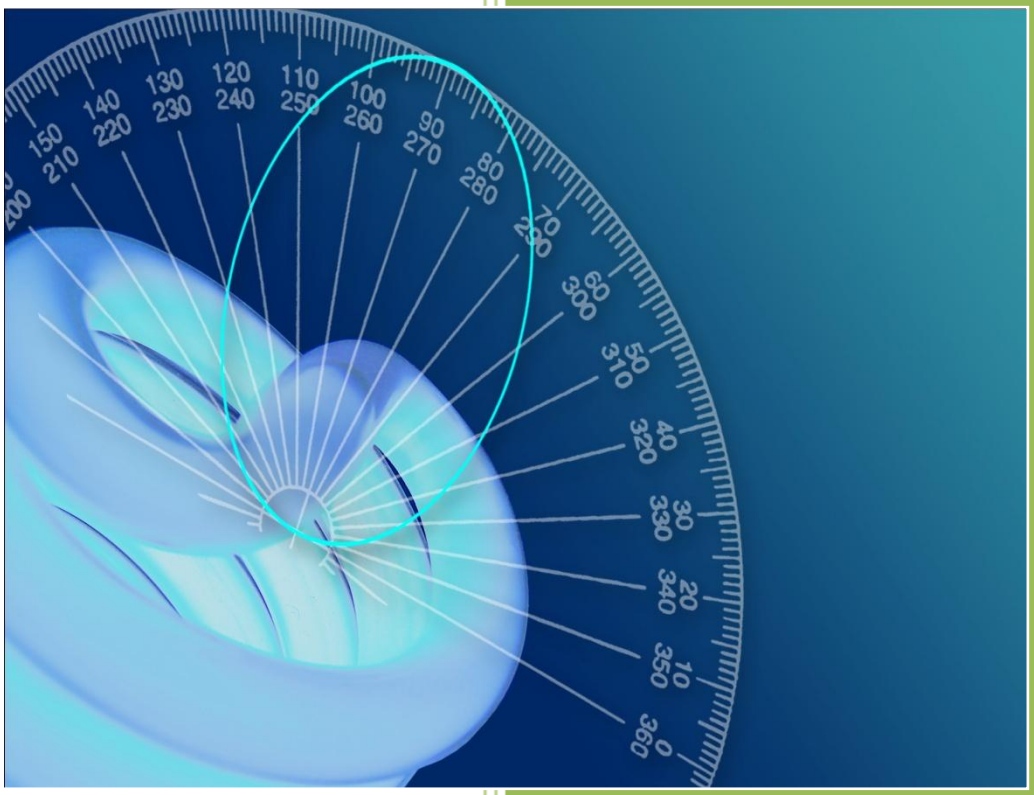
PHOTOMETRIC & OPTICAL TESTING

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/DC15226	Report Date: 01/12/2015	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: Thistle Down Barn, Holcot Lane, Sywell, Northampton, NN6 0BG		

Client Details

Company: TLC Southern Ltd	
Address: The TLC Building, 5 Newton Road, Crawley, West Sussex, RH10 9TS	

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: LEDLITE	Source Type: LED
Model: LTSP50W	Luminaire Type: DOWNLIGHT
Power Supply Used: Kikusui PCR1000M Voltage Stabiliser S/N SM01191	
Voltage(AC V) = 230.0	Current (mA)= 237
Power (Watts)= 53.28	Power factor= 0.978

Integrating Sphere Test

Date of Test: 26/11/2015	Ambient Temperature:25°C
Measurement Filename: 50W LED WHITE	
Instrument Used: Labsphere model 2m integrating sphere spectroradiometer AS-02949-012	
Integrating Sphere Size: 2m	Measurement Geometry (2π / 4π): 4π
Sample Orientation: Horizontal	Auxiliary Correction Applied: YES
Comments:	
Date of Last Calibration (Operating Hours): 12-10-2015 (0:57)	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: ± 0.67% (*k=2)*	

Results

Flux (lumens): 4674	
CIE 1931 Chromaticity Cx: 0.3794	CIE 1931 Chromaticity Cy: 0.3845
CRI (%):82.01	CCT (K): 4080

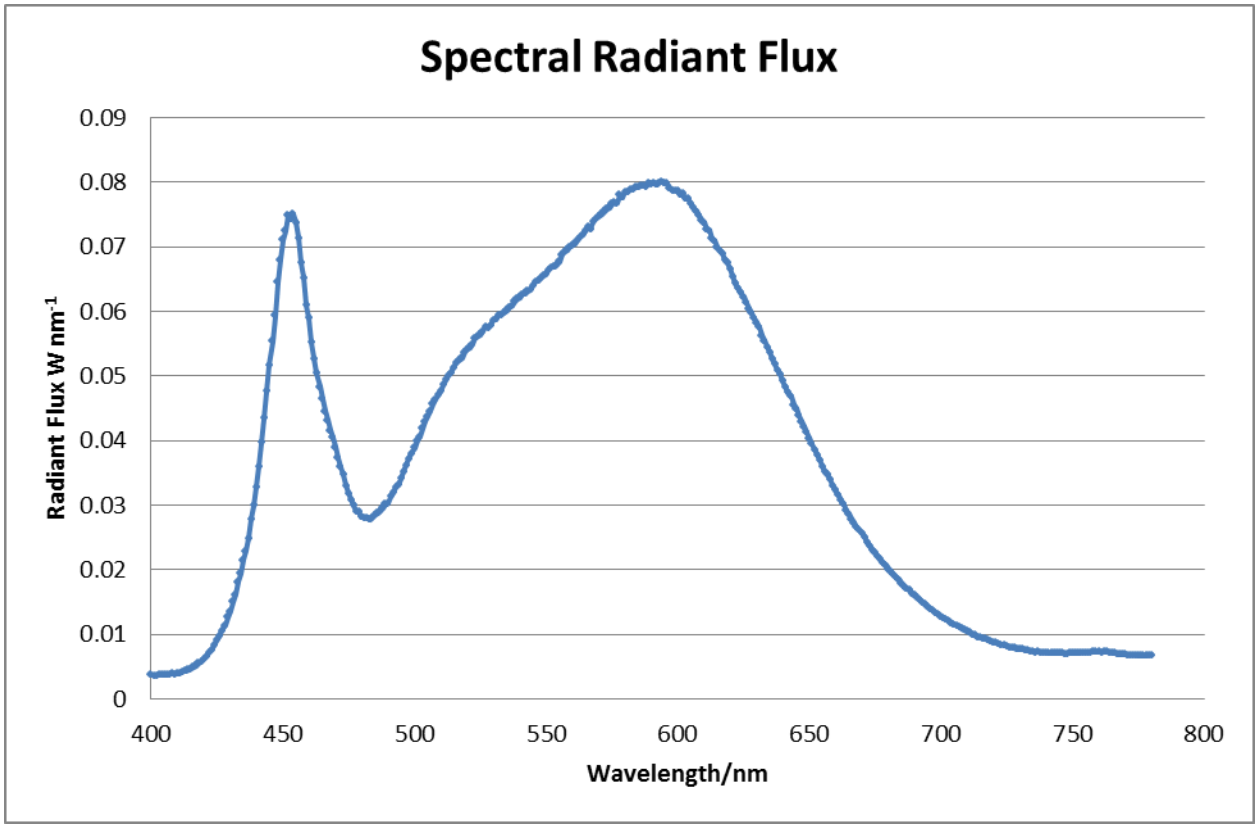


Figure 1: Spectral Flux

Figure 2: CIE 1931 diagram.

Goniophotometer Test		
Date of Test: 25/11/2015	Ambient Temperature: 25°C	
Measurement Filename: 50W LED WHITE		
Instrument Used: Radiant Imaging NFMS0800 Goniometer with ProMetric PM-1200N-1 Imaging Photometer		
Photometer Working Distance: 3m	Measurement Geometry: Near-Field	
Comments:		
Reference Photometer Used: Specbos1211	Reference Photometer Serial Number: 2014754	
Traceable: to NIST standards		
Calibration Certificate Date: 18 June 2015	Sample Stabilisation Time (minutes): 45	
Reference Photometer Calibration Uncertainty: ± 2.4% (*k*=2, 20-200 lux, CIE illuminant A source)		
Scan Set Up		
Direction	**Range**	**Increment**
Inclination Zone 1	0-90°	3°
Azimuth	0-360°	10°
Results		
Integrated Luminous Flux (lumens):4674	Peak Intensity (3° Spot, candelas): 1752.8	Efficacy (lumens/Watt): 87.4
Beam Angle (50% of max intensity C0-180, degrees): 105.8		
Photometric Filename (IES LM-63-2002): 50W LED WHITE		
IES File – Absolute or Relative Format? ABSOLUTE		
Photometric Filename (EULUMDAT): 50W LED WHITE		
EULUMDAT File – Absolute or Relative Format? ABSOLUTE		

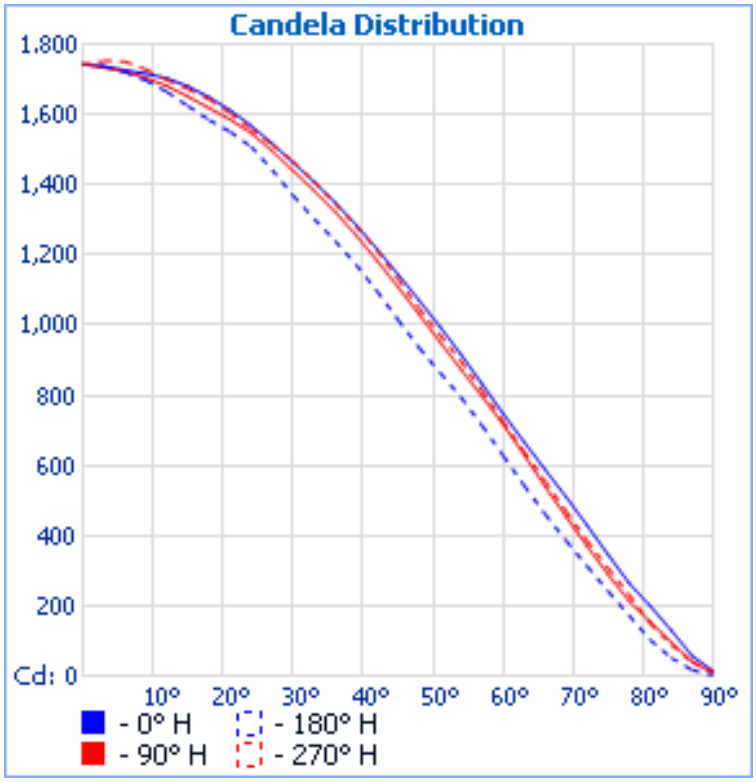


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

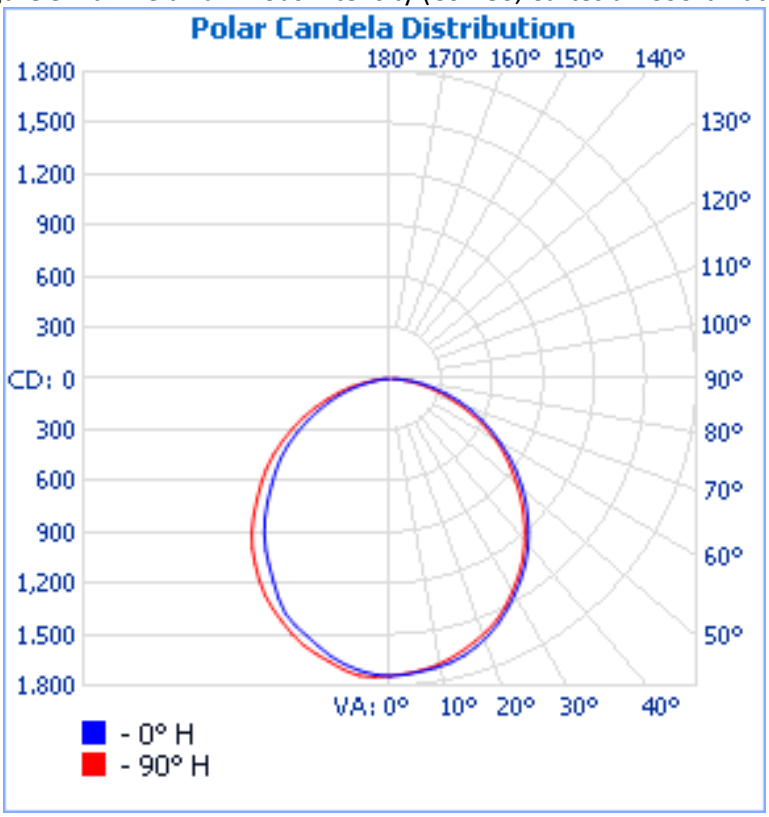


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

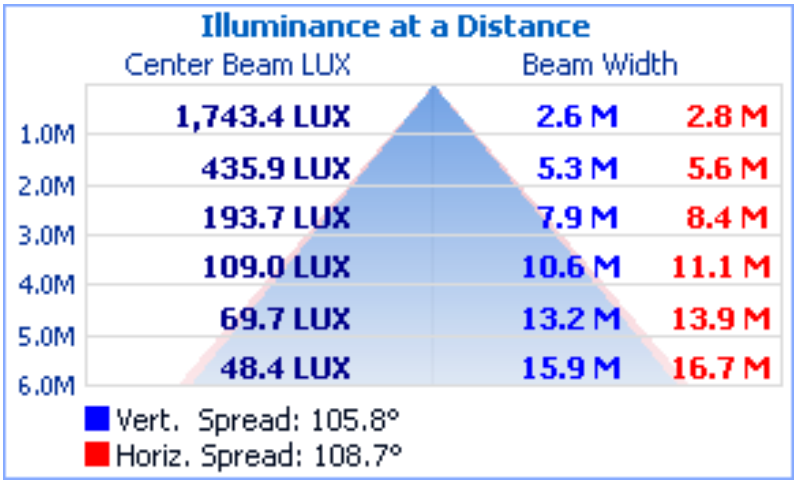


Figure 5. Cone diagram for mounting height of 6 metres.

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	18.3	19.9	18.6	20.2	20.5	18.1	19.7	18.5	20.0	20.4
	3H	19.9	21.4	20.3	21.7	22.1	19.6	21.1	20.0	21.5	21.8
	4H	20.6	22.0	21.0	22.3	22.7	20.3	21.7	20.7	22.0	22.4
	6H	21.1	22.4	21.5	22.8	23.2	20.7	22.0	21.1	22.4	22.8
	8H	21.3	22.5	21.7	22.9	23.3	20.8	22.0	21.2	22.4	22.8
	12H	21.4	22.6	21.9	23.0	23.4	20.9	22.1	21.3	22.4	22.8
4H	2H	19.0	20.4	19.4	20.7	21.1	18.8	20.2	19.2	20.5	20.9
	3H	20.7	21.9	21.2	22.3	22.7	20.5	21.7	20.9	22.1	22.5
	4H	21.6	22.6	22.0	23.1	23.5	21.3	22.3	21.7	22.7	23.2
	6H	22.2	23.1	22.7	23.6	24.0	21.8	22.7	22.2	23.2	23.6
	8H	22.5	23.3	22.9	23.8	24.2	21.9	22.8	22.4	23.3	23.7
	12H	22.7	23.5	23.2	23.9	24.4	22.1	22.9	22.5	23.3	23.8
8H	4H	21.8	22.7	22.3	23.2	23.6	21.5	22.4	22.0	22.8	23.3
	6H	22.6	23.3	23.1	23.8	24.3	22.1	22.9	22.6	23.3	23.8
	8H	23.0	23.6	23.5	24.1	24.6	22.4	23.1	22.9	23.6	24.1
	12H	23.2	23.8	23.8	24.3	24.8	22.6	23.1	23.1	23.6	24.1
12H	4H	21.9	22.7	22.4	23.1	23.6	21.6	22.4	22.0	22.8	23.3
	6H	22.7	23.3	23.2	23.8	24.3	22.3	22.9	22.8	23.4	23.9
	8H	23.1	23.6	23.6	24.1	24.6	22.5	23.0	23.0	23.6	24.1

Distance between luminaires: 0.25

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

Table 1. UGR values

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743
3	1738	1736	1735	1735	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1735	1736	1735	1736	1737
6	1727	1726	1726	1725	1724	1723	1723	1723	1723	1722	1721	1721	1721	1720	1721	1722	1722	1721	1721
9	1717	1716	1714	1711	1710	1711	1711	1710	1708	1705	1702	1700	1698	1697	1697	1697	1698	1697	1697
12	1703	1702	1699	1696	1697	1696	1695	1691	1686	1681	1676	1672	1670	1670	1671	1667	1665	1664	1665
15	1681	1681	1681	1678	1675	1673	1667	1662	1655	1651	1646	1642	1638	1638	1636	1633	1629	1624	1625
18	1650	1655	1654	1651	1643	1635	1626	1624	1623	1619	1616	1609	1603	1601	1597	1594	1585	1586	1585
21	1613	1614	1614	1612	1609	1597	1586	1590	1592	1586	1581	1574	1565	1561	1558	1549	1539	1545	1552
24	1569	1565	1562	1559	1570	1562	1551	1558	1557	1547	1538	1531	1520	1517	1510	1488	1485	1497	1509
27	1518	1516	1508	1510	1523	1519	1510	1511	1507	1497	1483	1479	1472	1468	1461	1436	1429	1439	1443
30	1463	1466	1458	1457	1460	1455	1451	1455	1448	1440	1426	1428	1416	1405	1401	1384	1381	1377	1369
33	1408	1409	1400	1399	1397	1394	1385	1392	1390	1383	1372	1371	1353	1342	1340	1324	1325	1314	1303
36	1350	1341	1332	1342	1334	1341	1329	1334	1330	1323	1314	1308	1287	1278	1275	1258	1250	1245	1240
39	1286	1269	1272	1274	1266	1279	1268	1274	1262	1256	1247	1242	1220	1215	1208	1183	1179	1168	1172
42	1217	1199	1204	1205	1201	1199	1200	1197	1186	1184	1171	1165	1155	1146	1141	1114	1104	1091	1097
45	1145	1128	1128	1129	1131	1120	1125	1119	1114	1109	1100	1089	1084	1066	1057	1041	1029	1022	1015
48	1071	1056	1058	1054	1059	1045	1050	1046	1042	1031	1029	1015	1007	984	975	967	961	955	936
51	995	985	985	979	980	969	970	968	966	952	952	938	929	912	902	893	883	884	865
54	916	910	918	888	890	893	884	891	880	873	865	865	845	843	824	806	811	800	794
57	833	832	831	806	812	814	805	808	799	797	785	788	765	765	748	731	725	716	714
60	748	747	741	723	730	726	720	720	719	718	707	702	678	681	663	653	638	633	628
63	667	665	664	642	642	635	637	635	636	631	628	613	597	599	576	573	563	551	543
66	589	582	573	566	561	556	552	552	546	541	542	528	521	519	503	497	476	466	461
69	510	498	488	478	472	473	466	470	458	454	453	447	442	433	424	413	401	385	385
72	429	413	409	396	390	389	386	389	379	370	370	368	362	353	350	338	332	310	313
75	346	333	326	314	308	310	304	306	299	289	290	286	280	279	273	266	257	241	242
78	264	256	246	238	233	229	229	225	222	213	216	209	208	205	200	199	188	175	173
81	200	187	186	179	176	169	169	167	158	155	151	147	142	140	136	133	128	107	103
84	131	120	106	111	98	96	104	97	94	97	93	83	83	79	74	77	69	60	52
87	58	52	45	44	46	40	40	35	40	41	38	32	28	31	30	24	25	23	17
90	14	16	14	13	13	12	8	8	7	9	5	5	6	4	6	6	6	6	2

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	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743	1743
3	1738	1739	1742	1743	1746	1748	1751	1752	1753	1753	1752	1750	1747	1745	1743	1740	1739
6	1720	1722	1724	1725	1729	1735	1742	1747	1751	1750	1747	1742	1737	1734	1731	1729	1727
9	1695	1695	1692	1692	1696	1704	1714	1723	1729	1729	1725	1719	1714	1711	1710	1713	1715
12	1664	1665	1665	1667	1667	1672	1681	1691	1698	1700	1699	1697	1697	1697	1695	1697	1701
15	1624	1630	1635	1638	1641	1644	1653	1663	1672	1677	1679	1679	1684	1685	1683	1681	1680
18	1586	1586	1597	1603	1612	1617	1626	1636	1644	1655	1657	1652	1656	1661	1661	1657	1655
21	1546	1542	1555	1567	1574	1583	1595	1601	1604	1620	1624	1611	1613	1623	1625	1620	1616
24	1500	1495	1500	1517	1528	1531	1550	1557	1559	1576	1579	1564	1570	1577	1574	1573	1569
27	1444	1445	1449	1463	1474	1477	1493	1506	1515	1527	1529	1525	1532	1531	1526	1524	1523
30	1382	1398	1395	1401	1413	1424	1441	1450	1467	1475	1479	1479	1480	1474	1466	1475	1476
33	1317	1332	1331	1341	1355	1367	1385	1394	1409	1420	1416	1419	1420	1417	1399	1419	1421
36	1248	1242	1262	1280	1296	1303	1321	1334	1346	1358	1343	1355	1358	1368	1340	1356	1357
39	1182	1166	1188	1214	1230	1232	1256	1268	1283	1290	1279	1286	1291	1309	1280	1296	1288
42	1114	1103	1126	1145	1155	1165	1184	1194	1213	1217	1219	1219	1217	1237	1217	1224	1215
45	1036	1037	1053	1064	1075	1094	1110	1122	1131	1145	1153	1148	1144	1157	1149	1145	1141
48	950	962	973	983	999	1019	1032	1049	1048	1067	1077	1074	1068	1077	1079	1068	1067
51	870	880	898	909	931	946	948	975	972	987	991	993	993	999	1003	985	994
54	791	813	816	828	859	869	868	892	897	902	907	903	920	919	915	915	915
57	712	733	739	751	773	788	788	808	814	823	823	821	840	837	837	833	835
60	629	649	654	669	682	697	707	721	726	739	739	736	749	743	754	748	753
63	548	576	572	587	602	615	626	640	640	652	654	652	656	652	669	674	670
66	467	487	498	512	525	535	543	559	555	562	565	567	570	572	583	582	584
69	389	404	415	430	439	449	463	472	469	476	480	481	479	483	483	496	500
72	314	331	342	357	359	368	382	386	386	397	398	399	394	404	402	414	417
75	235	257	269	279	286	289	295	302	307	314	310	314	314	318	324	328	336
78	173	190	201	206	211	218	215	226	232	233	228	236	233	235	245	247	256
81	102	126	132	133	136	138	143	143	150	149	157	158	160	162	171	179	184
84	59	66	76	72	75	79	83	84	89	90	94	93	95	89	101	100	119
87	19	23	24	29	28	30	33	36	39	37	36	38	37	40	36	38	54
90	1	1	4	4	5	4	3	7	11	9	7	7	5	6	6	8	11

Table 2b. Luminous intensity values, azimuth 190-350°

Zone	Lumens	% Total
0-5	41.7	0.90%
05-10	122.3	2.60%
10-15	199.3	4.20%
15-20	269.2	5.70%
20-25	326.7	6.90%
25-30	375.1	7.90%
30-35	409.3	8.70%
35-40	425.1	9.00%
40-45	430.3	9.10%
45-50	421.1	8.90%
50-55	393.8	8.30%
55-60	357.4	7.60%
60-65	310.6	6.60%
65-70	250.3	5.30%
70-75	187.9	4.00%
75-80	126.1	2.70%
80-85	64.9	1.40%
85-90	17.7	0.40%

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	1.09	1.04	1	0.96	1.06	1.02	0.98	0.85	0.98	0.94	0.92	0.94	0.91	0.89	0.9	0.88	0.86	0.84
2	0.99	0.91	0.84	0.78	0.96	0.89	0.83	0.72	0.85	0.8	0.76	0.82	0.78	0.74	0.79	0.76	0.72	0.7
3	0.9	0.8	0.72	0.65	0.88	0.78	0.71	0.61	0.75	0.69	0.64	0.73	0.67	0.62	0.7	0.65	0.61	0.59
4	0.83	0.71	0.62	0.55	0.81	0.7	0.61	0.52	0.67	0.6	0.54	0.65	0.59	0.54	0.63	0.57	0.53	0.51
5	0.76	0.63	0.54	0.48	0.74	0.62	0.54	0.46	0.6	0.53	0.47	0.58	0.52	0.46	0.56	0.51	0.46	0.44
6	0.7	0.57	0.48	0.42	0.68	0.56	0.48	0.4	0.54	0.47	0.41	0.53	0.46	0.41	0.51	0.45	0.4	0.38
7	0.65	0.52	0.43	0.37	0.64	0.51	0.43	0.36	0.49	0.42	0.37	0.48	0.41	0.36	0.47	0.41	0.36	0.34
8	0.61	0.47	0.39	0.33	0.59	0.47	0.38	0.32	0.45	0.38	0.33	0.44	0.37	0.32	0.43	0.37	0.32	0.3
9	0.57	0.43	0.35	0.3	0.55	0.43	0.35	0.29	0.42	0.34	0.29	0.41	0.34	0.29	0.4	0.34	0.29	0.27
10	0.53	0.4	0.32	0.27	0.52	0.4	0.32	0.26	0.39	0.32	0.27	0.38	0.31	0.27	0.37	0.31	0.27	0.25

Table 4. Utilisation Factor Table

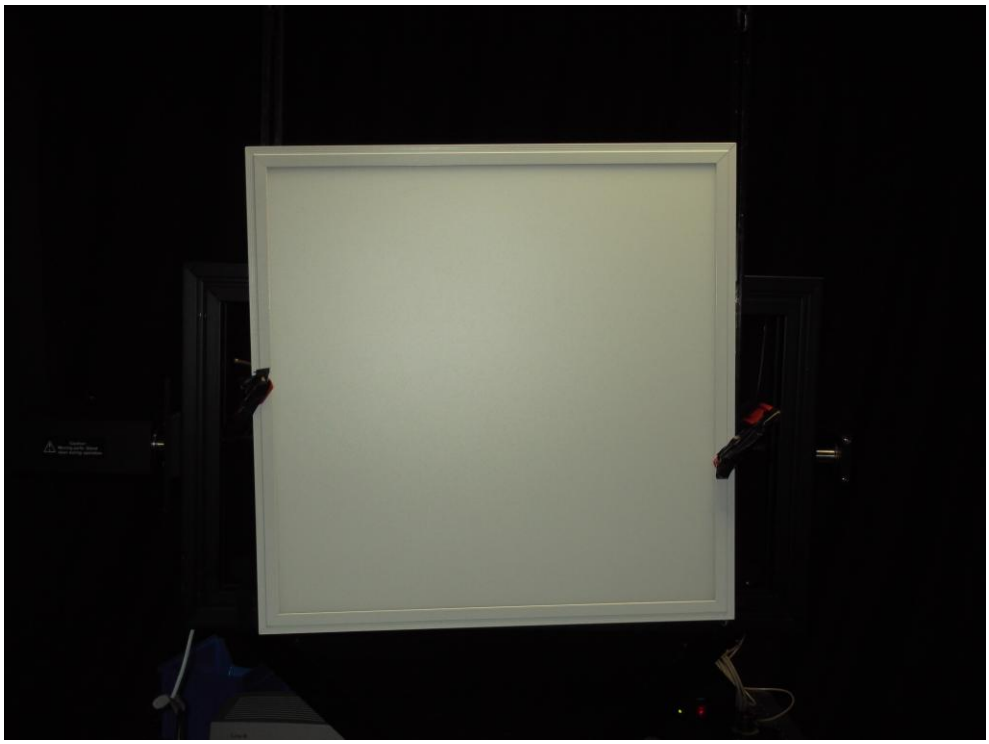


Photo 1: Luminaire on goniometer mount

Signature:

_____

Print Name:

D CHAMBERS

_____

Date:
01/12/2015

_____

Test Engineer
Duly authorised to sign on behalf of:
Photometric and Optical Testing Services LLP