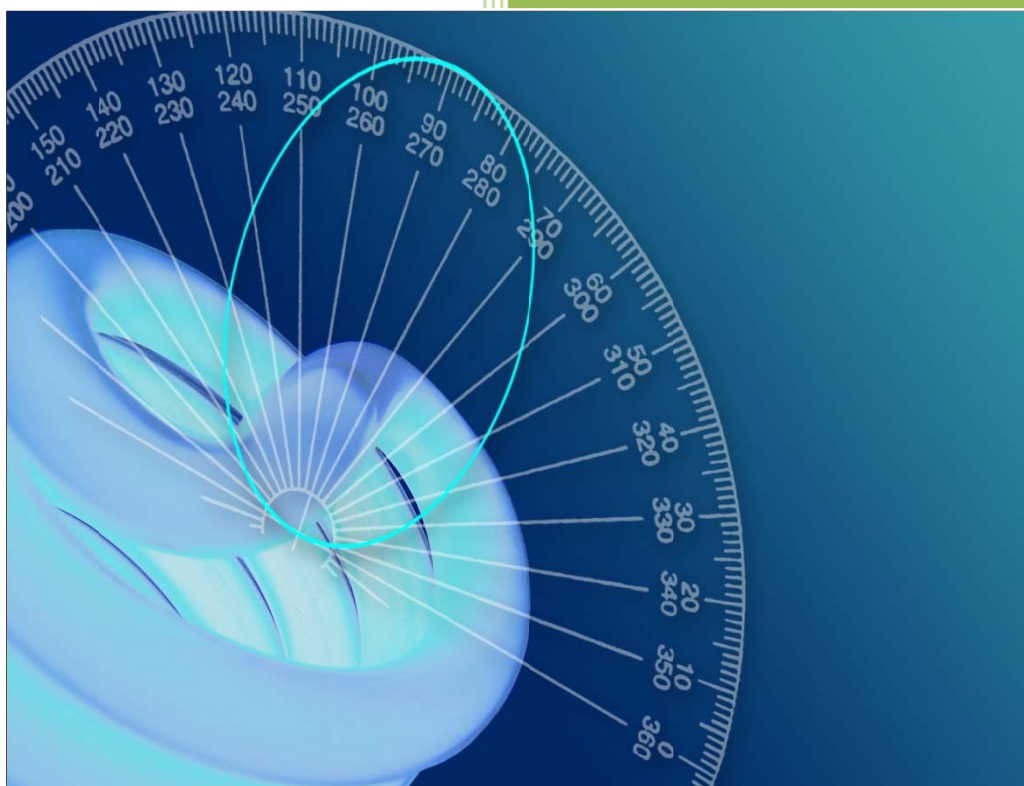


# Photometric Test Report



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/DC14071	Report Date: 11/03/2014	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: SH LIGHTING	Email: b.gregory@signalhouse.co.uk
Address: Cherrycourt Way, Stanbridge Road, Leighton Buzzard, Bedfordshire, LU7 4UH	

### Details of Product Tested

Manufacturer: SH LIGHTING	Source Type: LED
Model: 5FT BATTEN	Luminaire Type: DOWNLIGHT
Power Supply Used: Uninterruptible AC power supply	
Voltage(AC V) = 230.0	Current (mA)= 213
Power (Watts)= 43.46	Power factor= 0.887

### Results

Flux (lumens): 3521	
CIE 1931 Chromaticity Cx: 0.3193	CIE 1931 Chromaticity Cy: 0.3290
CRI (%):74.95	CCT (K): 6151

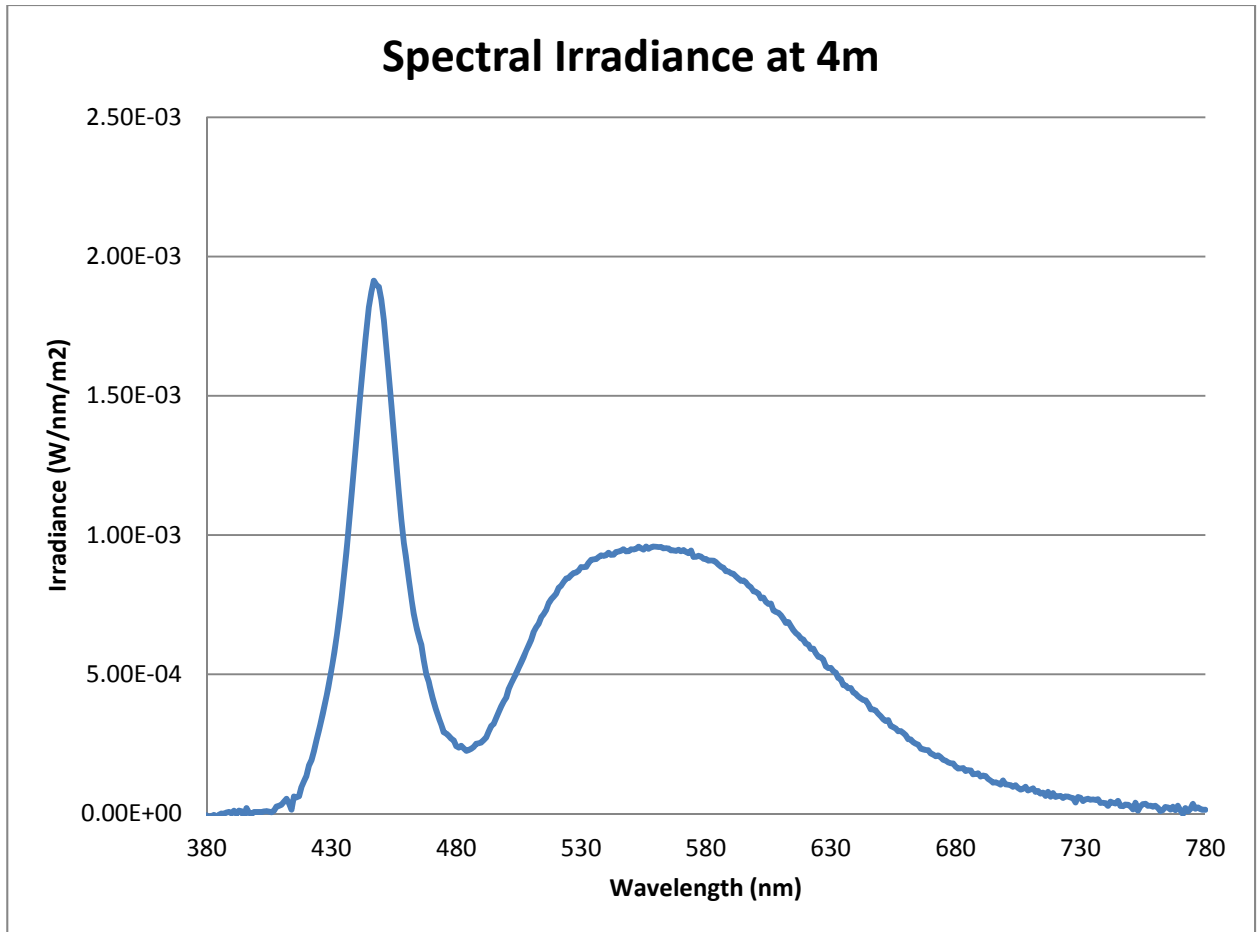


Figure 1: Spectral Irradiance

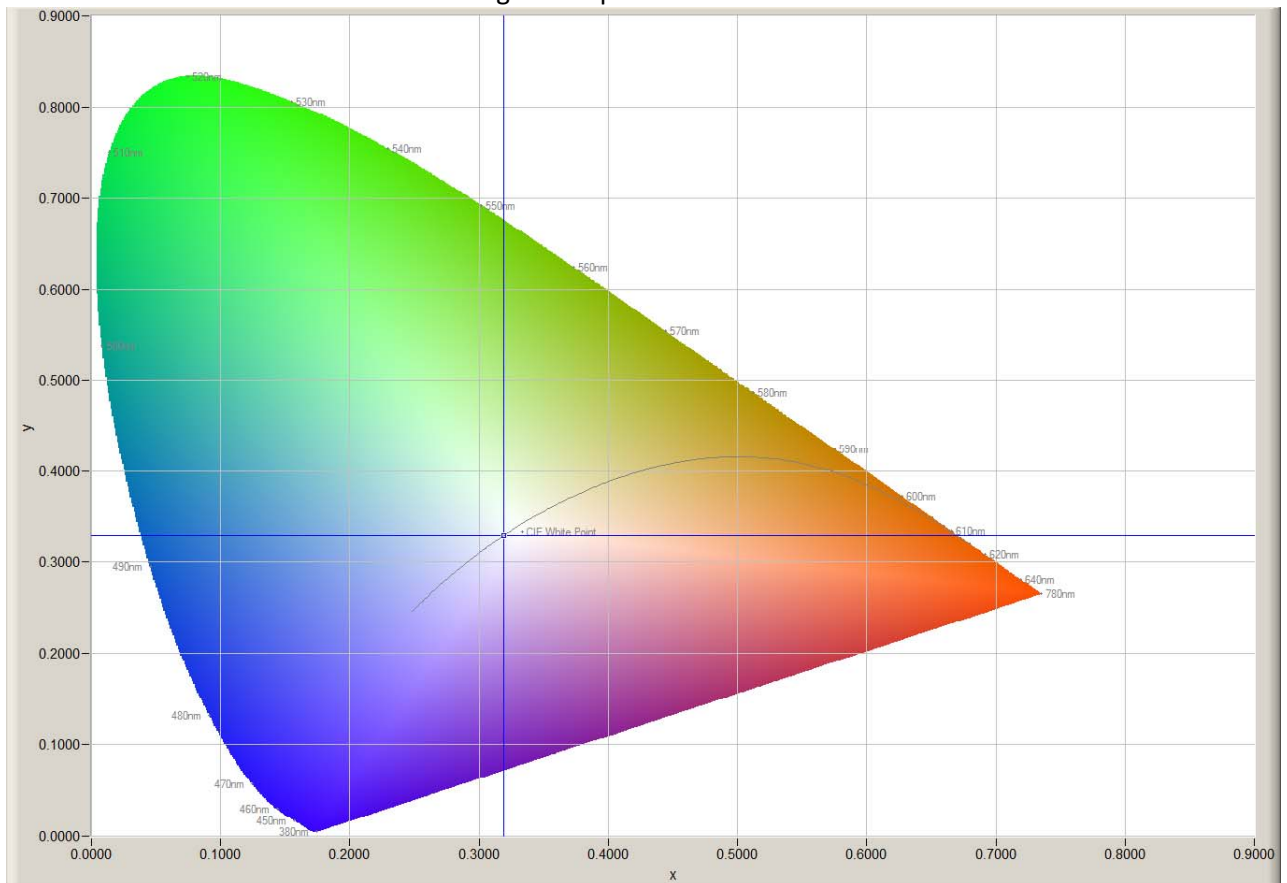


Figure 2: CIE 1931 diagram.

Goniophotometer Test

Date of Test: 20/02/2014	Ambient Temperature: 25°C	
Measurement Filename: 5FT BATTEN		
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: Specbos1201	Reference Photometer Serial Number: 2911670	
Traceable: to NPL standards, UKAS Accredited	Calibration Certificate Number: 13201	
Calibration Certificate Date: 15 <sup>th</sup> March 2013	Sample Stabilisation Time (minutes): 45	
Reference Photometer Calibration Uncertainty: $\pm 2.4\%$ ( $k=2$ , 20-200 lux, CIE illuminant A source)		
<b>Scan Set Up</b>		
<b>Direction</b>	<b>Range</b>	<b>Increment</b>
Inclination Zone 1	0-90°	3°
Azimuth	0-360°	10°
<b>Results</b>		
Integrated Luminous Flux (lumens):3521	Peak Intensity (3° Spot, candelas):979	Efficacy (lumens/Watt): 81
Beam Angle (50% of max intensity C0-180, degrees): 105.4		
Photometric Filename (IES LM-63-2002): 5FT BATTEN		
IES File – Absolute or Relative Format? ABSOLUTE		
Photometric Filename (EULUMDAT): 5FT BATTEN		
EULUMDAT File – Absolute or Relative Format? ABSOLUTE		

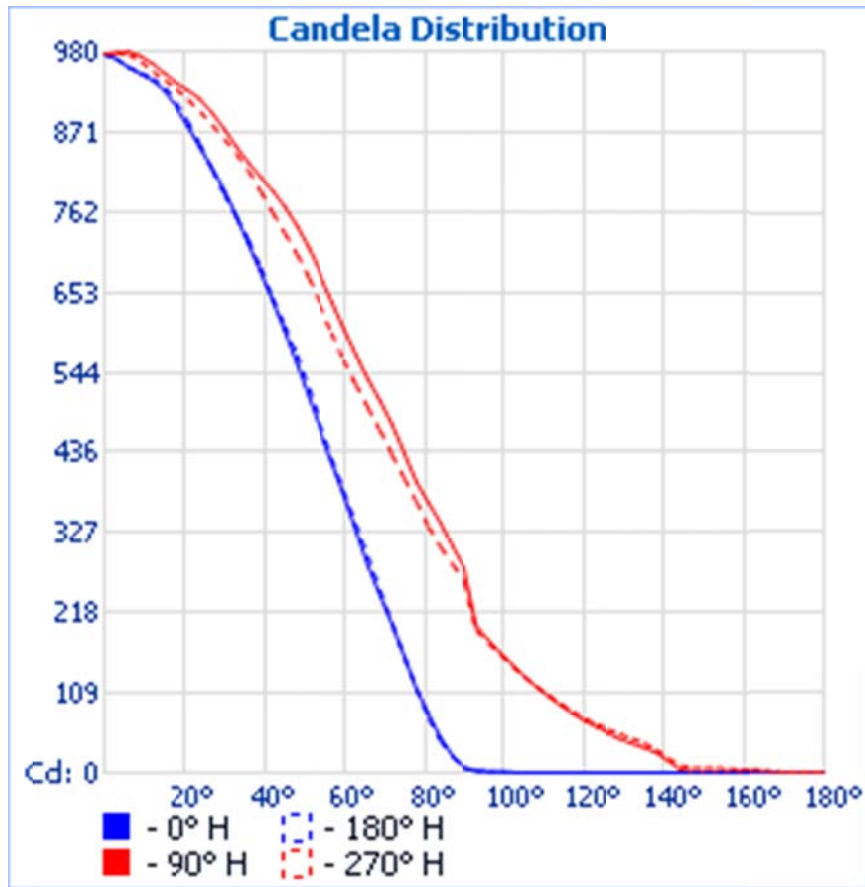


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

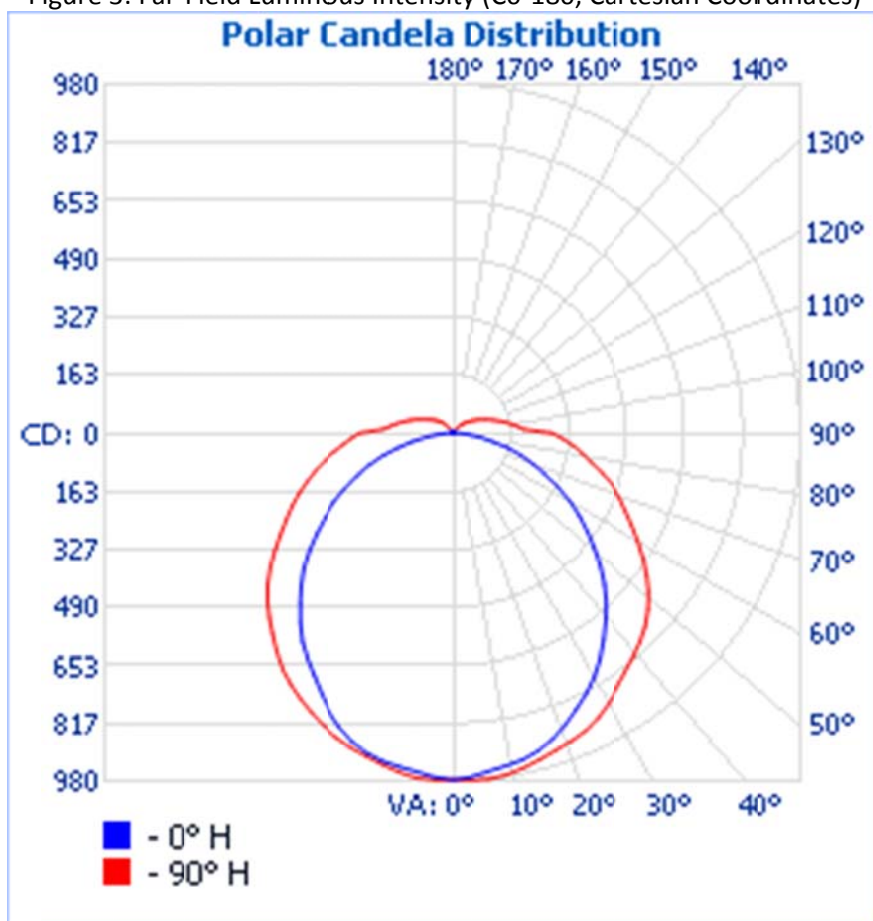


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

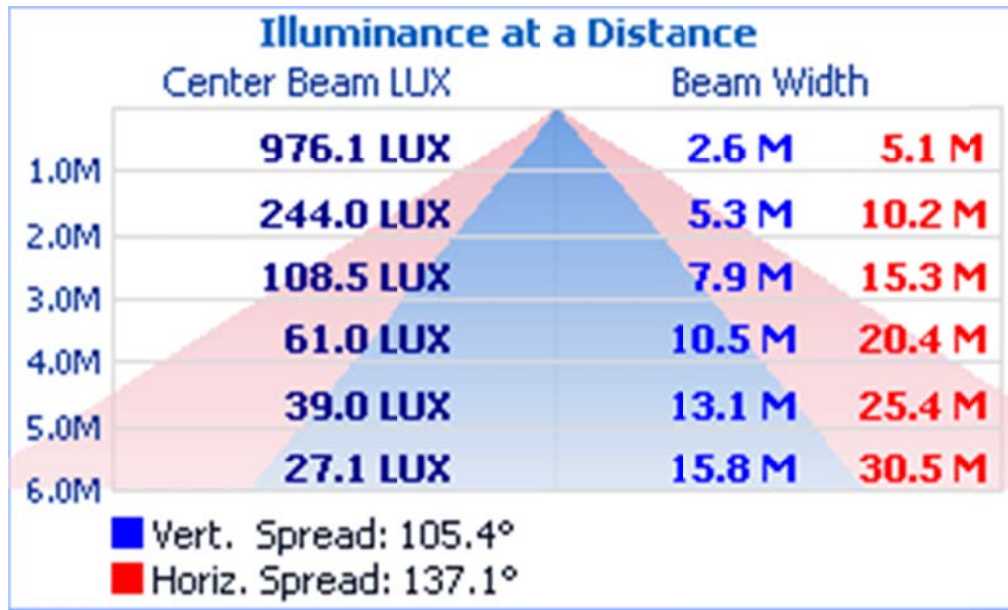


Figure 4. Cone diagram for mounting height of 6 metres.

Reflectance of	0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
Ceiling	0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
Walls	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		Viewed crosswise					Viewed endwise				
x	y										
2H	2H	16.4	17.9	16.8	18.4	18.9	20.7	22.2	21.2	22.7	23.2
	3H	17.2	18.7	17.7	19.2	19.7	23.0	24.4	23.5	24.9	25.5
	4H	17.5	18.9	18.0	19.4	19.9	24.3	25.6	24.8	26.1	26.7
	6H	17.7	18.9	18.2	19.4	20.0	25.6	26.8	26.1	27.3	27.9
	8H	17.7	18.9	18.2	19.4	20.0	26.2	27.4	26.7	28.0	28.5
	12H	17.6	18.8	18.2	19.3	19.9	27.0	28.1	27.5	28.7	29.2
4H	2H	17.5	18.8	18.0	19.3	19.9	20.9	22.2	21.4	22.7	23.3
	3H	18.5	19.7	19.1	20.2	20.8	23.3	24.5	23.9	25.0	25.6
	4H	19.0	20.0	19.5	20.6	21.2	24.7	25.8	25.3	26.3	26.9
	6H	19.2	20.1	19.7	20.7	21.3	26.1	27.1	26.7	27.7	28.3
	8H	19.2	20.1	19.8	20.7	21.3	26.9	27.8	27.5	28.4	29.0
	12H	19.2	20.1	19.8	20.6	21.3	27.7	28.6	28.3	29.1	29.8
8H	4H	19.7	20.6	20.3	21.2	21.8	24.8	25.7	25.4	26.2	26.9
	6H	20.1	20.8	20.7	21.4	22.1	26.3	27.0	26.9	27.6	28.3
	8H	20.3	20.9	20.9	21.6	22.2	27.2	27.8	27.8	28.5	29.1
	12H	20.3	20.9	20.9	21.5	22.2	28.1	28.7	28.7	29.3	30.0
12H	4H	19.9	20.7	20.5	21.3	22.0	24.8	25.6	25.4	26.2	26.8
	6H	20.5	21.1	21.1	21.8	22.4	26.3	27.0	26.9	27.6	28.3
	8H	20.7	21.2	21.3	21.9	22.5	27.2	27.8	27.8	28.4	29.1

Table 1. UGR values

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	976	976	976	976	976	976	976	976	976	976	976	976	976	976	976	976	976	976	976
3	970	970	971	973	974	975	977	978	978	978	978	977	975	973	972	971	970	970	970
6	958	959	962	965	967	970	974	977	979	979	977	974	969	965	962	961	959	958	959
9	949	951	953	954	957	960	966	971	974	974	971	965	958	952	950	949	951	951	951
12	940	942	943	944	948	951	956	961	964	963	959	954	947	943	942	942	943	944	944
15	926	928	930	931	933	939	946	953	953	950	948	945	939	934	931	930	929	929	931
18	905	909	909	912	914	922	932	943	942	937	939	939	931	923	918	914	907	909	912
21	879	881	885	891	897	903	914	928	930	928	930	928	917	906	901	896	885	884	886
24	850	851	861	869	878	885	894	909	914	916	916	908	895	887	878	868	859	853	855
27	822	823	832	845	853	861	873	887	898	898	896	885	877	871	857	845	830	817	820
30	792	793	800	814	824	834	850	864	880	875	874	866	858	849	831	825	808	777	786
33	756	757	763	784	799	813	830	841	854	851	851	841	829	815	796	795	781	743	755
36	718	719	727	754	770	784	807	823	827	829	826	812	800	782	758	755	744	711	724
39	680	681	693	711	731	750	774	799	804	810	804	788	778	758	728	706	705	677	686
42	641	643	652	672	697	719	745	767	781	791	781	763	751	730	702	669	662	642	645
45	600	604	609	640	661	685	714	738	757	769	754	733	713	692	664	638	615	606	607
48	555	564	572	609	626	651	678	708	730	743	723	705	677	655	623	611	571	564	568
51	510	523	529	569	593	622	646	673	700	712	694	674	646	623	591	576	526	519	522
54	465	477	491	519	556	590	612	640	662	678	661	638	608	590	560	524	491	469	475
57	423	430	447	482	520	554	578	607	628	641	623	599	573	554	530	478	448	429	429
60	379	387	405	449	483	520	548	572	597	604	583	564	544	520	489	435	397	381	384
63	330	345	369	412	448	484	515	538	563	568	552	532	514	484	441	397	363	335	340
66	283	300	324	370	412	445	472	504	527	535	525	498	478	450	405	357	311	291	295
69	241	253	283	322	370	408	432	468	491	505	494	466	440	416	371	309	266	248	249
72	202	208	242	284	336	376	405	436	458	473	459	437	407	382	338	270	228	205	204
75	159	165	199	245	303	347	381	408	426	435	424	407	376	348	301	239	192	164	159
78	115	124	161	211	272	314	353	377	395	396	389	374	348	313	266	210	156	125	116
81	81	94	136	187	245	289	326	350	366	368	359	345	318	278	234	181	132	87	74
84	48	68	106	160	211	262	299	316	332	340	334	316	291	249	205	156	102	63	44
87	23	46	86	133	183	235	269	279	309	308	299	286	263	220	180	124	79	41	21
90	7	28	69	116	165	202	244	250	277	278	279	263	240	203	159	111	64	26	7
93	3	13	42	75	111	142	169	190	197	201	199	191	170	138	109	75	41	13	3

96	2	9	31	61	94	123	149	169	179	182	178	168	148	120	90	58	29	8	2
99	1	6	22	48	77	105	128	146	161	164	160	146	127	103	76	47	22	6	1
102	1	4	19	40	68	94	115	132	145	149	144	133	115	95	68	41	19	4	1
105	1	2	16	35	58	82	104	119	129	132	129	119	104	82	58	36	15	2	1
108	1	1	12	30	51	72	91	105	115	117	114	105	91	71	50	31	13	2	1
111	0	1	10	26	44	62	80	93	101	104	101	93	80	62	43	27	11	2	1
114	0	1	7	22	38	53	69	81	88	92	89	81	70	53	37	22	8	1	1
117	0	1	5	18	32	46	60	71	77	81	78	71	61	46	32	18	6	1	1
120	0	0	3	13	26	40	53	63	69	71	69	63	54	40	26	12	3	0	1
123	0	0	2	8	20	35	46	55	61	62	60	56	46	35	21	7	2	0	0
126	0	0	1	3	15	30	41	49	53	55	53	49	41	30	15	3	1	0	0
129	0	0	1	2	9	24	36	43	46	47	45	43	36	25	8	1	1	0	0
132	0	0	1	1	4	17	30	38	40	40	40	38	31	19	5	1	0	0	0
135	0	0	1	1	2	11	23	32	35	35	34	32	24	13	2	1	0	0	0
138	0	0	0	1	1	5	15	22	26	28	26	22	17	7	1	1	0	0	0
141	0	0	0	1	1	2	7	12	16	16	15	13	8	3	1	1	0	0	0
144	0	0	0	1	1	1	2	5	6	5	6	5	3	1	1	1	0	0	0
147	0	0	0	1	1	1	2	2	2	2	2	2	2	1	1	1	0	0	0
150	0	0	0	1	1	1	2	2	2	2	2	2	2	1	1	1	0	0	0
153	0	0	0	0	1	1	2	2	2	2	2	2	2	1	1	1	0	0	0
156	0	0	0	0	1	1	1	2	2	2	2	2	2	1	1	0	0	0	0
159	0	0	0	0	1	1	1	1	2	2	2	1	1	1	1	0	0	0	0
162	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0
165	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0
168	0	0	0	0	0	0	0	1	1	1	1	1	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 2a. Luminous intensity values, azimuth 0-180°



	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350
<b>0</b>	976	976	976	976	976	976	976	976	976	976	976	976	976	976	976	976	976
<b>3</b>	970	970	972	973	975	976	977	977	977	977	976	974	973	971	971	969	970
<b>6</b>	959	961	963	965	968	971	974	976	976	974	971	967	963	961	959	958	957
<b>9</b>	950	950	950	952	954	958	962	965	966	965	961	956	950	946	945	946	947
<b>12</b>	941	939	939	942	944	944	947	951	953	952	949	946	942	938	934	934	937
<b>15</b>	929	927	929	935	938	936	937	940	941	938	935	934	933	928	921	919	921
<b>18</b>	914	911	914	921	926	926	929	932	929	923	918	919	920	912	904	897	902
<b>21</b>	891	892	892	898	903	908	915	917	916	911	904	903	903	894	883	877	877
<b>24</b>	865	867	861	868	879	886	894	897	899	900	892	884	883	872	859	854	852
<b>27</b>	839	835	829	837	855	865	871	875	881	887	876	863	859	848	834	825	825
<b>30</b>	810	796	797	808	830	843	848	853	862	869	857	839	829	817	803	791	793
<b>33</b>	774	756	774	789	807	820	826	825	841	843	831	813	803	789	772	758	758
<b>36</b>	730	717	754	767	777	791	806	799	818	809	802	788	778	759	740	727	721
<b>39</b>	682	687	717	729	742	756	780	781	790	780	775	761	746	722	697	692	681
<b>42</b>	636	655	674	692	713	729	747	759	760	752	745	730	706	686	660	649	637
<b>45</b>	599	622	627	655	682	699	719	724	732	721	715	694	671	651	627	610	596
<b>48</b>	562	582	584	622	644	661	690	687	704	689	688	660	641	616	590	575	559
<b>51</b>	523	531	548	584	607	627	652	659	672	661	657	628	608	578	549	531	520
<b>54</b>	480	488	505	538	574	595	613	631	636	629	622	593	569	535	505	491	475
<b>57</b>	436	442	465	496	536	563	577	598	598	595	583	558	528	501	470	445	430
<b>60</b>	394	401	423	455	494	529	546	558	561	558	546	524	491	464	431	400	387
<b>63</b>	353	368	385	413	455	493	516	524	527	521	512	491	456	424	390	361	342
<b>66</b>	309	328	351	378	423	453	481	494	496	486	476	454	421	388	355	315	293
<b>69</b>	264	289	313	342	388	415	449	462	465	457	438	416	387	351	316	275	251
<b>72</b>	218	250	278	313	350	386	416	428	433	433	404	383	354	319	278	240	213
<b>75</b>	174	207	243	281	316	356	380	395	401	400	374	351	322	284	242	205	173
<b>78</b>	132	169	210	250	283	322	342	364	369	361	345	320	288	251	211	172	132
<b>81</b>	94	138	179	216	248	283	307	330	335	325	317	291	259	223	189	148	99
<b>84</b>	68	110	157	190	219	260	281	306	307	302	288	268	233	195	164	116	71
<b>87</b>	43	84	128	168	199	233	256	277	284	277	265	241	211	172	138	89	48
<b>90</b>	27	66	114	150	184	212	234	252	260	261	246	217	184	151	115	70	29
<b>93</b>	15	45	78	109	134	161	183	193	195	194	185	164	137	110	80	46	16

<b>96</b>	13	38	65	95	117	145	164	174	177	176	168	149	122	96	69	38	14
<b>99</b>	11	31	56	82	103	126	144	159	162	160	147	129	107	82	58	32	11
<b>102</b>	9	26	48	72	94	112	129	141	146	142	131	114	96	74	49	27	9
<b>105</b>	8	23	43	64	84	102	118	128	131	128	119	105	85	65	43	24	8
<b>108</b>	6	20	37	56	75	92	105	115	118	115	108	94	75	57	38	20	7
<b>111</b>	5	16	32	50	67	83	94	103	106	103	97	84	67	50	33	16	5
<b>114</b>	4	13	28	44	60	73	84	92	95	91	86	75	59	44	28	13	4
<b>117</b>	4	9	23	38	53	65	75	81	84	81	76	66	53	39	23	10	4
<b>120</b>	3	7	19	34	47	58	67	73	74	73	68	59	47	34	19	7	3
<b>123</b>	3	6	14	28	41	51	60	65	66	65	61	52	42	28	14	6	3
<b>126</b>	2	5	10	22	36	46	53	58	60	58	53	47	36	21	10	5	2
<b>129</b>	1	4	7	16	29	40	47	51	53	51	47	41	30	17	6	4	1
<b>132</b>	1	3	5	11	22	34	41	45	47	46	42	34	23	10	5	4	1
<b>135</b>	1	3	5	7	14	24	34	39	41	39	35	25	15	7	5	3	1
<b>138</b>	1	3	4	5	7	14	23	30	32	30	24	16	9	6	4	3	1
<b>141</b>	1	2	4	5	6	9	13	18	20	19	14	9	7	5	4	2	1
<b>144</b>	0	2	3	5	6	7	7	9	10	9	8	7	6	5	3	2	1
<b>147</b>	0	2	3	4	5	7	7	7	7	7	7	6	5	4	3	2	0
<b>150</b>	0	1	3	4	5	6	7	7	7	7	7	6	5	4	2	1	0
<b>153</b>	0	1	2	3	4	5	6	6	7	6	6	5	4	3	2	1	0
<b>156</b>	0	0	2	3	4	4	5	5	6	5	5	4	4	3	1	0	0
<b>159</b>	0	0	1	2	3	4	4	5	5	5	4	4	3	2	1	0	0
<b>162</b>	0	0	1	1	2	3	3	4	4	4	3	3	2	1	0	0	0
<b>165</b>	0	0	0	1	1	2	2	3	3	3	3	2	2	1	0	0	0
<b>168</b>	0	0	0	0	1	1	1	2	2	2	1	1	1	0	0	0	0
<b>171</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>174</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>177</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>180</b>	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°



Photo 1: Luminaire on goniometer mount

Signature:

A handwritten signature in black ink on a light blue background. The signature is cursive and appears to read "D Chambers".

---

Print Name:

D CHAMBERS

---

Date:

11/03/2014

---

Test Engineer

*Duly authorised to sign on behalf of:*

Photometric and Optical Testing Services LLP