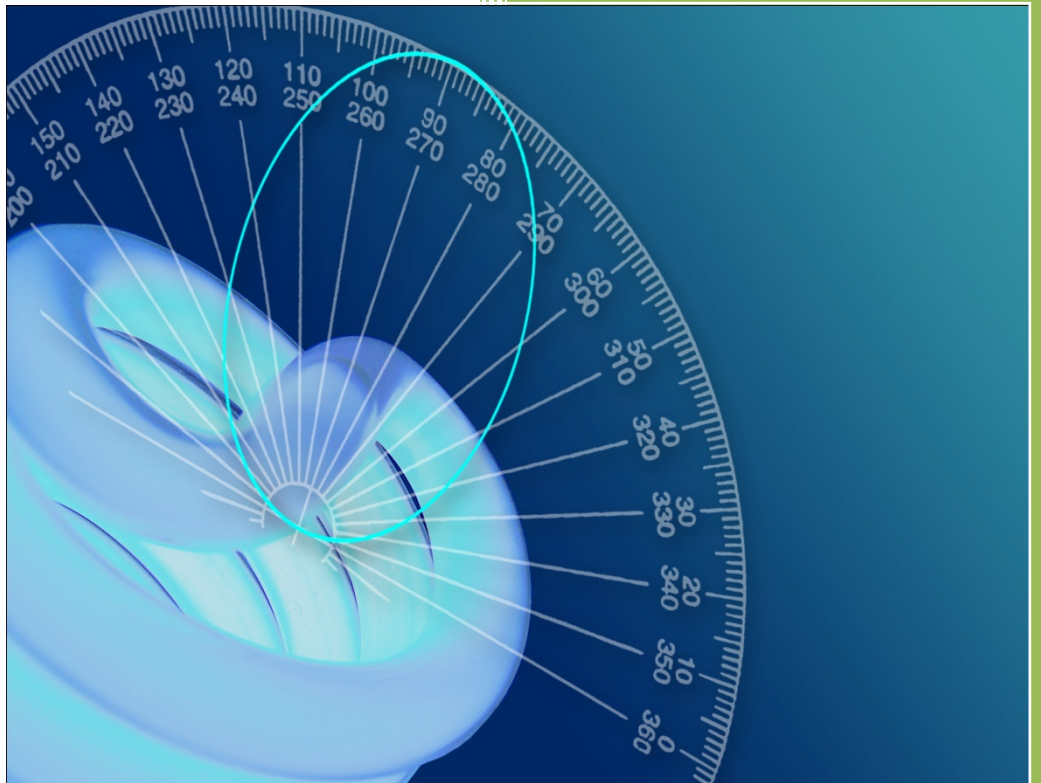


Photometric Test Report



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/DC18017	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 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: RGB 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): 167.6	
CIE 1931 Chromaticity Cx: 0.2708	CIE 1931 Chromaticity Cy: 0.2521
CRI (%): 62.82	CCT (K): 16608

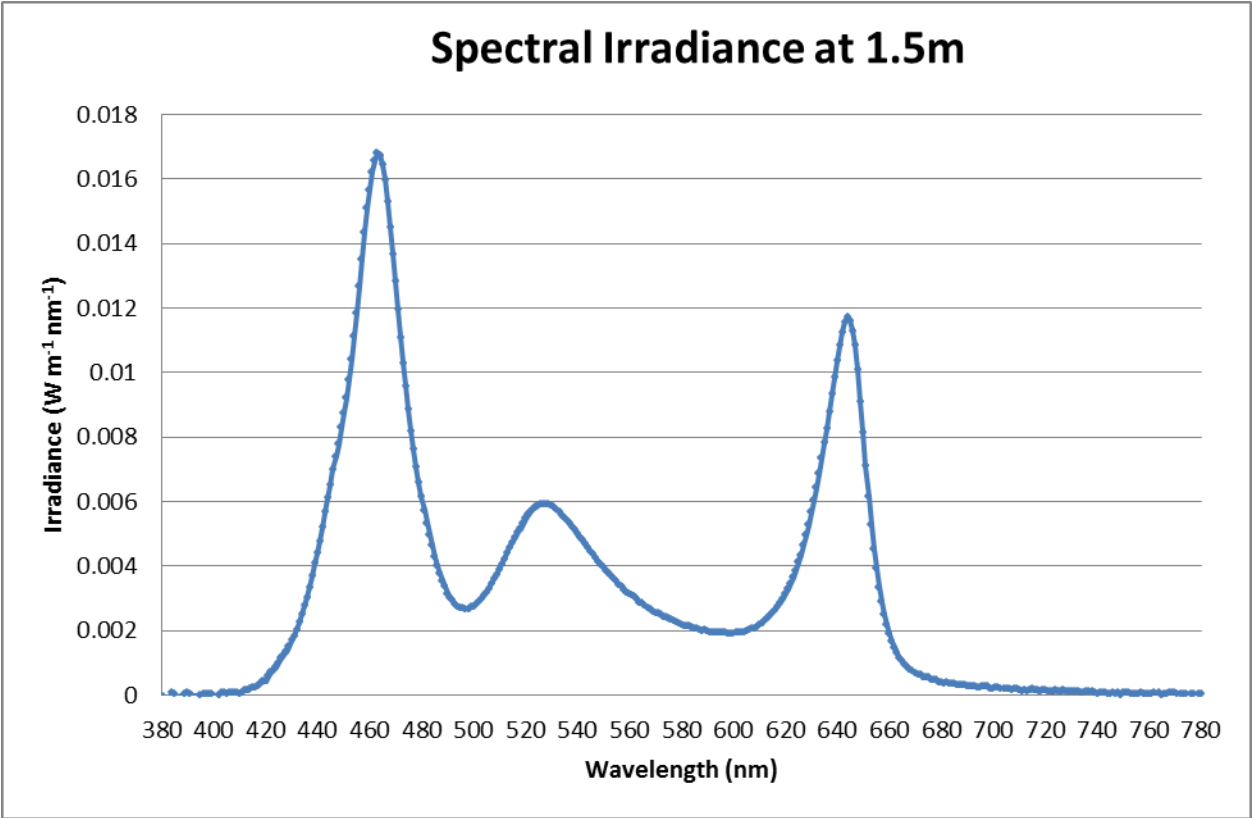


Figure 1: Spectral Irradiance

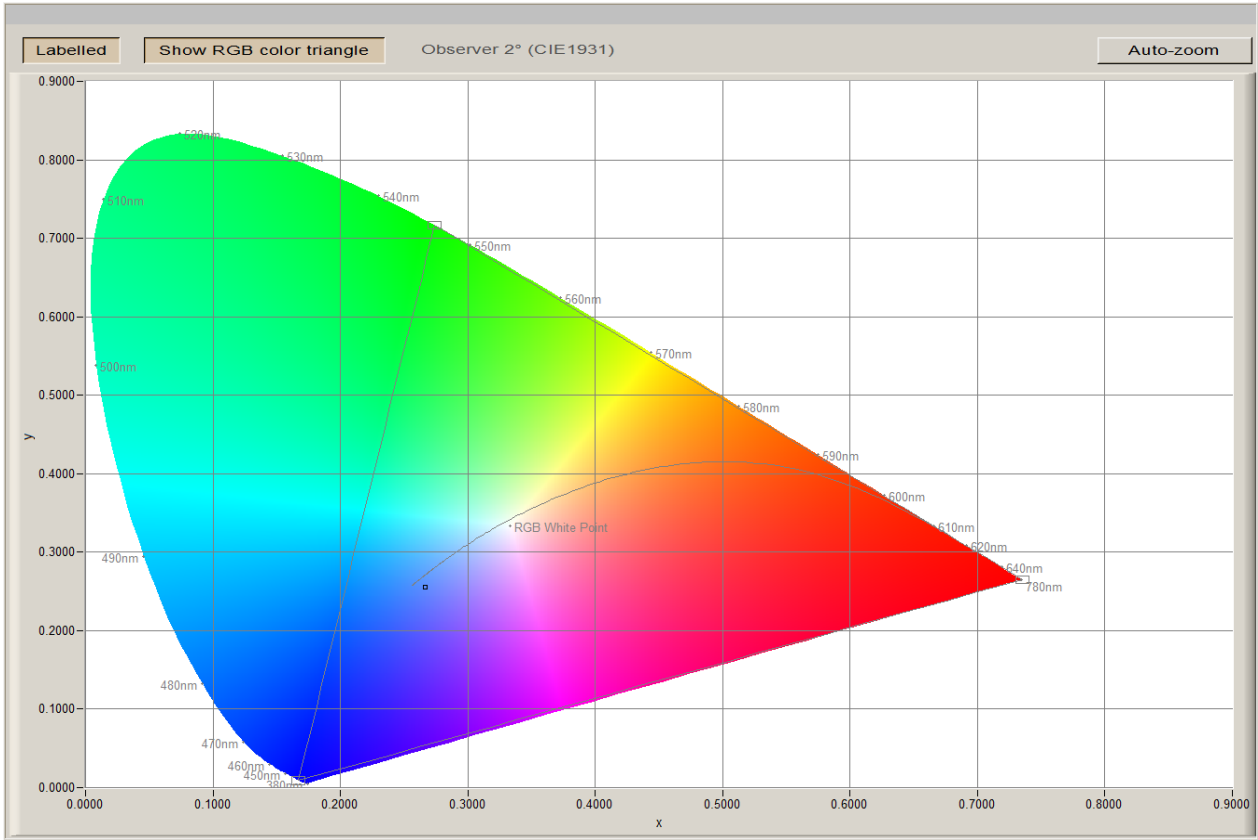


Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 12/01/2018		Ambient Temperature: 25°C
Measurement Filename: RGB 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	0-40°	2°
Inclination Zone 2	45-90°	5°
Azimuth	0-360°	10°
Results		
Integrated Luminous Flux (lumens):167.6	Peak Intensity (3° Spot, candelas): 694.7	Efficacy (lumens/Watt): 35.7
Beam Angle (50% of max intensity C0-180, degrees): 27.4		
Photometric Filename (IES LM-63-2002): RGB 40 DEG OPTIC		
IES File – Absolute or Relative Format? Absolute		
Photometric Filename (EULUMDAT): RGB 40 DEG OPTIC		
EULUMDAT File – Absolute or Relative Format? Absolute		

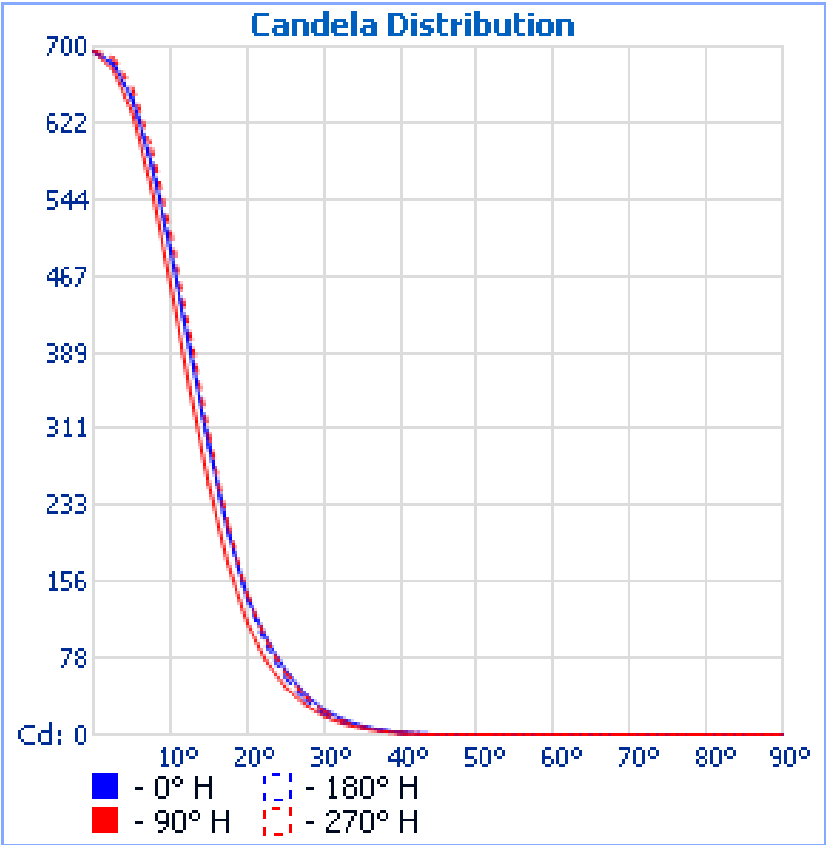


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

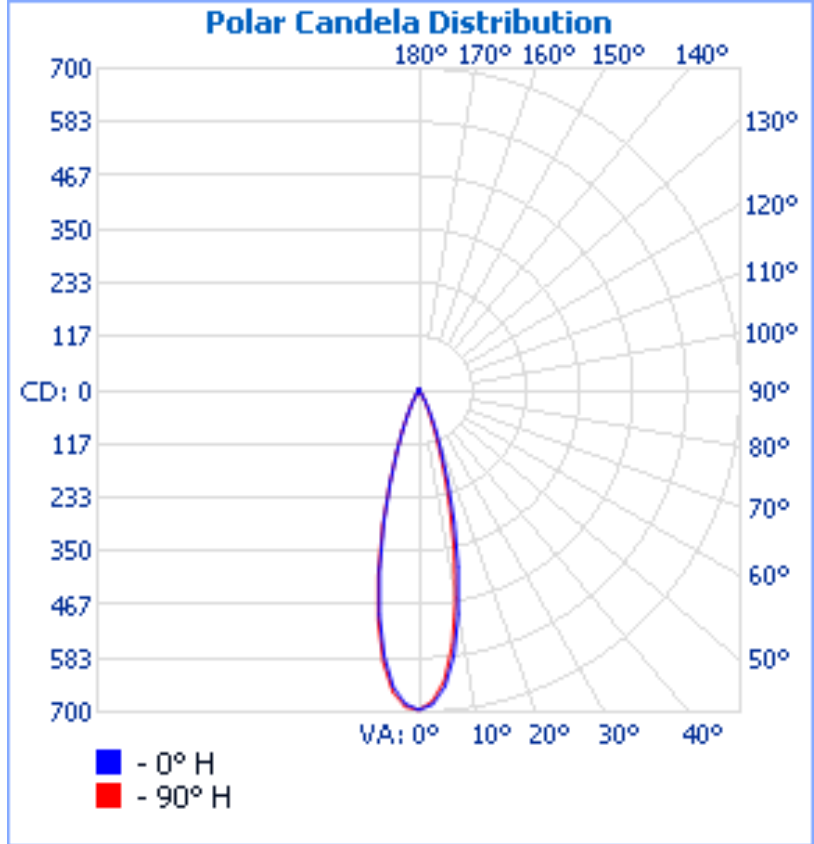


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

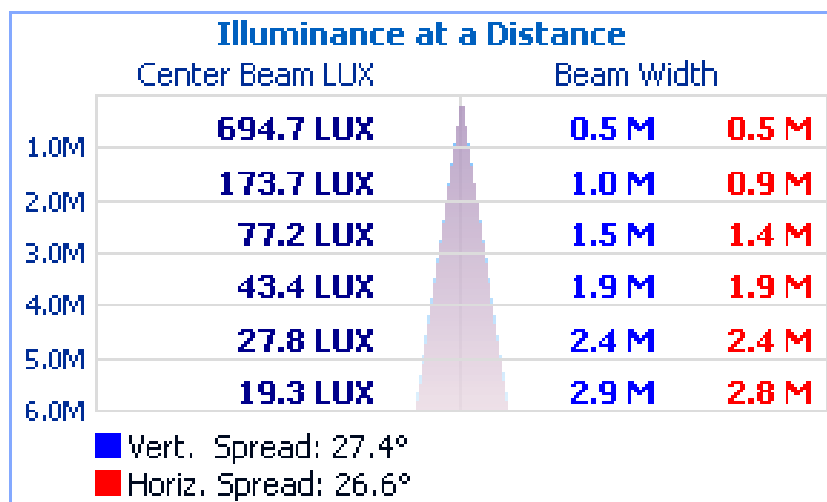


Figure 5. Cone diagram for mounting height of 6 metres.

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	695	695	695	695	695	695	695	695	695	695	695	695	695	695	695	695	695
2.5	684	684	688	687	687	689	689	689	689	688	688	688	686	686	687	684	684
5	649	656	654	659	660	660	662	659	658	657	658	655	655	654	650	654	648
7.5	586	594	598	601	604	604	602	598	597	595	595	595	593	590	589	587	582
10	497	507	519	519	516	517	514	511	511	507	506	505	502	504	505	497	490
12.5	400	409	405	416	412	412	413	409	410	404	404	399	397	399	389	396	392
15	297	309	310	309	313	310	311	306	306	300	301	297	298	293	294	296	289
17.5	220	218	226	219	221	223	220	221	214	214	208	209	207	205	212	206	214
20	149	146	147	149	150	151	147	148	144	142	137	140	138	139	138	138	145
22.5	97	100	100	102	101	102	101	99	97	96	95	95	94	95	95	96	96
25	61	63	66	66	66	65	64	64	63	64	63	62	63	63	64	63	65
27.5	38	39	41	41	41	41	40	40	40	41	41	41	40	40	41	41	43
30	23	24	24	25	23	24	23	24	24	25	25	25	24	25	26	26	27
32.5	14	14	15	15	15	14	14	14	14	14	14	15	15	15	16	16	16
35	8	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9
37.5	4	5	4	4	5	5	5	4	4	4	4	4	5	5	5	5	5
40	2	2	2	2	2	2	2	2	2	1	1	2	2	3	3	3	2
42.5	1	1	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	16	9.40%
05-10	40.4	23.70%
10-15	45	26.40%
15-20	33.3	19.60%
20-25	19.5	11.40%
25-30	9.9	5.80%
30-35	4.3	2.50%
35-40	1.6	0.90%
40-45	0.4	0.20%
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	1.11	1.09	1.13	1.11	1.09	0.97	1.07	1.05	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	1.03	0.94	1.03	1.01	0.99	1	0.98	0.97	0.97	0.96	0.95	0.93
3	1.08	1.03	0.99	0.97	1.06	1.02	0.98	0.91	0.99	0.97	0.94	0.97	0.95	0.93	0.95	0.93	0.92	0.9
4	1.04	0.99	0.95	0.92	1.03	0.98	0.94	0.88	0.96	0.93	0.9	0.94	0.92	0.89	0.92	0.9	0.88	0.87
5	1.01	0.95	0.91	0.88	1	0.94	0.91	0.85	0.93	0.9	0.87	0.91	0.89	0.86	0.9	0.88	0.86	0.85
6	0.98	0.92	0.88	0.85	0.97	0.91	0.87	0.83	0.9	0.87	0.84	0.89	0.86	0.83	0.88	0.85	0.83	0.82
7	0.95	0.89	0.85	0.82	0.94	0.88	0.84	0.8	0.87	0.84	0.81	0.86	0.83	0.81	0.85	0.83	0.8	0.79
8	0.93	0.86	0.82	0.79	0.92	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
9	0.9	0.84	0.79	0.77	0.89	0.83	0.79	0.76	0.82	0.79	0.76	0.82	0.78	0.76	0.81	0.78	0.76	0.75
10	0.88	0.81	0.77	0.74	0.87	0.81	0.77	0.74	0.8	0.77	0.74	0.79	0.76	0.74	0.79	0.76	0.74	0.73

Table 4. Utilisation Factor Table

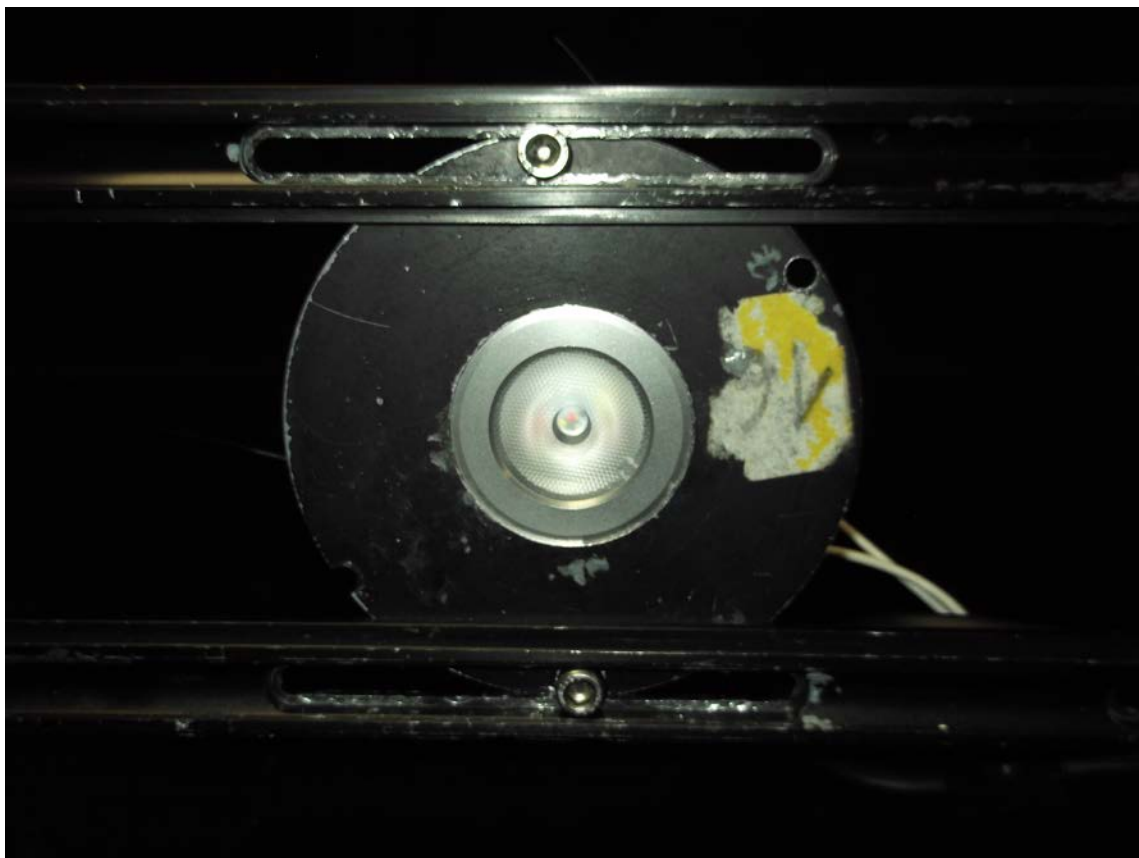


Photo 1: Luminaire on goniometer mount

Signature:

Print Name:

D CHAMBERS

Date:

16/01/2018

Technical Manager

Duly authorised to sign on behalf of:

Photometric and Optical Testing Services LLP