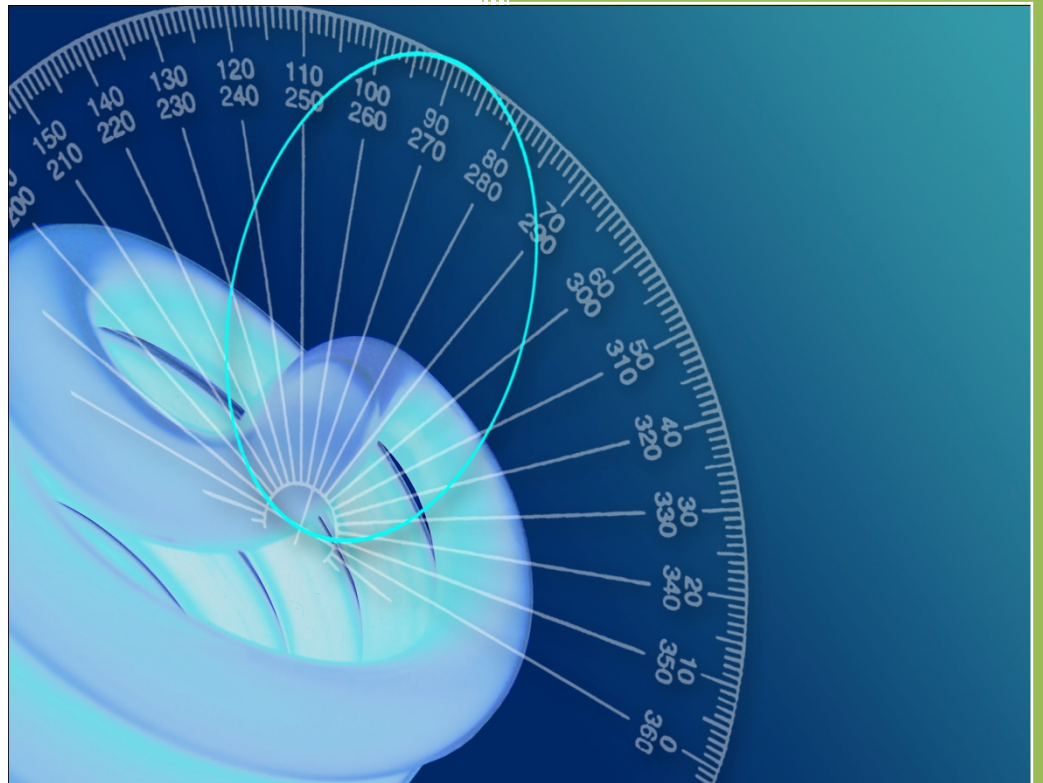


Photometric Test Report



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/DC18011	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 40 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 40 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): 254	
CIE 1931 Chromaticity Cx: 0.3792	CIE 1931 Chromaticity Cy: 0.3744
CRI (%): 77.34	CCT (K): 4013

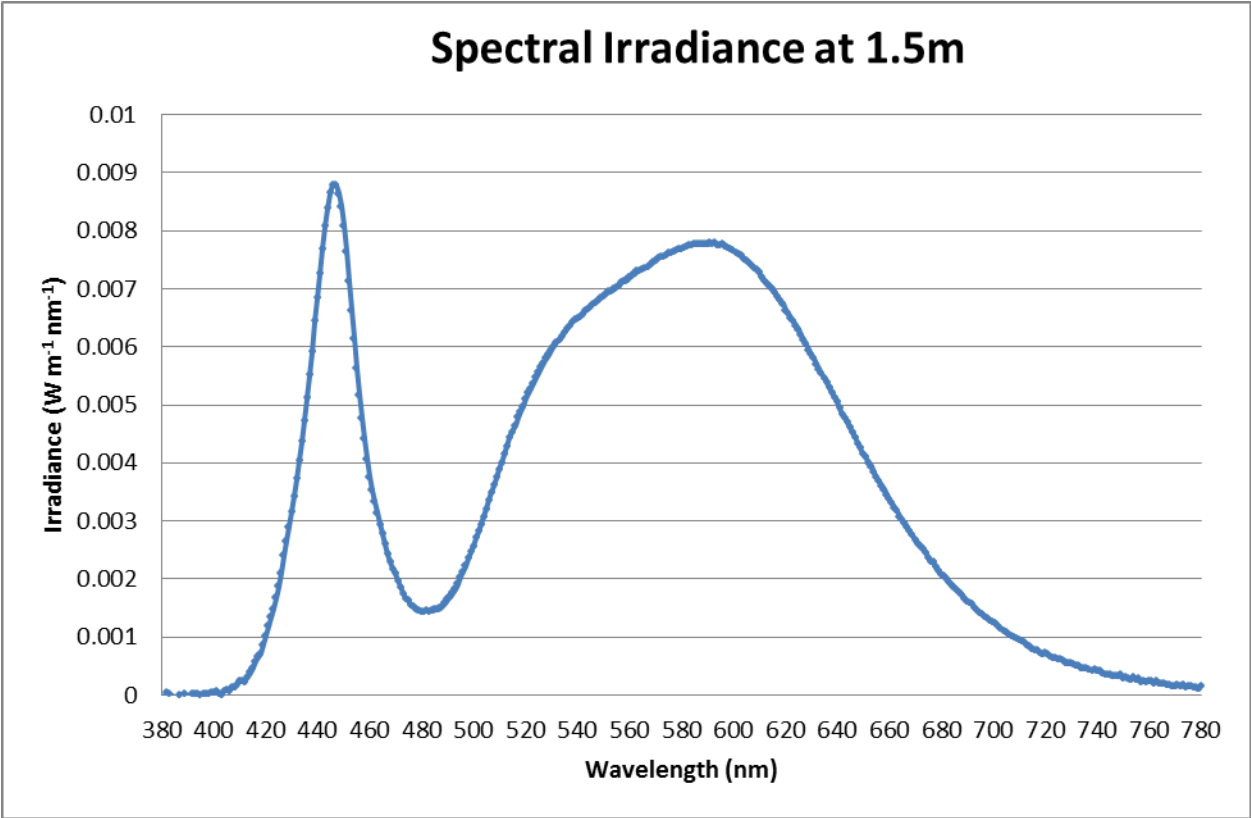


Figure 1: Spectral Irradiance

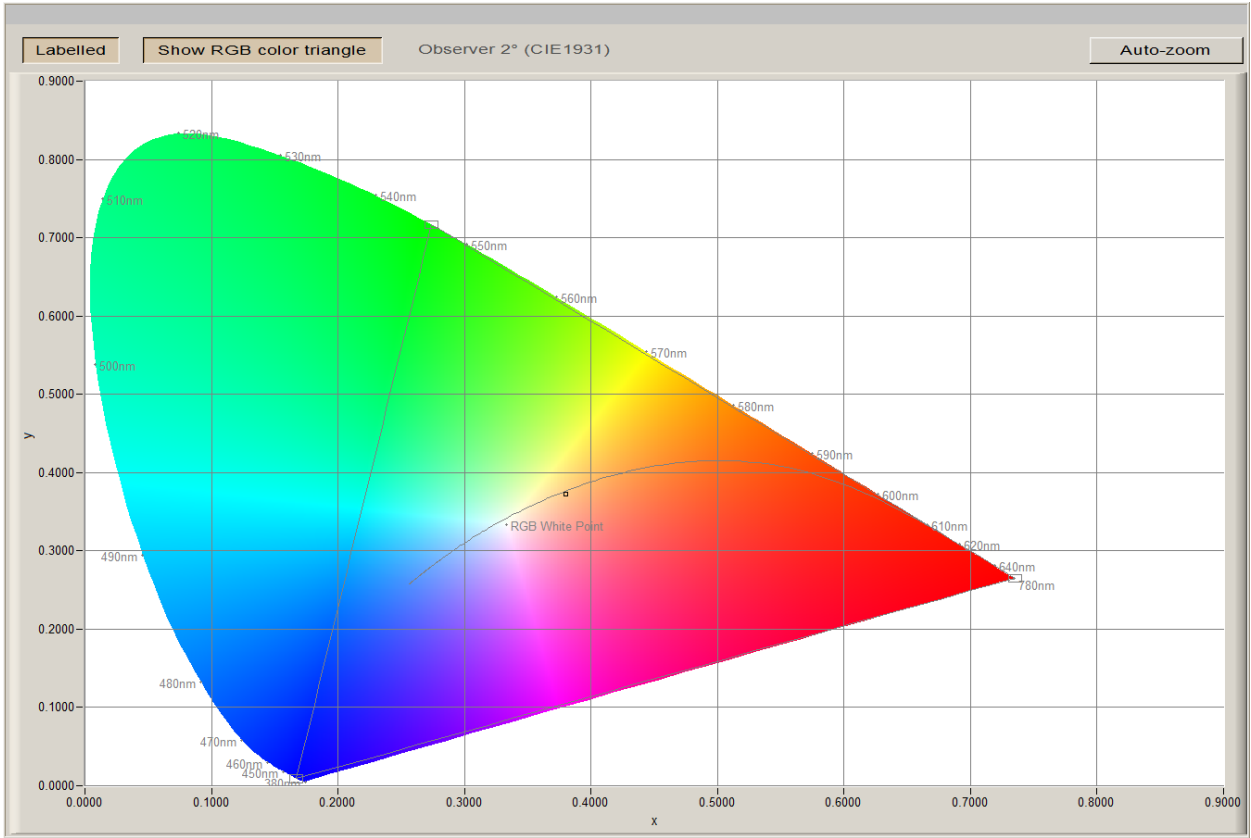


Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 04/01/2018		Ambient Temperature: 25°C
Measurement Filename: WHITE 40 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	21-45°	3°
Inclination Zone 3	50-90°	5°
Azimuth	0-360°	10°
Results		
Integrated Luminous Flux (lumens):253.9	Peak Intensity (3° Spot, candelas): 1116.6	Efficacy (lumens/Watt): 54.1
Beam Angle (50% of max intensity C0-180, degrees): 26.1		
Photometric Filename (IES LM-63-2002): WHITE 40 DEG OPTIC		
IES File – Absolute or Relative Format? Absolute		
Photometric Filename (EULUMDAT): WHITE 40 DEG OPTIC		
EULUMDAT File – Absolute or Relative Format? Absolute		

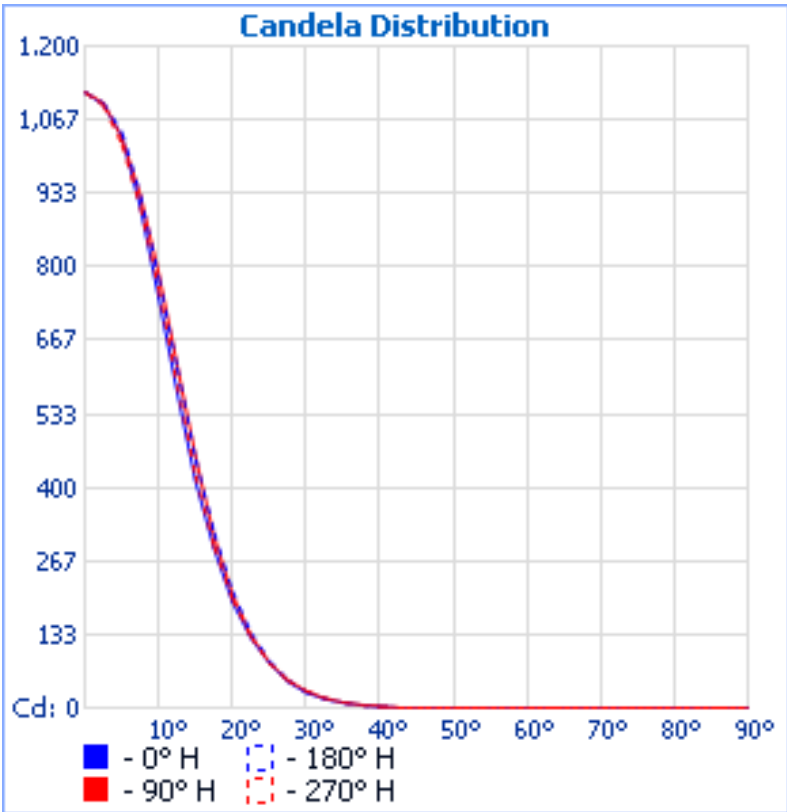


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

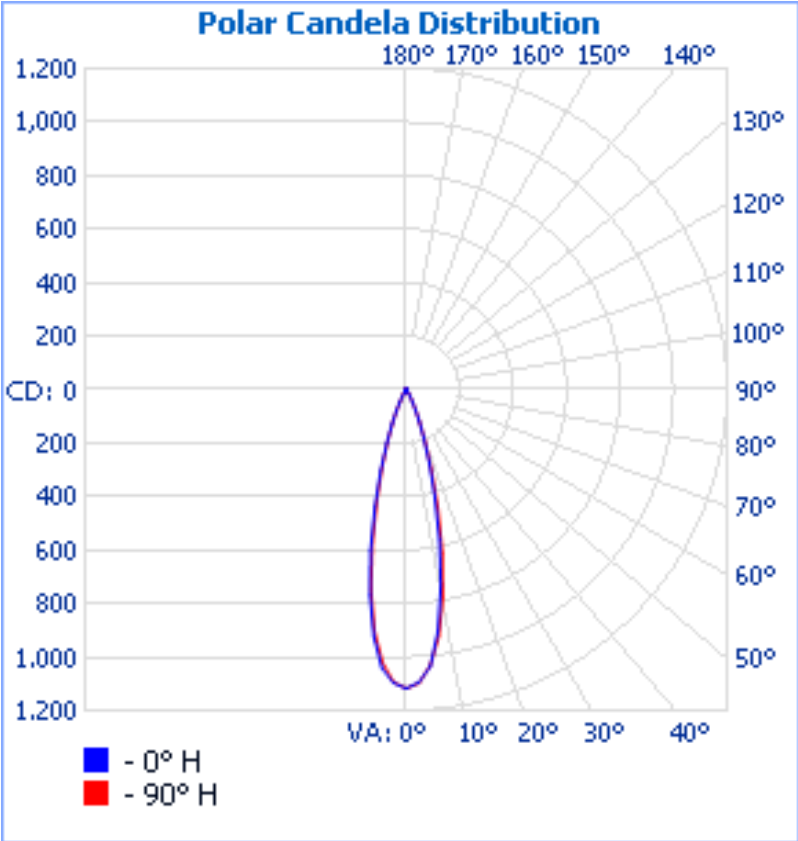


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

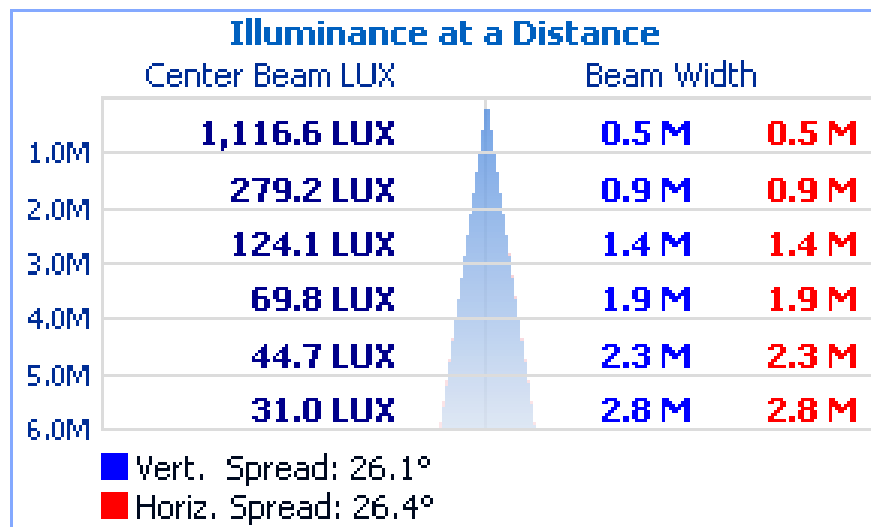


Figure 5. Cone diagram for mounting height of 6 metres.

Reflectance of											
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	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	3H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	4H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	6H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	8H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	12H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
4H	2H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	3H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	4H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	6H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	8H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	12H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
8H	4H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	6H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	8H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	12H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
12H	4H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	6H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	8H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0

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	1117	1117	1117	1117	1117	1117	1117	1117	1117	1117	1117	1117	1117	1117	1117	1117	1117
2.5	1095	1094	1094	1094	1094	1093	1093	1093	1093	1092	1092	1092	1093	1093	1093	1093	1093
5	1046	1038	1031	1029	1028	1027	1025	1024	1023	1022	1022	1023	1023	1024	1026	1033	1040
7.5	923	919	921	918	918	915	913	911	909	907	905	904	905	904	906	902	903
10	775	771	780	776	776	769	764	761	759	754	750	749	751	749	752	739	741
12.5	613	607	608	608	604	600	595	586	586	578	578	575	573	573	572	569	572
15	455	451	444	444	442	438	434	429	422	423	421	416	413	411	409	415	417
17.5	312	311	308	307	307	306	305	300	294	296	295	290	284	281	281	286	285
20	206	204	206	205	205	206	207	203	198	199	199	194	189	187	189	189	190
22.5	135	130	127	129	131	132	135	133	130	129	128	123	121	120	118	122	126
25	84	81	81	82	82	83	84	84	82	81	78	76	76	76	77	79	81
27.5	51	49	49	50	50	52	53	52	50	49	48	47	46	47	48	49	50
30	29	29	29	30	30	32	32	32	31	30	29	28	28	28	29	29	29
32.5	16	16	17	18	18	19	19	19	18	18	17	17	16	16	17	17	17
35	9	9	9	10	11	11	11	11	10	10	10	10	9	9	9	9	10
37.5	5	4	4	5	6	6	6	5	5	5	5	5	5	4	4	5	5
40	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2
42.5	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67.5	0	0	0	0	0	0	0	0	0	0	0	0	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	25.5	9.80%
05-10	64	24.60%
10-15	70	26.90%
15-20	50.6	19.50%
20-25	28.4	10.90%
25-30	13.4	5.10%
30-35	5.5	2.10%
35-40	1.9	0.70%
40-45	0.4	0.20%
45-50	0.1	0.00%
50-55	0	0.00%
55-60	0	0.00%
60-65	0	0.00%
65-70	0	0.00%
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	1.13	1.11	1.09	1.13	1.11	1.09	0.97	1.07	1.06	1.04	1.03	1.02	1.01	1	0.99	0.98	0.97
2	1.11	1.08	1.05	1.02	1.09	1.06	1.04	0.94	1.03	1.01	0.99	1	0.98	0.97	0.98	0.96	0.95	0.94
3	1.08	1.03	1	0.97	1.06	1.02	0.99	0.91	1	0.97	0.95	0.97	0.95	0.93	0.95	0.93	0.92	0.91
4	1.05	0.99	0.95	0.92	1.03	0.98	0.95	0.88	0.96	0.93	0.91	0.94	0.92	0.9	0.93	0.91	0.89	0.88
5	1.02	0.96	0.92	0.89	1	0.95	0.91	0.86	0.93	0.9	0.88	0.92	0.89	0.87	0.9	0.88	0.86	0.85
6	0.99	0.93	0.88	0.85	0.97	0.92	0.88	0.83	0.91	0.87	0.85	0.89	0.86	0.84	0.88	0.86	0.84	0.83
7	0.96	0.9	0.85	0.83	0.95	0.89	0.85	0.81	0.88	0.84	0.82	0.87	0.84	0.82	0.86	0.83	0.81	0.8
8	0.93	0.87	0.83	0.8	0.92	0.86	0.83	0.79	0.85	0.82	0.8	0.85	0.82	0.79	0.84	0.81	0.79	0.78
9	0.91	0.84	0.8	0.78	0.9	0.84	0.8	0.77	0.83	0.8	0.77	0.82	0.79	0.77	0.82	0.79	0.77	0.76
10	0.89	0.82	0.78	0.75	0.88	0.82	0.78	0.75	0.81	0.78	0.75	0.8	0.77	0.75	0.8	0.77	0.75	0.74

Table 4. Utilisation Factor Table

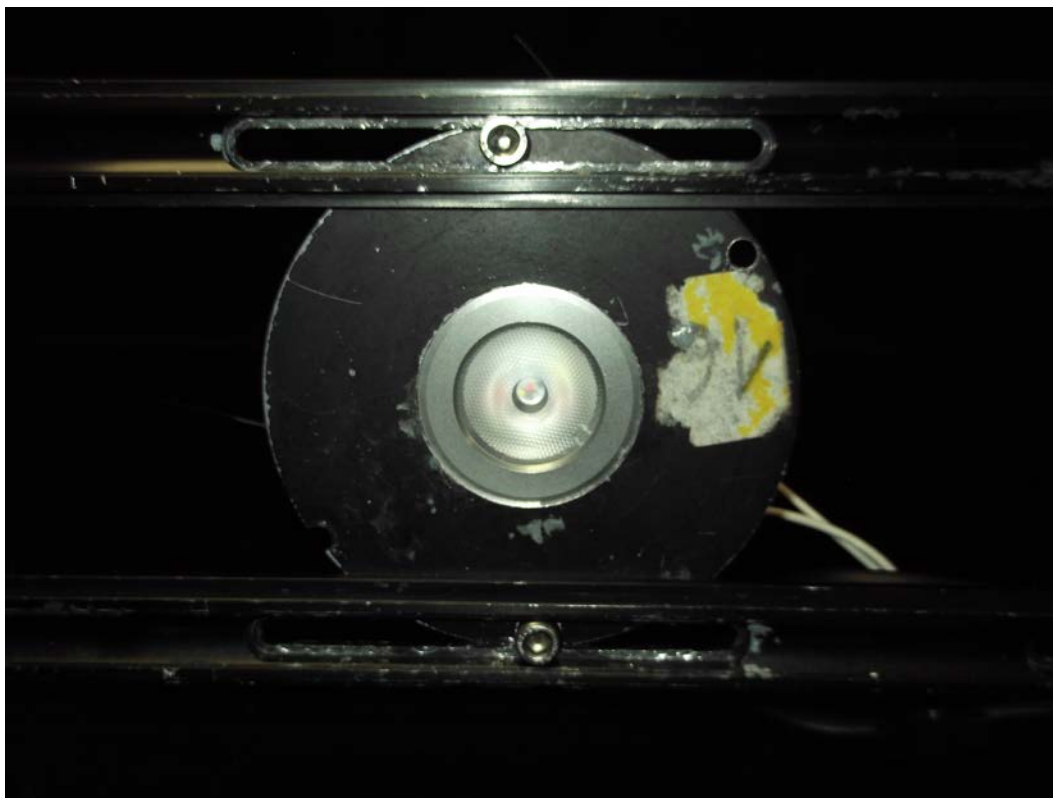


Photo 1: Luminaire on goniometer mount

Signature:

Print Name:

D CHAMBERS

Date:

16/01/2018

Technical Manager

Duly authorised to sign on behalf of:

Photometric and Optical Testing Services LLP