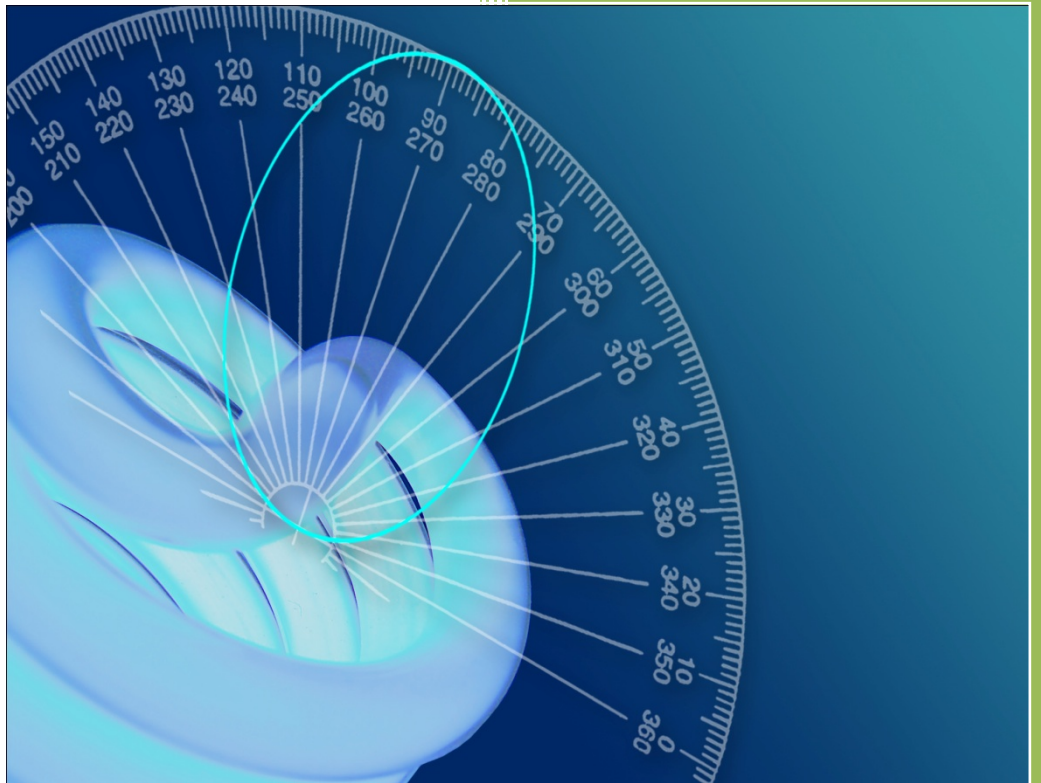


Photometric Test Report



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/DC17027	Report Date: 10/04/2017	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: FOOTFALL	Email: linda@footfalllighting.co.uk
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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: FOOTFALL	Source Type: LED
Model: CONTINULUX	Luminaire Type: HANDRAIL
Power Supply Used: Kikusui PCR1000M Voltage Stabiliser S/N SM01191	
Voltage(AC V) = 230.0	Current (mA)= 105
Power (Watts)= 10.546	Power factor= 0.435

Integrating Sphere Test

Date of Test: 10/04/2017	Ambient Temperature: 25°C
Measurement Filename: CONTINULUX	
Instrument Used: Labsphere model 2m integrating sphere spectroradiometer AS-02949-012	
Integrating Sphere Size: 2m	Measurement Geometry ($2\pi / 4\pi$): 4π
Sample Orientation: Facing Downwards	Auxiliary Correction Applied: YES
Comments:	
Date of Last Calibration (Operating Hours): 03-03-2017 (1:44)	Spectral Flux Standard Lamp Used: SCL-600
Standard Lamp Serial Number: L123	Traceable: to NIST standards
Calibration Certificate Number: SCL-600-L123	Calibration Certificate Date: 29/01/2014
Calibration Lamp Uncertainty: $\pm 0.67\%$ ($k=2$)	
Results	
Flux (lumens): 652	
CIE 1931 Chromaticity Cx: 0.4365	CIE 1931 Chromaticity Cy: 0.4005
CRI (%): 83.40	CCT (K): 2976

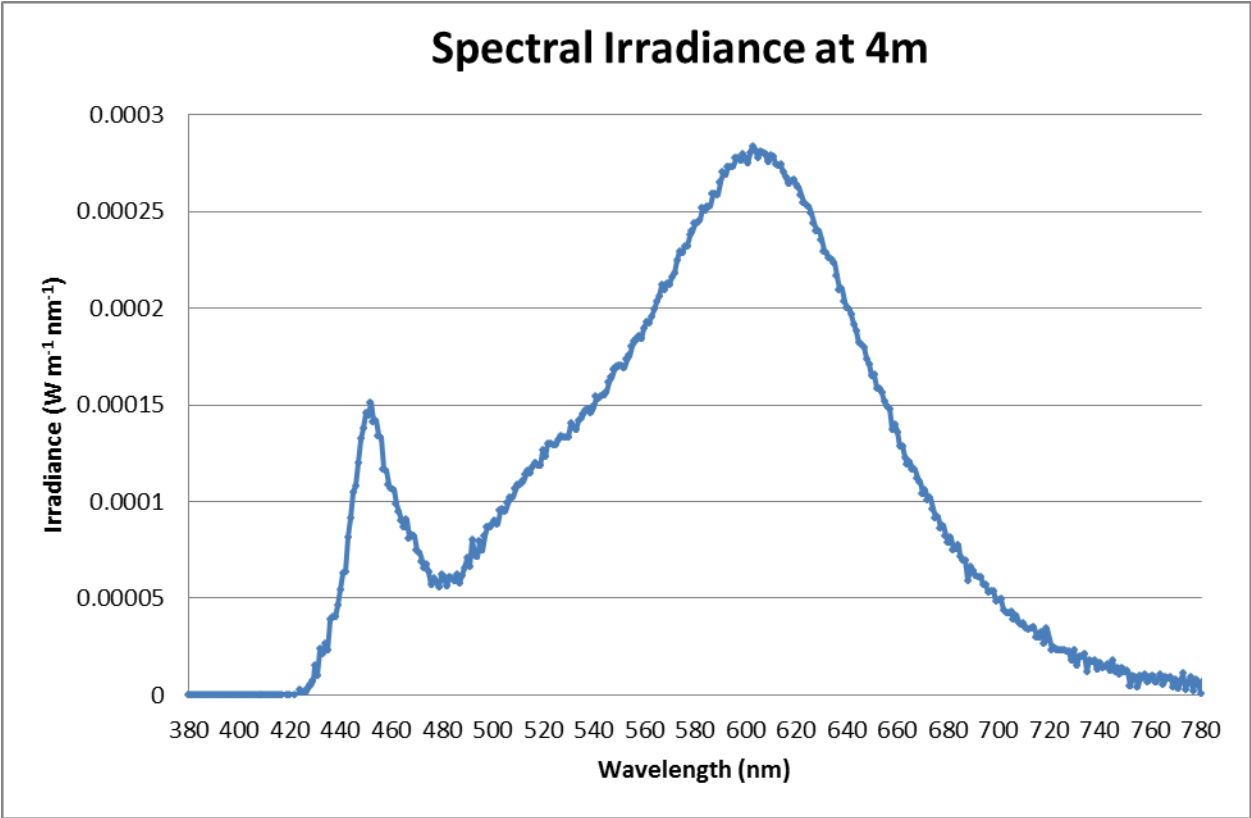


Figure 1: Spectral Irradiance

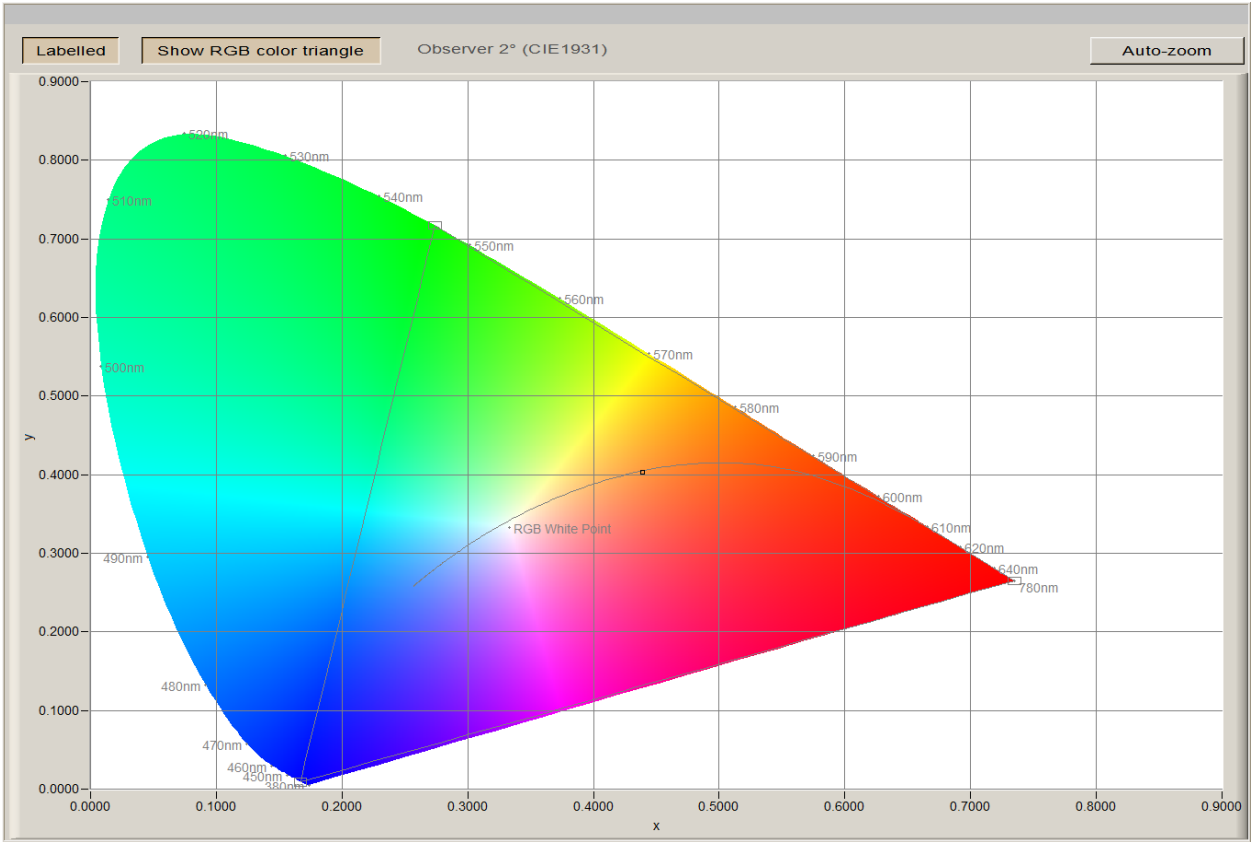


Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 10/04/2017		Ambient Temperature: 25°C
Measurement Filename: CONTINULUX		
Instrument Used: Radiant Imaging NFMS0800 Goniometer with ProMetric PM-1200N-1 Imaging Photometer		
Photometer Working Distance: 4m		Measurement Geometry: Near-Field
Comments:		
Reference Photometer Used: Specbos1211		Reference Photometer Serial Number: 2014754
Traceable: to NIST standards		
Calibration Certificate Date: 28 September 2016		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	0-180°	3°
Azimuth	0-360°	10°
Results		
Integrated Luminous Flux (lumens): 652	Peak Intensity (3° Spot, candelas): 207.2	Efficacy (lumens/Watt): 61.8
Beam Angle (50% of max intensity C0-180, degrees): 109.4		
Photometric Filename (IES LM-63-2002): CONTINULUX		
IES File – Absolute or Relative Format? ABSOLUTE		
Photometric Filename (EULUMDAT): CONTINULUX		
EULUMDAT File – Absolute or Relative Format? ABSOLUTE		

Distance (m)	Centre Beam Lux
1.0	207.23
2.0	51.81
3.0	23.03
4.0	12.95
5.0	8.29
6.0	5.76

Table 1. Illuminance at a distance

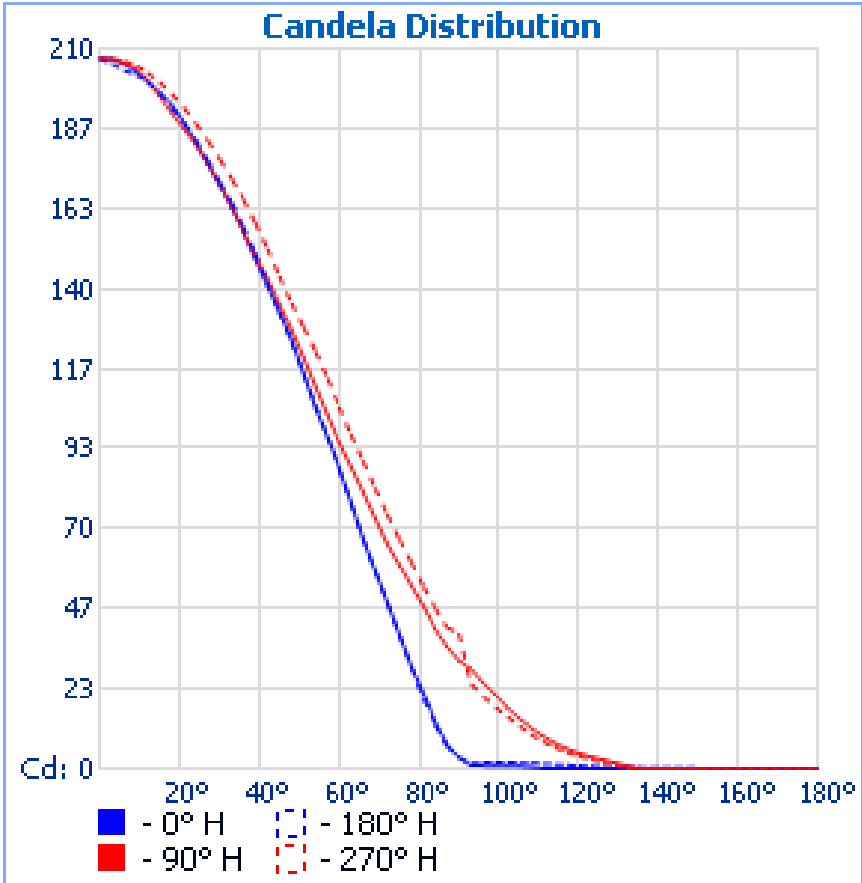


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

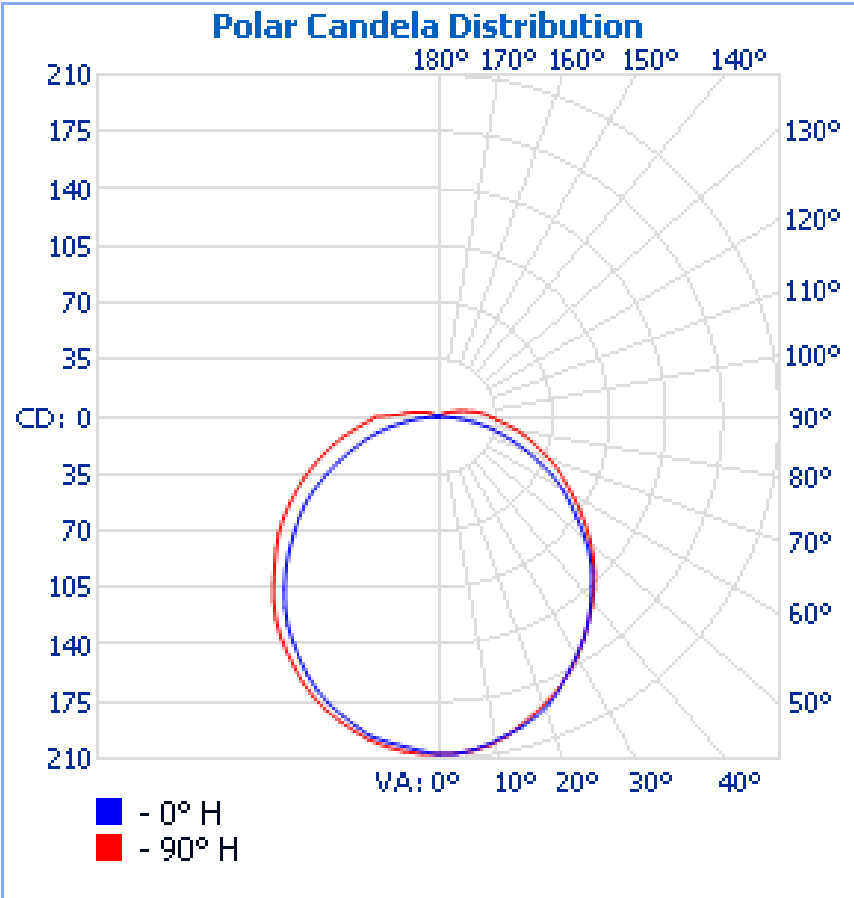


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

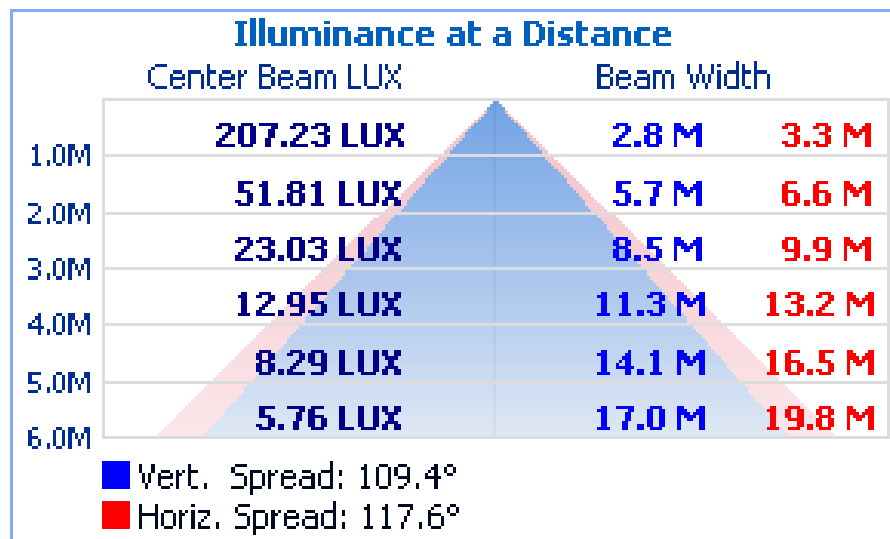


Figure 5. Cone diagram for mounting height of 6 metres.

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	10.8	<10.0	11.2	11.6	10.1	11.7	10.5	12.1	12.5
	3H	10.8	12.3	11.2	12.7	13.1	12.2	13.7	12.6	14.1	14.5
	4H	11.4	12.8	11.9	13.2	13.7	13.3	14.7	13.7	15.1	15.6
	6H	11.9	13.2	12.4	13.6	14.1	14.4	15.7	14.9	16.1	16.6
	8H	12.0	13.3	12.5	13.7	14.2	14.9	16.2	15.4	16.6	17.1
	12H	12.1	13.3	12.6	13.8	14.3	15.5	16.7	16.0	17.2	17.7
4H	2H	10.1	11.5	10.5	11.9	12.4	10.8	12.2	11.3	12.6	13.1
	3H	11.8	13.0	12.3	13.5	14.0	13.1	14.3	13.6	14.8	15.3
	4H	12.6	13.7	13.1	14.2	14.7	14.4	15.5	14.9	16.0	16.5
	6H	13.2	14.2	13.7	14.7	15.2	15.7	16.6	16.2	17.2	17.7
	8H	13.4	14.4	14.0	14.9	15.4	16.3	17.3	16.9	17.8	18.3
	12H	13.6	14.5	14.2	15.0	15.5	17.1	17.9	17.6	18.4	19.0
8H	4H	13.2	14.1	13.7	14.6	15.1	14.8	15.7	15.3	16.2	16.7
	6H	14.0	14.8	14.5	15.3	15.9	16.2	17.0	16.8	17.5	18.1
	8H	14.4	15.1	14.9	15.6	16.2	17.1	17.8	17.7	18.4	18.9
	12H	14.6	15.2	15.2	15.8	16.4	18.0	18.6	18.6	19.2	19.8
12H	4H	13.3	14.2	13.9	14.7	15.3	14.8	15.6	15.3	16.2	16.7
	6H	14.3	15.0	14.8	15.5	16.1	16.4	17.1	17.0	17.6	18.2
	8H	14.7	15.3	15.3	15.9	16.5	17.3	17.9	17.9	18.5	19.0

Distance between luminaires: 0.25

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

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
3	207	207	207	207	207	207	207	207	207	207	207	206	206	206	206	206	205	205	206
6	206	205	205	205	205	205	205	206	206	206	206	205	204	204	203	203	203	203	204
9	203	203	203	202	202	201	202	203	204	204	203	202	201	201	201	201	202	202	202
12	200	200	200	200	199	199	199	200	200	201	200	199	198	198	199	200	201	201	200
15	197	197	197	197	196	195	195	196	196	196	196	195	194	194	195	197	198	197	197
18	194	193	192	192	192	191	191	192	192	191	191	191	190	190	191	192	192	192	193
21	189	188	187	187	187	187	187	187	186	187	187	187	187	186	187	188	187	188	188
24	183	182	182	181	182	182	182	181	181	182	182	182	182	181	182	182	182	183	184
27	176	177	176	176	176	176	177	176	175	177	176	176	177	176	176	175	176	177	178
30	170	170	170	169	169	169	170	171	170	171	170	170	170	169	169	169	169	170	171
33	164	163	163	163	163	162	163	164	164	164	163	163	163	163	162	162	162	163	165
36	157	155	155	156	156	156	156	157	157	157	156	156	156	157	155	155	154	155	158
39	149	148	148	148	149	149	149	150	149	150	150	150	149	150	148	148	148	147	150
42	141	141	140	140	141	141	142	143	142	143	142	142	142	141	140	140	140	139	142
45	133	132	131	131	133	133	134	135	134	136	135	134	134	133	132	131	132	130	133
48	125	123	124	122	124	125	126	127	127	128	127	127	126	125	124	122	123	122	124
51	115	114	114	114	116	117	118	120	119	120	119	119	118	116	116	114	113	114	115
54	105	105	106	106	108	109	109	112	112	111	112	111	109	109	107	105	105	105	106
57	97	96	97	97	100	101	100	103	104	103	104	103	102	101	98	96	96	96	97
60	88	87	87	87	89	92	92	95	96	95	96	94	93	92	89	87	86	86	88
63	78	78	78	79	80	83	85	87	88	88	88	86	85	83	79	79	78	77	77
66	67	67	68	71	72	75	77	80	80	81	80	79	77	75	71	70	68	67	67
69	58	57	59	61	64	66	70	72	73	73	73	72	69	67	63	60	59	58	58
72	49	48	50	52	56	59	62	65	66	66	66	65	61	59	56	52	50	48	48
75	39	39	41	44	48	52	55	58	59	60	59	58	54	53	48	44	41	39	39
78	30	30	32	37	41	45	48	50	52	53	52	50	48	46	41	37	32	30	30
81	22	22	27	31	35	39	43	45	47	47	46	45	42	39	34	29	25	21	20
84	14	16	19	25	28	33	37	40	42	41	41	39	37	33	28	23	18	15	13
87	7	9	13	19	23	28	32	34	36	36	36	34	31	27	23	17	13	9	7
90	3	5	9	15	18	23	26	29	31	32	32	28	25	22	18	14	9	6	3
93	1	2	5	9	14	19	23	27	29	29	28	25	21	17	13	9	5	2	2

96	1	1	4	8	12	16	20	23	25	25	25	23	20	16	12	8	4	2	2
99	1	1	3	6	10	13	16	19	22	22	21	19	17	14	10	6	4	2	2
102	1	1	2	4	7	10	13	16	17	18	17	16	13	11	7	4	2	2	2
105	1	1	1	3	5	8	11	13	14	15	14	13	11	8	6	3	2	2	2
108	1	1	0	2	4	6	9	10	12	12	12	10	9	6	4	3	1	1	2
111	0	0	0	1	3	5	7	8	9	10	9	8	7	5	3	2	1	1	2
114	0	0	0	1	2	3	5	6	7	8	7	6	5	4	2	1	1	1	1
117	0	0	0	0	1	3	4	5	6	6	6	5	4	3	2	1	1	1	1
120	0	0	0	0	1	2	3	4	4	5	4	4	3	2	1	1	1	1	1
123	0	0	0	0	0	1	2	3	3	4	3	3	2	1	1	0	0	1	1
126	0	0	0	0	0	1	1	2	2	3	3	2	1	1	0	0	0	0	0
129	0	0	0	0	0	0	1	1	2	2	2	1	1	0	0	0	0	0	0
132	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3a. Luminous intensity values, azimuth 0-180°

	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350
0	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
3	206	206	206	206	207	207	207	207	207	207	207	207	207	207	207	207	207
6	204	205	205	206	206	206	207	207	206	206	206	206	206	206	206	206	206
9	202	203	203	204	204	205	205	205	205	205	205	204	204	204	204	204	203
12	200	200	200	201	202	202	203	203	203	203	203	203	202	202	202	201	201
15	197	197	197	198	199	200	200	200	200	200	200	200	200	199	198	198	197
18	194	194	195	195	196	196	197	197	197	197	197	197	196	195	194	194	194
21	189	190	190	191	191	191	193	193	193	193	193	193	192	191	190	190	189
24	184	184	184	186	186	186	187	188	188	189	188	188	187	186	185	185	184
27	178	178	179	180	181	182	182	183	183	184	183	182	182	180	179	179	179
30	172	172	172	174	175	176	177	178	178	178	177	176	175	173	173	172	172
33	165	165	166	168	169	170	171	172	172	172	171	170	169	167	167	165	164
36	157	158	160	162	162	163	164	165	166	164	165	163	163	161	161	158	157
39	149	151	153	154	155	157	157	158	159	158	159	156	156	154	152	151	150
42	141	144	145	146	147	149	150	151	152	151	151	149	148	147	144	143	143
45	132	135	135	138	140	142	142	144	144	144	143	141	140	138	136	135	134
48	124	126	127	130	133	135	135	137	136	136	136	134	132	130	128	127	124
51	116	116	120	122	124	127	128	129	129	129	128	126	124	122	119	117	116
54	108	108	110	113	115	118	121	120	122	121	120	118	116	113	110	110	108
57	98	99	101	104	107	110	112	113	114	113	112	110	108	105	101	101	98
60	88	89	92	96	98	101	103	105	106	105	104	101	99	96	93	91	89
63	79	81	83	86	89	93	94	97	98	97	96	93	90	87	84	82	80
66	69	71	75	77	81	85	87	89	90	89	88	85	81	78	75	71	69
69	59	62	64	69	73	76	80	81	82	82	80	77	73	70	65	62	59
72	49	53	56	61	65	69	73	74	74	74	73	70	65	62	56	53	50
75	40	44	48	53	59	62	65	67	67	67	66	62	58	54	48	44	41
78	31	35	40	46	51	55	58	60	60	60	58	55	51	46	40	36	31
81	22	27	33	38	43	46	50	52	53	53	51	48	44	40	34	29	24
84	16	20	26	31	36	41	45	47	47	47	45	43	37	33	28	21	17
87	10	14	20	26	31	35	38	41	41	42	39	37	32	27	21	15	10
90	6	10	15	20	25	30	32	35	40	36	34	30	26	21	16	11	6
93	2	5	8	12	16	19	23	24	25	24	23	20	16	12	8	4	1

96	2	4	7	11	14	17	19	21	21	21	19	16	13	10	6	3	1
99	2	3	5	8	11	14	16	18	18	17	15	13	10	7	4	2	1
102	1	2	4	7	9	11	13	15	15	15	13	11	9	6	3	1	0
105	1	1	3	5	7	9	11	12	12	12	11	9	7	4	2	1	0
108	1	1	2	4	5	7	9	10	10	10	9	7	5	3	1	0	0
111	1	1	1	3	4	6	7	8	8	8	7	5	4	2	1	0	0
114	1	1	1	2	3	4	5	6	6	6	5	4	3	1	0	0	0
117	1	0	0	1	2	3	4	5	5	5	4	3	2	1	0	0	0
120	1	0	0	0	1	2	3	4	4	4	3	2	1	0	0	0	0
123	0	0	0	0	1	1	2	3	3	3	2	1	0	0	0	0	0
126	0	0	0	0	0	1	1	2	2	2	1	1	0	0	0	0	0
129	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3b. Luminous intensity values, azimuth 190-350°

Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	5	0.80%	90-95	8.9	1.40%
05-10	14.5	2.20%	95-100	6.2	0.90%
10-15	23.7	3.60%	100-105	4.3	0.70%
15-20	32.1	4.90%	105-110	2.9	0.40%
20-25	38.9	6.00%	110-115	1.8	0.30%
25-30	44.9	6.90%	115-120	1.1	0.20%
30-35	49.2	7.50%	120-125	0.6	0.10%
35-40	51.5	7.90%	125-130	0.3	0%
40-45	52.7	8.10%	130-135	0.1	0%
45-50	52.3	8.00%	135-140	0	0%
50-55	50	7.60%	140-145	0	0%
55-60	46.7	7.10%	145-150	0	0%
60-65	42.3	6.50%	150-155	0	0%
65-70	36.4	5.60%	155-160	0	0%
70-75	30.5	4.70%	160-165	0	0%
75-80	24.6	3.80%	165-170	0	0%
80-85	18.5	2.80%	170-175	0	0%
85-90	13.5	2.10%	175-180	0	0%

Table 4. 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	1.18	1.18	1.18	1.18	1.15	1.15	1.15	0.96	1.09	1.09	1.09	1.03	1.03	1.03	0.98	0.98	0.98	0.96
1	1.06	1.01	0.96	0.92	1.03	0.98	0.94	0.78	0.93	0.89	0.86	0.88	0.86	0.83	0.84	0.82	0.8	0.77
2	0.96	0.87	0.8	0.74	0.93	0.85	0.78	0.65	0.81	0.75	0.7	0.77	0.72	0.68	0.73	0.69	0.66	0.63
3	0.87	0.76	0.68	0.61	0.85	0.74	0.66	0.55	0.71	0.64	0.58	0.67	0.62	0.57	0.64	0.59	0.55	0.53
4	0.8	0.67	0.58	0.51	0.77	0.66	0.57	0.47	0.63	0.55	0.49	0.6	0.53	0.48	0.57	0.52	0.47	0.45
5	0.73	0.6	0.51	0.44	0.71	0.59	0.5	0.41	0.56	0.48	0.43	0.54	0.47	0.42	0.51	0.46	0.41	0.39
6	0.68	0.54	0.45	0.38	0.65	0.53	0.44	0.36	0.51	0.43	0.37	0.48	0.42	0.37	0.47	0.41	0.36	0.34
7	0.63	0.49	0.4	0.34	0.61	0.48	0.39	0.32	0.46	0.38	0.33	0.44	0.37	0.32	0.42	0.36	0.32	0.3
8	0.58	0.45	0.36	0.3	0.57	0.44	0.35	0.28	0.42	0.35	0.29	0.4	0.34	0.29	0.39	0.33	0.28	0.26
9	0.55	0.41	0.33	0.27	0.53	0.4	0.32	0.26	0.39	0.31	0.26	0.37	0.31	0.26	0.36	0.3	0.26	0.24
10	0.51	0.38	0.3	0.24	0.5	0.37	0.29	0.23	0.36	0.29	0.24	0.35	0.28	0.24	0.33	0.28	0.23	0.22

Table 5. Utilisation Factor Table

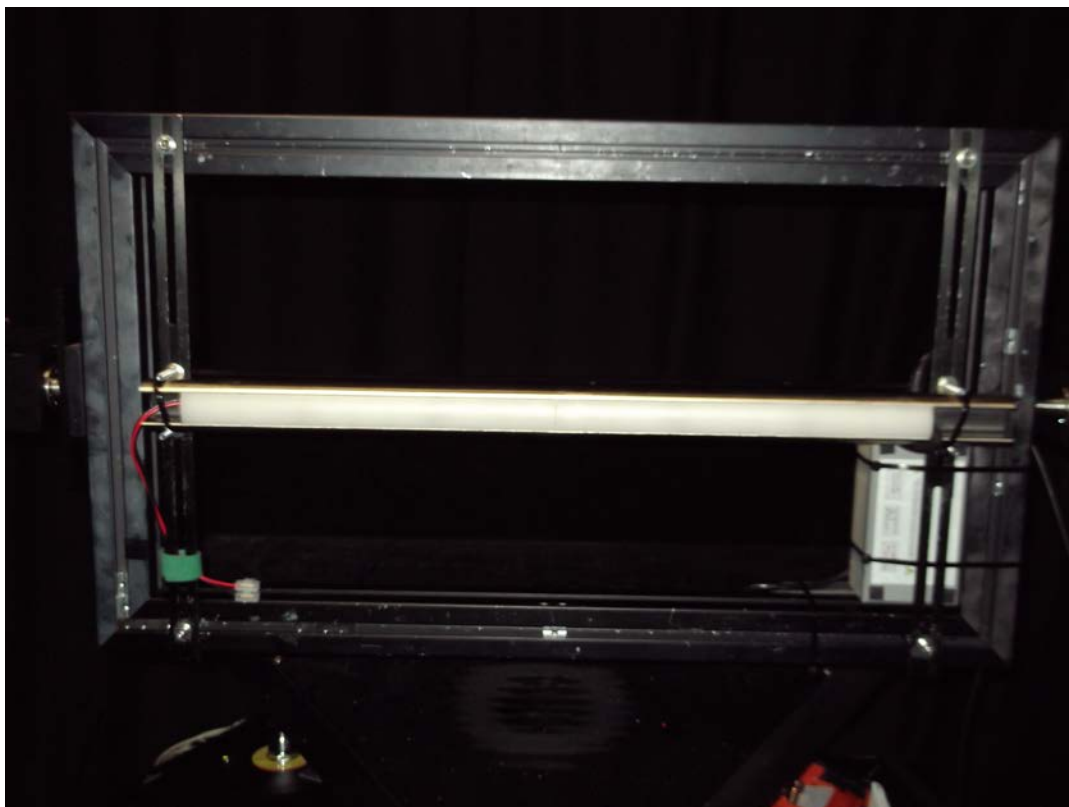


Photo 1: Luminaire on goniometer mount

Signature:

Print Name:

D CHAMBERS

Date:

10/04/2017

Technical Manager

Duly authorised to sign on behalf of:

Photometric and Optical Testing Services LLP