0.93	0.91	0.9	0.88
4	1.03	0.97	0.93	0.9	1.01	0.96	0.92	0.86	0.94	0.91	0.88	0.92	0.89	0.87	0.9	0.88	0.86	0.85
5	1	0.93	0.89	0.86	0.98	0.92	0.88	0.83	0.91	0.87	0.85	0.89	0.86	0.84	0.88	0.85	0.83	0.82
6	0.97	0.9	0.85	0.82	0.95	0.89	0.85	0.8	0.88	0.84	0.81	0.87	0.83	0.81	0.85	0.83	0.8	0.79
7	0.94	0.87	0.82	0.79	0.93	0.86	0.82	0.78	0.85	0.81	0.79	0.84	0.81	0.78	0.83	0.8	0.78	0.77
8	0.91	0.84	0.8	0.77	0.9	0.84	0.8	0.76	0.83	0.79	0.76	0.82	0.79	0.76	0.81	0.78	0.76	0.75
9	0.89	0.82	0.78	0.75	0.88	0.81	0.77	0.74	0.81	0.77	0.74	0.8	0.76	0.74	0.79	0.76	0.74	0.73
10	0.87	0.8	0.75	0.73	0.86	0.79	0.75	0.72	0.79	0.75	0.72	0.78	0.75	0.72	0.77	0.74	0.72	0.71

Table 4. Utilisation Factor Table

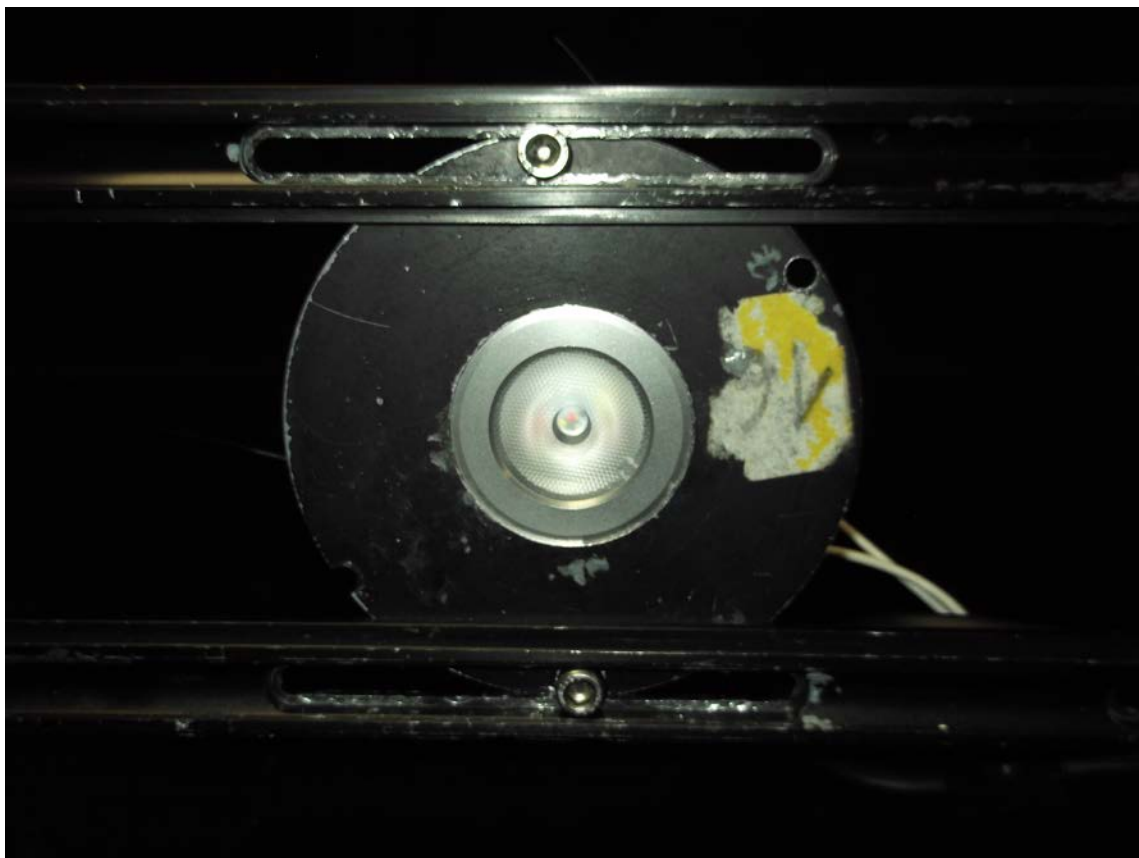


Photo 1: Luminaire on goniometer mount

Signature:

Print Name:

D CHAMBERS

Date:

16/01/2018

Technical Manager

Duly authorised to sign on behalf of:

Photometric and Optical Testing Services LLP