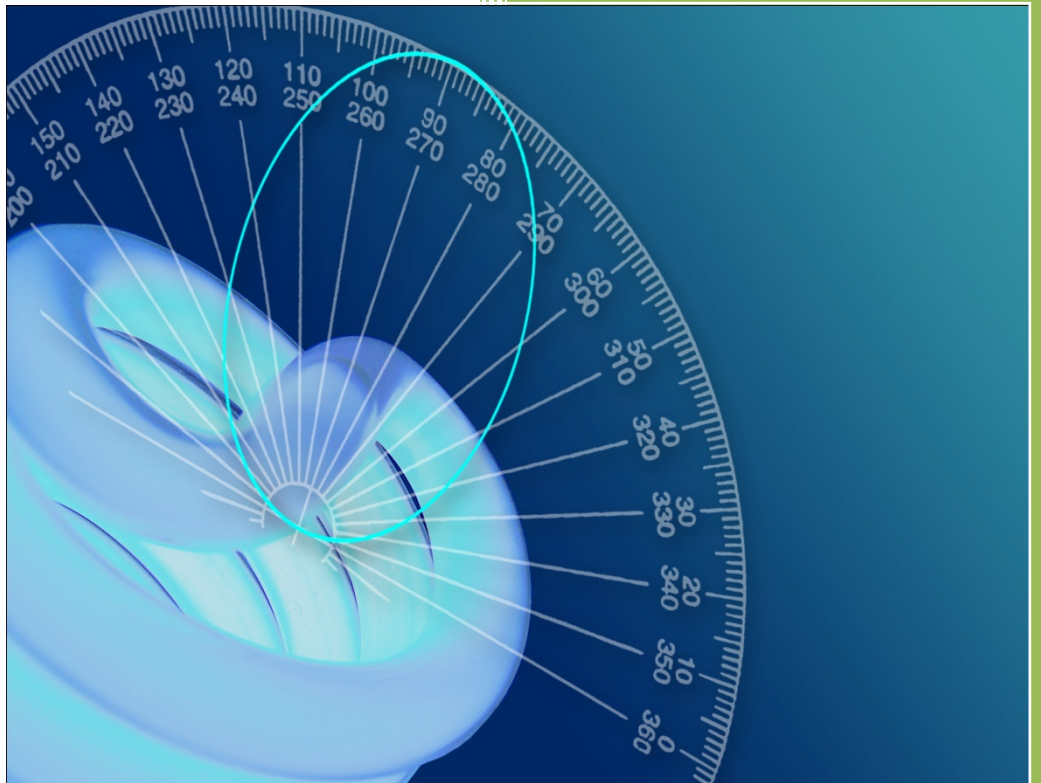


Photometric Test Report



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/DC18019	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 15/30 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_30 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): 161.3	
CIE 1931 Chromaticity Cx: 0.2713	CIE 1931 Chromaticity Cy: 0.2529
CRI (%): 62.61	CCT (K): 16248

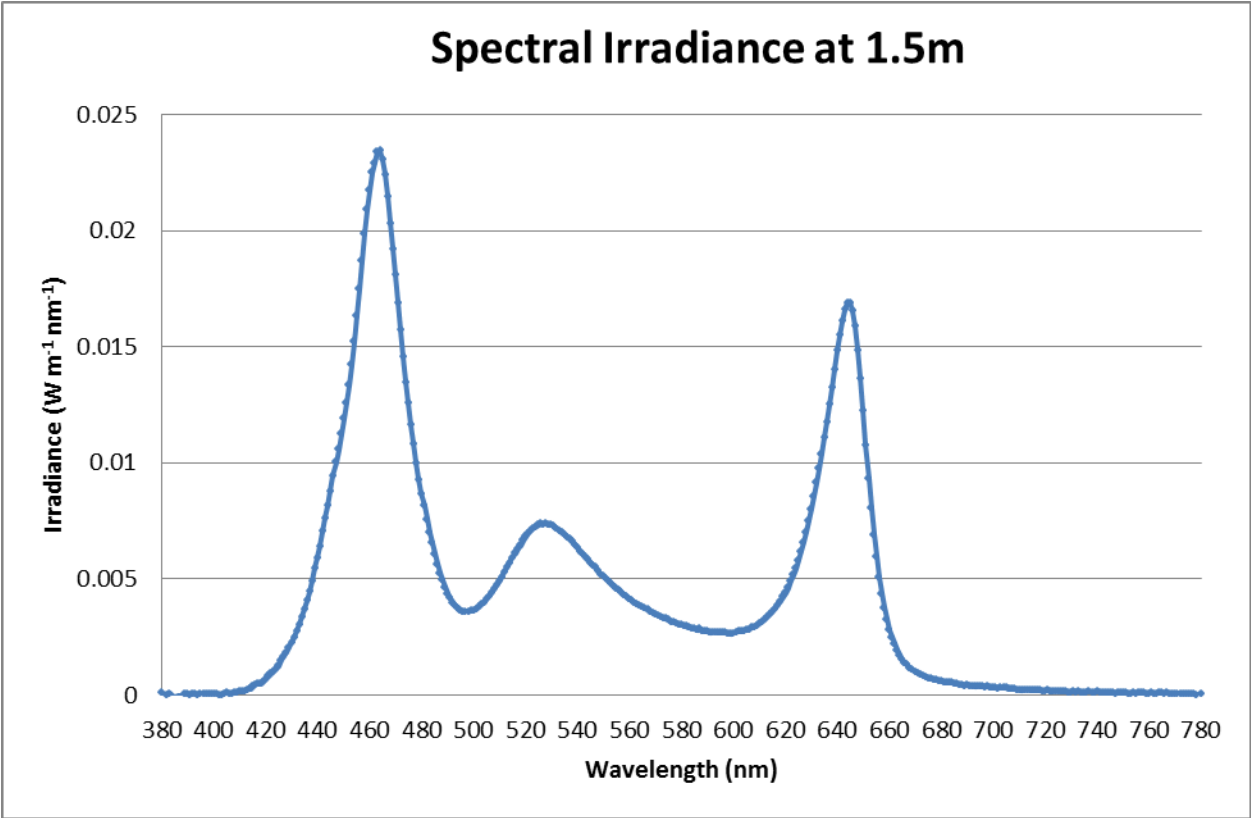


Figure 1: Spectral Irradiance

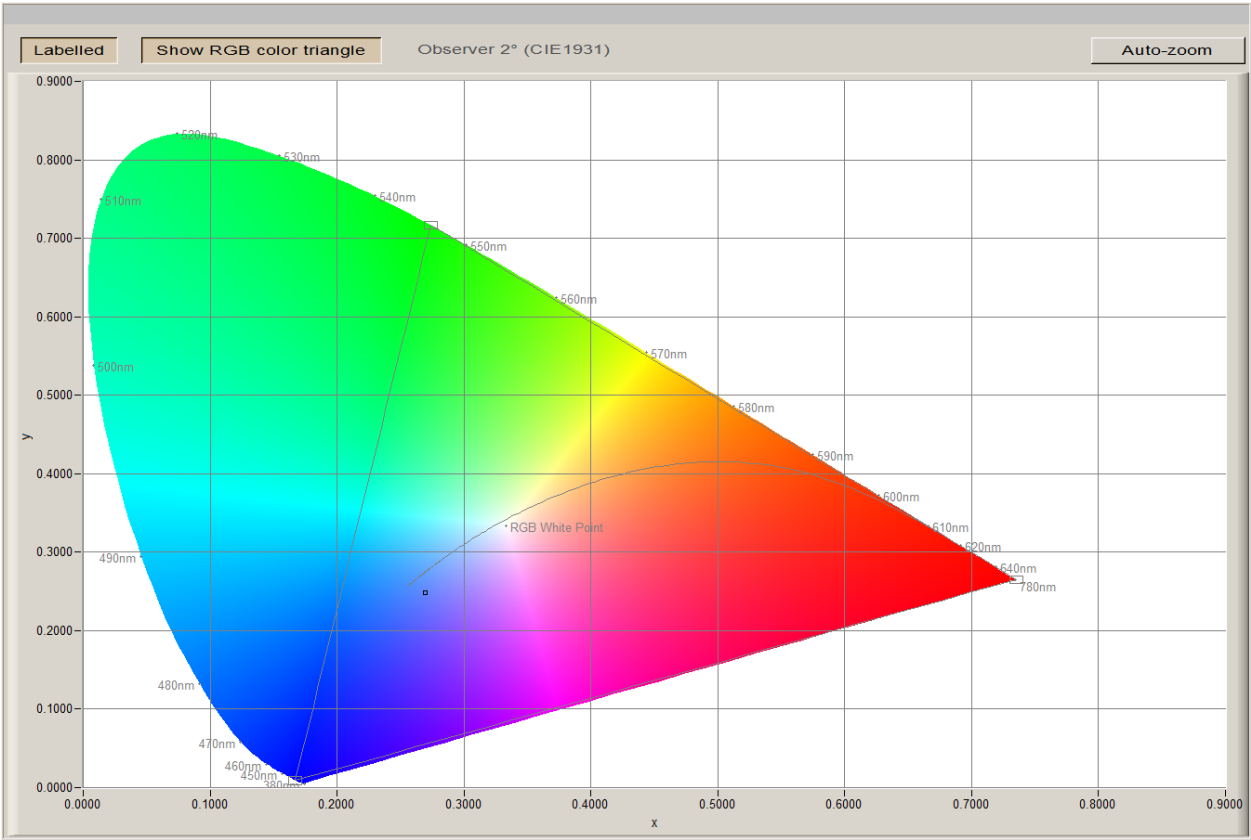


Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 05/01/2018		Ambient Temperature: 25°C
Measurement Filename: RGB 15_30 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):161.3	Peak Intensity (3° Spot, candelas): 884.4	Efficacy (lumens/Watt): 34.3
Beam Angle (50% of max intensity C0-180, degrees): 19.3		
Photometric Filename (IES LM-63-2002): RGB 15_30 DEG OPTIC		
IES File – Absolute or Relative Format? Absolute		
Photometric Filename (EULUMDAT): RGB 15_30 DEG OPTIC		
EULUMDAT File – Absolute or Relative Format? Absolute		

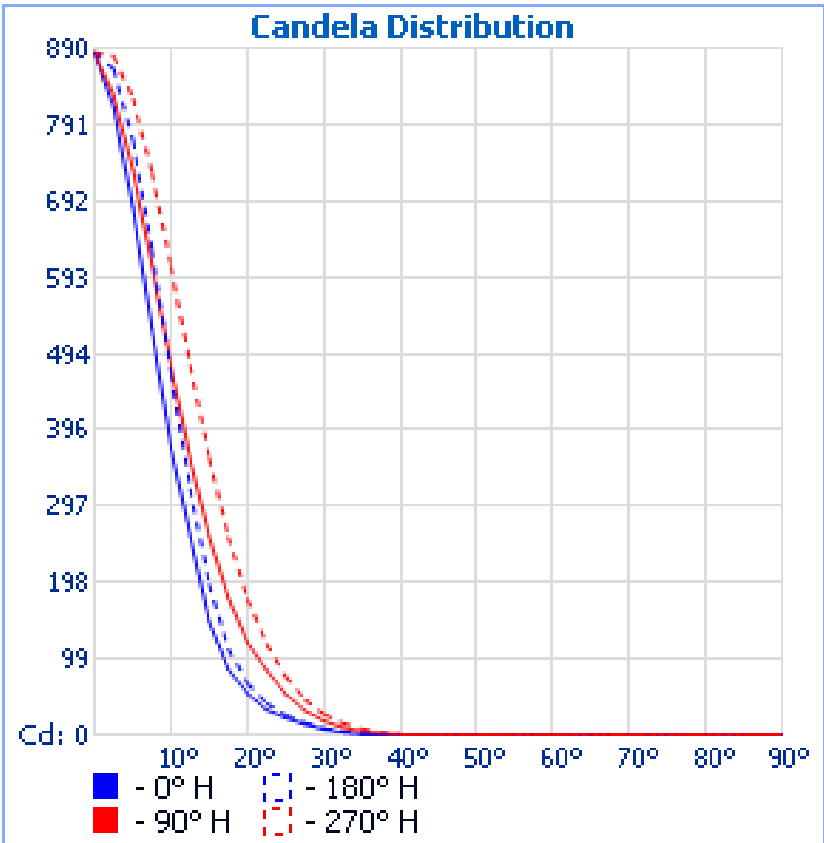


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

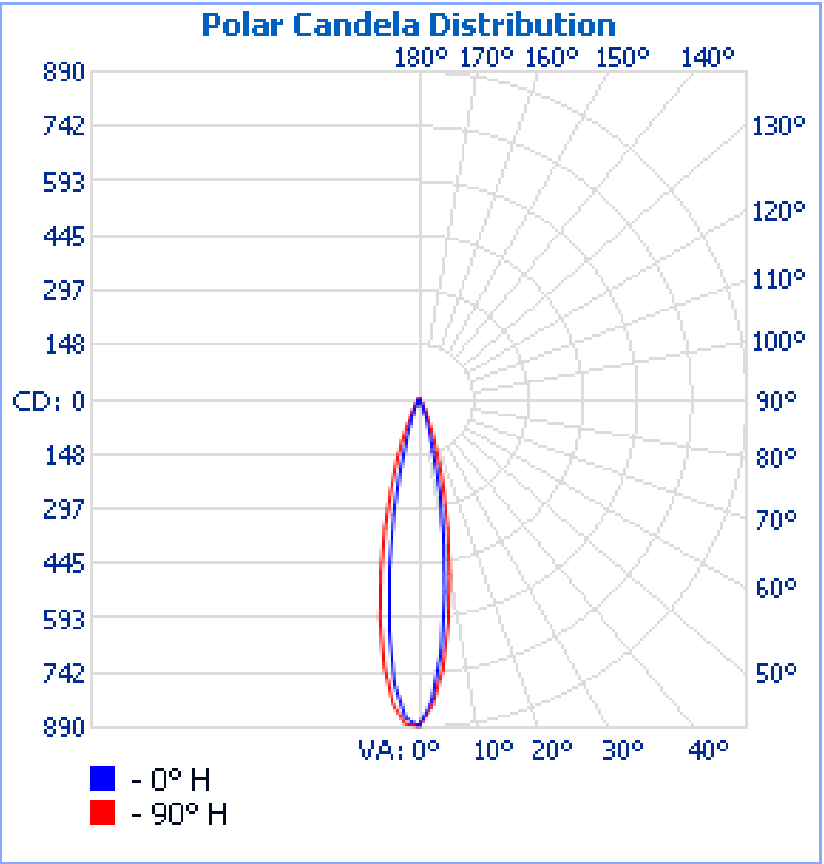


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

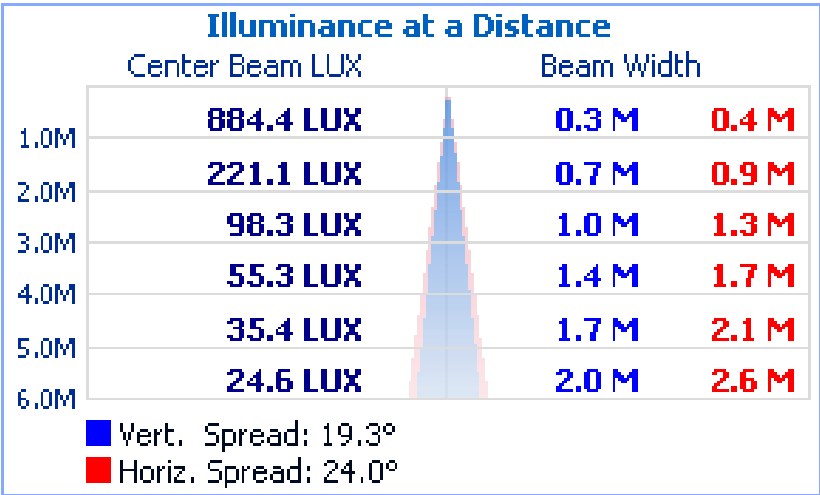


Figure 5. Cone diagram for mounting height of 6 metres.

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	<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	884	884	884	884	884	884	884	884	884	884	884	884	884	884	884	884	884
2.5	861	858	867	863	865	871	875	877	880	879	877	872	861	854	851	828	822
5	757	763	745	757	770	779	800	811	826	834	837	827	816	788	758	742	704
7.5	602	593	587	591	612	637	670	698	729	750	764	760	741	704	663	615	563
10	429	414	418	420	432	468	509	558	608	645	671	674	648	610	558	484	413
12.5	278	261	242	261	277	313	362	416	480	529	567	573	544	496	419	362	297
15	150	139	130	141	158	184	241	297	360	411	457	463	440	380	317	253	199
17.5	94	81	84	84	94	112	142	205	258	312	345	355	328	277	231	175	130
20	58	50	50	52	57	68	88	132	177	221	245	257	236	196	147	113	78
22.5	36	35	35	36	38	45	57	83	119	154	177	185	169	138	103	74	49
25	24	23	24	25	26	29	36	51	76	103	120	124	115	93	72	45	30
27.5	15	14	15	16	16	18	22	31	46	66	77	80	72	59	44	26	19
30	9	8	9	9	9	11	13	18	27	40	47	44	41	36	25	16	11
32.5	4	4	4	4	5	6	7	10	16	23	26	24	24	21	15	9	6
35	2	1	1	1	2	3	4	5	8	12	13	12	12	10	7	4	3
37.5	0	0	0	0	1	1	1	2	3	6	6	6	6	5	3	2	1
40	0	0	0	0	0	0	0	1	1	2	2	2	2	2	1	0	0
42.5	0	0	0	0	0	0	0	0	0	0	1	1	1	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	19.3	11.80%
05-10	43.5	26.50%
10-15	42.4	25.80%
15-20	29.2	17.80%
20-25	17.1	10.40%
25-30	8.5	5.20%
30-35	3.2	2.00%
35-40	0.8	0.50%
40-45	0.1	0.10%
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	1.1	1.13	1.11	1.09	0.97	1.07	1.06	1.05	1.03	1.02	1.02	1	0.99	0.99	0.97
2	1.12	1.08	1.05	1.03	1.1	1.06	1.04	0.94	1.03	1.01	0.99	1.01	0.99	0.97	0.98	0.97	0.95	0.94
3	1.08	1.04	1	0.98	1.06	1.02	0.99	0.92	1	0.97	0.95	0.98	0.96	0.94	0.96	0.94	0.92	0.91
4	1.05	1	0.96	0.93	1.04	0.99	0.95	0.89	0.97	0.94	0.92	0.95	0.93	0.91	0.93	0.91	0.9	0.89
5	1.02	0.96	0.93	0.9	1.01	0.96	0.92	0.87	0.94	0.91	0.89	0.93	0.9	0.88	0.91	0.89	0.87	0.86
6	0.99	0.93	0.89	0.87	0.98	0.93	0.89	0.84	0.91	0.88	0.86	0.9	0.87	0.85	0.89	0.87	0.85	0.84
7	0.97	0.91	0.87	0.84	0.96	0.9	0.86	0.82	0.89	0.86	0.83	0.88	0.85	0.83	0.87	0.84	0.82	0.81
8	0.94	0.88	0.84	0.81	0.93	0.87	0.84	0.8	0.87	0.83	0.81	0.86	0.83	0.81	0.85	0.82	0.8	0.79
9	0.92	0.86	0.82	0.79	0.91	0.85	0.81	0.78	0.84	0.81	0.79	0.84	0.81	0.78	0.83	0.8	0.78	0.77
10	0.9	0.83	0.79	0.77	0.89	0.83	0.79	0.76	0.82	0.79	0.77	0.82	0.79	0.77	0.81	0.78	0.76	0.75

Table 4. Utilisation Factor Table

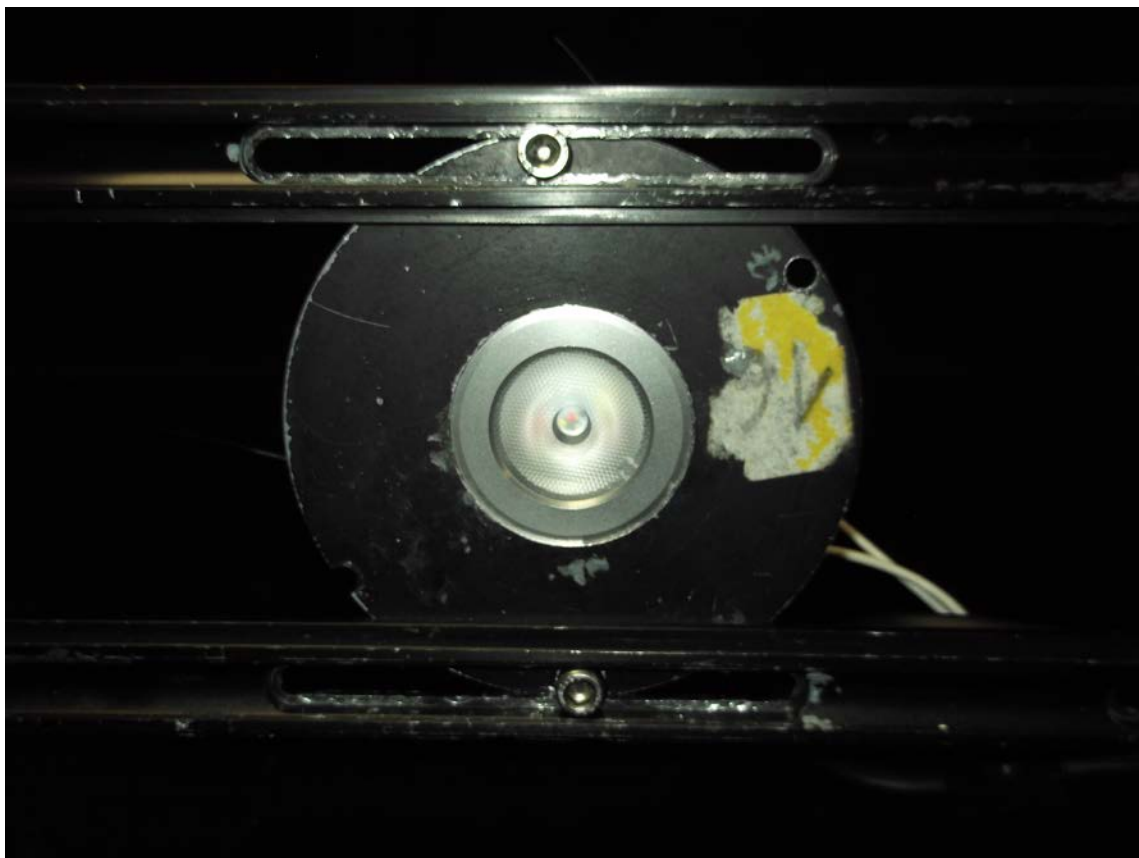


Photo 1: Luminaire on goniometer mount

Signature:

Print Name:

D CHAMBERS

Date:

16/01/2018

Technical Manager

Duly authorised to sign on behalf of:

Photometric and Optical Testing Services LLP