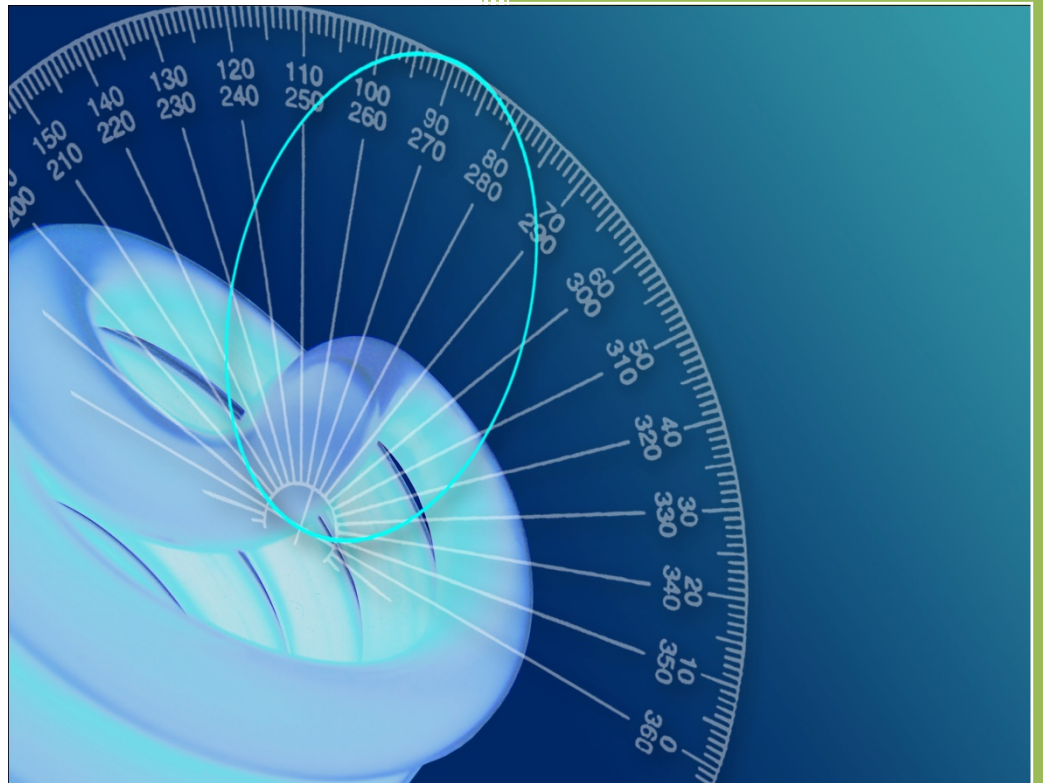


Photometric Test Report



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/DC18020	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: RGB 15 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: RGB 15 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): 164.8	
CIE 1931 Chromaticity Cx: 0.2710	CIE 1931 Chromaticity Cy: 0.2527
CRI (%): 63.10	CCT (K): 16370

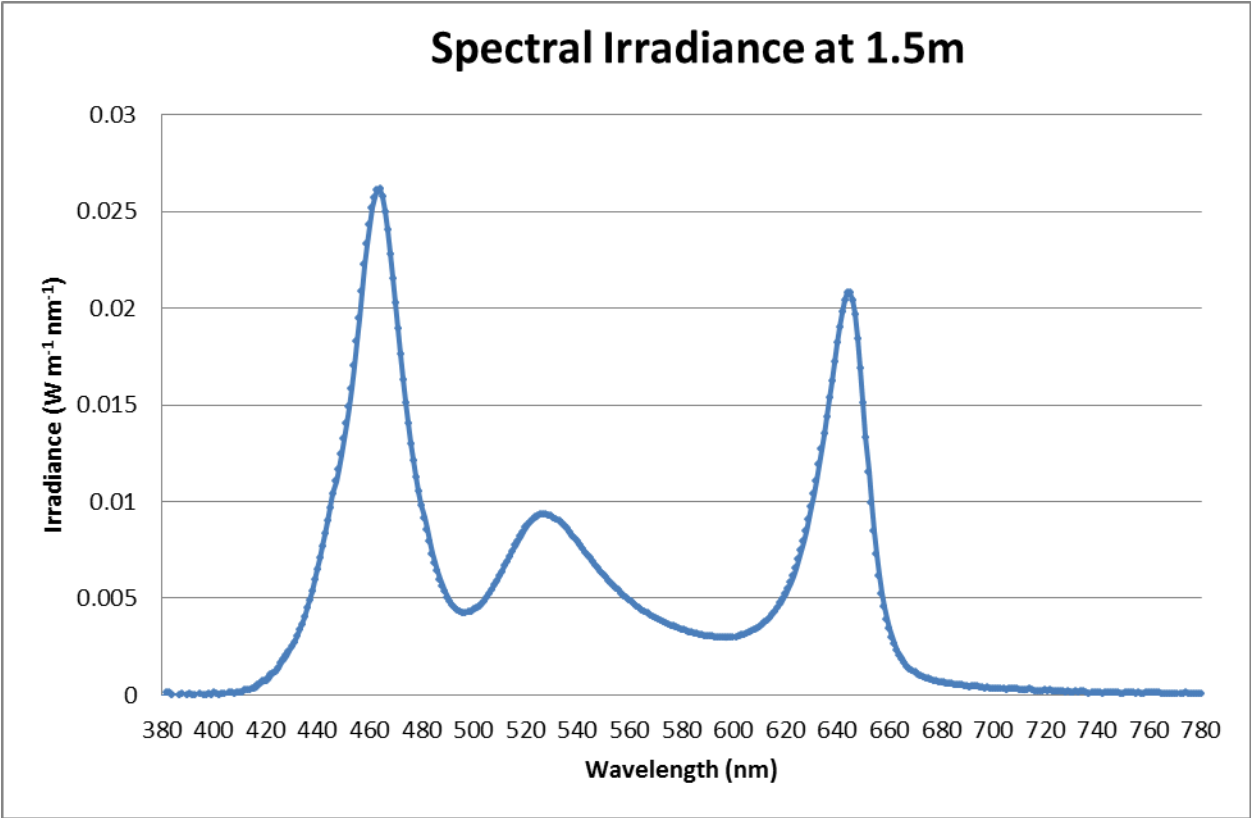


Figure 1: Spectral Irradiance

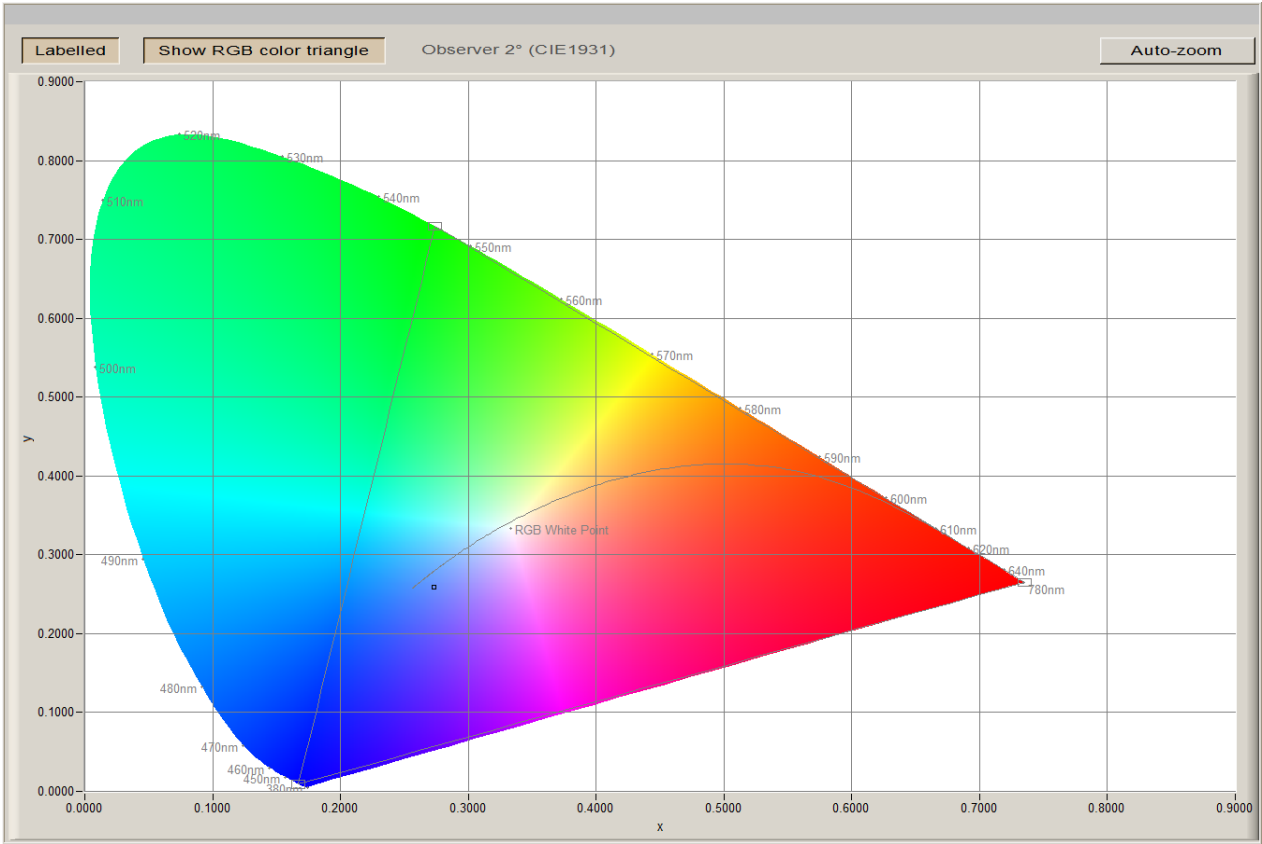


Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 05/01/2018		Ambient Temperature: 25°C
Measurement Filename: RGB 15 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	0-40°	2°
Inclination Zone 2	45-90°	5°
Azimuth	0-360°	10°
Results		
Integrated Luminous Flux (lumens):164.8	Peak Intensity (3° Spot, candelas): 1099.7	Efficacy (lumens/Watt): 35.1
Beam Angle (50% of max intensity C0-180, degrees): 19.9		
Photometric Filename (IES LM-63-2002): RGB 15 DEG OPTIC		
IES File – Absolute or Relative Format? Absolute		
Photometric Filename (EULUMDAT): RGB 15 DEG OPTIC		
EULUMDAT File – Absolute or Relative Format? Absolute		

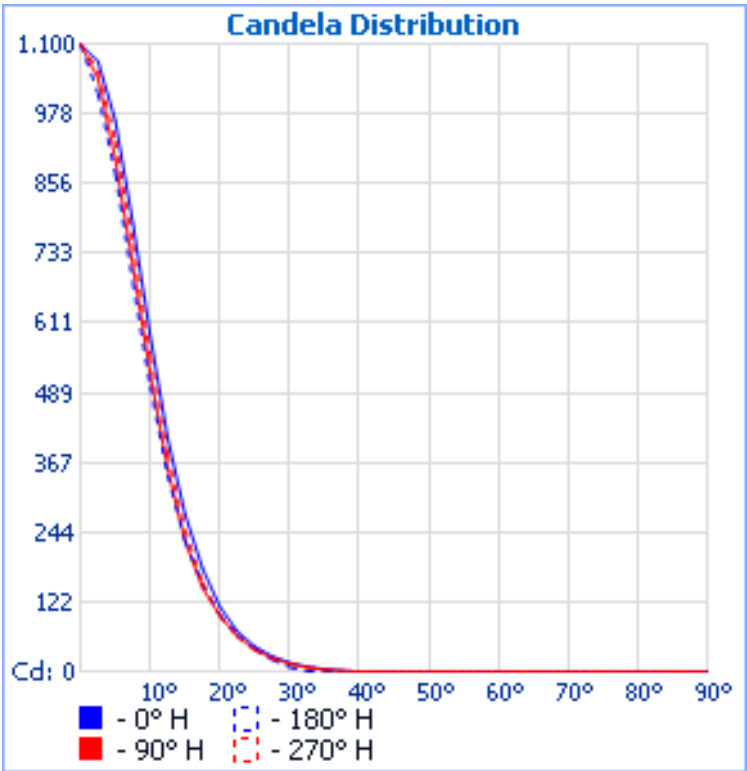


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

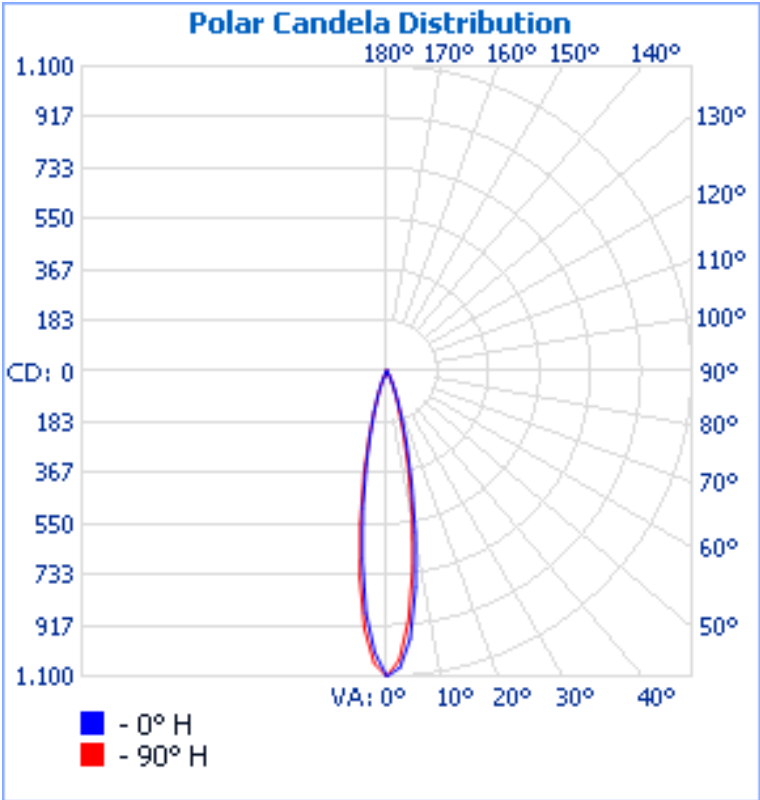


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

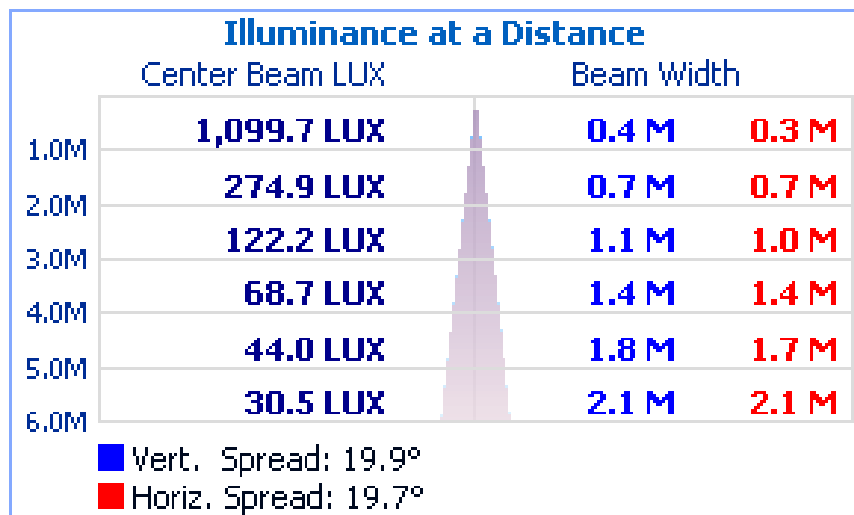


Figure 5. Cone diagram for mounting height of 6 metres.

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
4H	12H	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
	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	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	<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	12H	<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

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	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100
2.5	1027	1020	1022	1028	1032	1035	1042	1049	1054	1057	1060	1063	1068	1070	1072	1074	1078
5	879	873	880	884	892	903	911	920	931	938	945	952	956	959	964	964	971
7.5	687	687	699	703	709	720	731	738	750	758	770	778	786	792	798	792	793
10	497	507	514	515	519	525	529	540	554	560	568	583	592	598	604	600	590
12.5	347	347	343	351	352	357	366	368	382	384	398	403	408	416	411	418	416
15	227	230	227	228	230	235	239	238	249	248	261	266	268	271	273	276	270
17.5	153	149	149	145	149	149	152	156	157	163	165	168	172	172	177	175	178
20	99	95	95	93	93	95	97	97	97	101	105	105	106	108	110	108	110
22.5	64	62	60	59	58	59	60	61	62	63	64	65	65	67	67	69	70
25	39	39	39	37	37	37	37	38	39	39	40	40	41	42	43	45	45
27.5	21	22	24	23	22	23	22	23	24	24	24	25	25	25	28	27	28
30	7	9	12	13	13	13	13	14	14	14	14	14	14	15	15	16	16
32.5	1	3	6	7	7	7	7	7	8	8	8	8	8	8	9	9	9
35	0	0	2	3	3	3	3	4	3	4	4	4	4	4	4	5	5
37.5	0	0	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2
40	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
42.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	23.7	14.10%
05-10	50.6	30.00%
10-15	44.2	26.30%
15-20	27	16.00%
20-25	13.9	8.20%
25-30	6.3	3.80%
30-35	2.2	1.30%
35-40	0.5	0.30%
40-45	0.1	0.00%
45-50	0	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	1.12	1.1	1.13	1.11	1.1	0.98	1.07	1.06	1.05	1.04	1.03	1.02	1	1	0.99	0.97
2	1.12	1.09	1.06	1.04	1.1	1.07	1.05	0.95	1.04	1.02	1	1.01	1	0.98	0.98	0.97	0.96	0.95
3	1.09	1.05	1.01	0.99	1.07	1.03	1	0.93	1.01	0.98	0.96	0.99	0.97	0.95	0.97	0.95	0.94	0.92
4	1.06	1.01	0.97	0.95	1.04	1	0.97	0.91	0.98	0.95	0.93	0.96	0.94	0.92	0.95	0.93	0.91	0.9
5	1.03	0.98	0.94	0.91	1.02	0.97	0.94	0.89	0.96	0.93	0.9	0.94	0.92	0.9	0.93	0.91	0.89	0.88
6	1.01	0.95	0.91	0.89	1	0.94	0.91	0.87	0.93	0.9	0.88	0.92	0.89	0.87	0.91	0.89	0.87	0.86
7	0.98	0.93	0.89	0.86	0.97	0.92	0.88	0.85	0.91	0.88	0.86	0.9	0.87	0.85	0.89	0.87	0.85	0.84
8	0.96	0.9	0.86	0.84	0.95	0.9	0.86	0.83	0.89	0.86	0.83	0.88	0.85	0.83	0.87	0.85	0.83	0.82
9	0.94	0.88	0.84	0.82	0.93	0.88	0.84	0.81	0.87	0.84	0.82	0.86	0.83	0.81	0.85	0.83	0.81	0.8
10	0.92	0.86	0.82	0.8	0.91	0.86	0.82	0.79	0.85	0.82	0.8	0.84	0.82	0.8	0.84	0.81	0.79	0.79

Table 4. Utilisation Factor Table

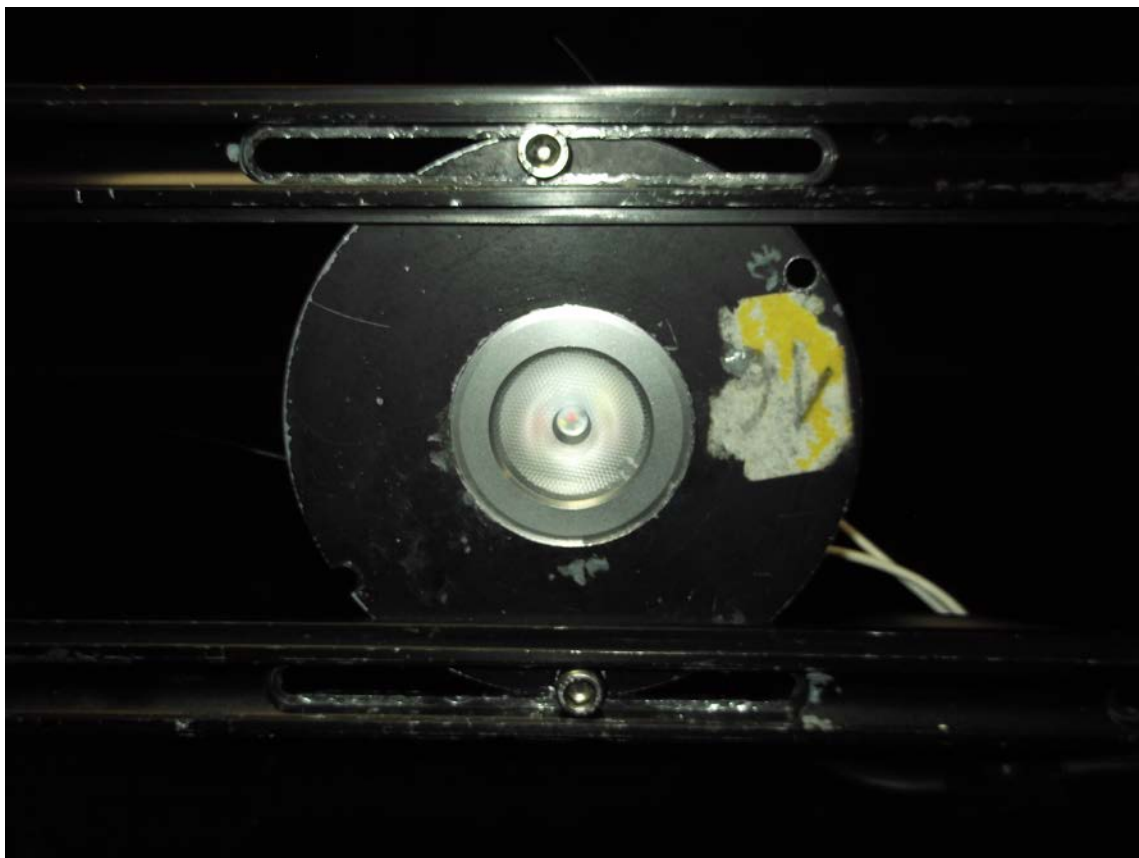


Photo 1: Luminaire on goniometer mount

Signature:

Print Name:

D CHAMBERS

Date:

16/01/2018

Technical Manager

Duly authorised to sign on behalf of:

Photometric and Optical Testing Services LLP