Goniophotometric Test Report

TEST ARTEFACT

The measurement device (DUT) was LED park light. The DUT worked fine during the calibration and no defects were observed. The DUT was mounted on the goniometer i.e. the AC input cable of the LUT was located in the direction of the C180 plane.

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MEASUREMENT METHOD

The measurements were made by a goniospectrophotometer SSL-25-240-60 at the dark room of SSL Resource Ltd. The spectral radiant intensities of a light source at different directions were measured with a calibrated spectrometer located at a known distance from the light source.

MEASUREMENT UNCERTAINTY

The photometer (SSL L-200, sn L200-004) used in goniophotometer is traceable to national standard of illuminance responsivity at VTT-MIKES (Certificate of calibration T-R 1025 signed on 9 February 2018). The power meter of type Chroma 66201-30000266 is traceable national standard of electrical parameters at NIST (Calibration date 6 September 2016). The expanded measurement uncertainties of the luminous flux and luminous efficacy are ±3.8% and ±4.0% (k = 2), respectively.

MEASUREMENTS

Table below describes the measurement conditions. The luminaire under test and photometer/spectrometer were mounted onto the same optical axis and perpendicular by an alignment laser. The measurement distance from the rotation axis to the photometer optical receiving surface was measured by a laser distance meter.

Table - Measurement information

Ambient temperature of the laboratory	24.5 degC
Power supply	229.8 Vac
Measurement distance	12431 mm
Location of the rotation axis (behind the outermost surface of the optics)	0 mm
Angular step, C plane	15.0 deg
Angular step, gamma angle	2.5 deg
Maximum gamma angle	150.0 deg
Stabilization time	59 min

Table. Luminous intensity data (cd) at measured C planes (rows) and gamma angles (columns)

	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345
0.0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
2.5	42	42	42	41	41	42	42	42	42	42	42	42	47	47	49	49	48	49	49	50	49	49	48	48
5.0	51	51	52	51	52	53	52	51	51	51	51	51	56	58	60	61	63	63	64	61	68	70	65	66
7.5	99	83	89	105	91	93	80	84	78	81	78	70	154	97	108	106	166	121	120	114	154	127	100	113
10.0	158	138	150	136	128	154	133	136	165	131	122	125	302	254	260	175	273	188	306	188	197	145	241	203
12.5	207	215	241	257	182	206	174	174	211	267	224	192	186	239	273	182	300	225	270	211	310	239	361	212
15.0	242	245	299	323	204	306	218	266	271	271	279	252	393	331	293	352	251	305	451	322	277	414	332	249
17.5	343	495	401	368	337	463	285	312	370	374	335	395	313	470	517	310	388	485	485	511	482	384	551	482
20.0	545	554	584	378	518	520	657	573	443	512	570	540	686	580	594	644	567	564	826	585	581	676	641	551
22.5	853	786	663	578	646	752	761	681	668	716	576	775	832	725	717	708	845	704	781	795	784	769	831	738
25.0	831	795	740	668	886	749	655	806	845	724	708	773	878	572	687	651	939	578	565	731	868	679	689	699
27.5	842	624	688	738	775	690	546	681	851	793	615	805	803	731	646	641	741	663	761	734	670	754	659	611
30.0	823	662	771	731	634	768	712	658	705	827	651	805	690	703	760	574	644	665	821	759	639	715	789	672
32.5	692	729	809	659	696	823	695	579	655	817	761	837	693	670	808	580	728	580	852	743	658	651	838	587
35.0	708	666	837	633	834	822	709	669	798	763	796	731	710	694	829	684	736	629	892	841	721	741	812	709
37.5	797	639	868	827	816	827	735	683	868	903	822	808	891	785	834	807	813	650	935	839	846	921	804	720
40.0	918	836	834	824	921	1028	856	798	892	977	867	905	957	943	905	890	898	862	966	1037	922	1013	871	894
42.5	940	833	877	966	964	986	896	900	932	960	834	1022	988	853	899	871	949	805	953	992	986	914	874	888
45.0	1042	795	865	941	1097	948	882	858	1037	955	824	979	1048	919	822	846	912	862	949	1014	958	870	810	922
47.5	1039	798	878	957	1009	991	947	852	996	946	812	935	985	824	875	835	919	743	905	891	956	872	866	811
50.0	896	747	869	937	876	876	754	799	936	951	800	809	785	758	802	788	798	716	799	861	867	817	789	764
52.5	776	743	814	831	854	821	730	784	835	853	798	767	724	753	757	711	772	714	774	799	743	729	746	699
55.0	724	682	751	786	707	810	726	724	711	809	697	774	715	726	670	704	659	665	773	776	661	721	656	706
57.5	710	668	687	749	679	764	709	663	657	787	668	711	715	673	662	660	660	605	765	690	666	669	648	643
60.0	660	663	669	634	669	737	654	651	653	695	648	679	613	613	644	597	645	591	650	669	653	615	633	636
62.5	592	605	611	618	652	619	594	644	601	628	648	623	593	582	585	582	589	575	636	607	589	601	578	577
65.0	582	539	550	604	550	601	538	543	582	601	511	602	571	525	496	533	531	527	548	549	534	523	483	526
67.5	505	524	462	499	532	543	456	527	505	503	467	541	455	406	434	465	467	393	426	434	471	445	433	410
70.0	437	400	405	409	442	419	397	401	438	409	395	417	379	383	382	383	360	373	404	401	360	393	380	383
72.5	358	376	381	357	357	383	377	351	356	386	370	367	334	324	325	327	327	316	344	343	332	338	327	332
75.0	326	321	328	325	325	333	320	320	324	320	313	329	296	286	288	288	289	279	303	300	292	299	290	291
77.5	285	277	282	281	283	287	277	276	282	276	269	285	246	239	243	242	243	235	254	249	245	247	244	245
80.0	234	228	233	231	233	238	230	228	233	227	221	236	187	190	195	194	196	189	202	191	192	197	195	196
82.5	181	177	180	181	181	186	180	179	183	177	174	184	125	131	133	131	129	129	136	126	126	127	126	131
85.0	105	104	108	108	107	111	107	103	107	102	101	105	66	69	72	69	67	68	71	65	65	67	66	69
87.5	53	54	57	57	55	57	56	54	56	53	53	55	35	36	37	36	35	35	36	34	33	35	34	35
90.0	26	28	29	29	29	29	29	28	28	28	27	28	18	18	19	19	18	18	18	16	16	17	17	18
92.5	14	15	15	16	15	17	15	15	15	15	14	16	11	11	11	10	10	10	10	9	9	10	10	10
95.0	8	8	9	10	9	10	9	9	9	9	8	9	8	8	8	7	7	7	7	7	7	7	7	7
97.5	7	8	8	9	8	9	9	8	8	8	8	8	9	8	8	8	7	7	7	7	7	7	7	7
100.0	8	8	8	9	9	9	9	9	9	8	8	9	9	9	9	8	8	8	8	7	8	8	8	8
102.5	8	9	9	10	9	10	10	8	9	9	8	9	10	9	9	9	8	8	8	6	8	8	8	9
105.0	9	9	9	10	10	11	10	8	10	9	9	9	10	10	9	9	9	9	9	6	9	9	9	9
107.5	9	9	10	11	10	11	10	8	10	10	9	10	10	9	10	9	9	9	8	6	9	9	9	9
110.0	9	9	9	10	10	11	10	7	10	9	9	9	9	9	9	9	8	8	8	5	8	9	9	9
112.5	8	8	9	10	10	10	9	6	9	9	8	9	9	8	9	9	8	8	8	5	8	8	9	9
115.0	8	8	9	10	9	10	9	6	9	9	8	9	9	9	9	9	8	8	8	5	8	8	8	8
117.5	8	7	8	9	9	10	9	5	9	9	8	9	10	9	10	9	9	8	8	5	8	9	9	9
120.0	8	8	9	9	9	10	10	5	9	9	8	9	10	9	10	10	9	8	8	5	8	9	9	9
122.5	9	8	9	9	9	10	9	5	9	9	9	10	10	8	10	10	9	9	7	5	8	9	10	10
125.0	9	7	9	9	9	10	9	5	9	9	9	10	11	6	11	11	10	9	7	5	9	9	10	10
127.5	10	7	10	10	9	10	8	5	9	9	9	10	11	6	11	11	10	9	6	5	9	10	11	11
130.0	10	7	10	10	9	10	7	5	9	9	9	11	11	6	11	11	10	8	6	5	8	10	11	11
132.5	9	7	10	10	9	9	7	5	8	9	9	11	10	6	10	12	10	8	5	5	8	10	11	11
135.0	8	7	10	10	9	9	6	5	7	9	9	11	10	5	9	11	10	7	5	4	7	9	10	10
137.5	6	6	9	9	8	8	5	4	6	8	8	10	7	4	6	8	7	5	4	4	5	6	7	7
140.0	4	5	6	7	7	7	5	4	6	7	7	7	5	4	5	5	5	5	4	3	4	5	5	5
142.5	4	3	5	5	5	6	4	3	5	6	5	5	4	3	4	4	4	4	3	2	4	4	4	4
145.0	3	3	4	5	5	5	4	2	4	5	5	4	3	2	3	4	4	3	2	2	3	3	4	4
147.5	2	2	3	4	4	4	3	2	4	4	3	3	2	1	2	2	2	2	1	1	2	1	2	1
150.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table. Measurement results of the main luminous parameters

Luminous flux	Input power	Luminous efficacy	LOR	DWFF	Luminous intensity (g=0)
3287.0 lm	48.00 W	68.5 lm/W	100.0 %	98.6 %	38 cd

Table. Electrical parameters during the light measurements.

	Value	St.dev.
Pin	48.02 W	0.16 %
PF	0.986	0.15 %
Vin	229.8 V	0.02 %
If	0.212 A	0.14 %

Table. Beam widths at two perpendicular planes

	Beam angle, FWHM, 50% (deg)	Beam angle, 10% (deg)	Effective beam direction from g=0
C0-180	181.3	284.1	0.8
C90-270	181.6	282.8	-1.0

Figure. Polar curve of the angular luminous intensity distribution at two perpendicular C planes and at C plane with maximum luminous intensity.

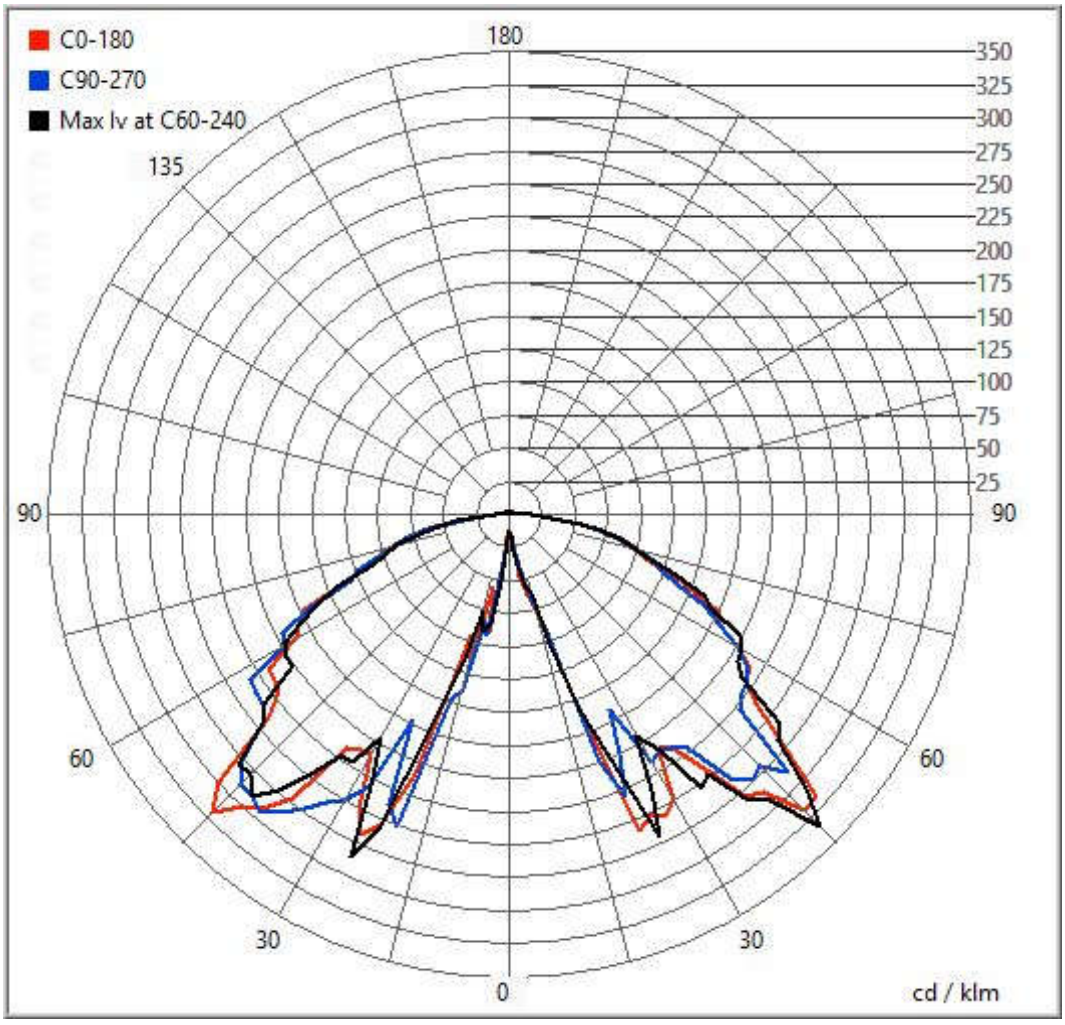


Figure. Luminous intensity distribution in cartesian diagram at all measured C planes

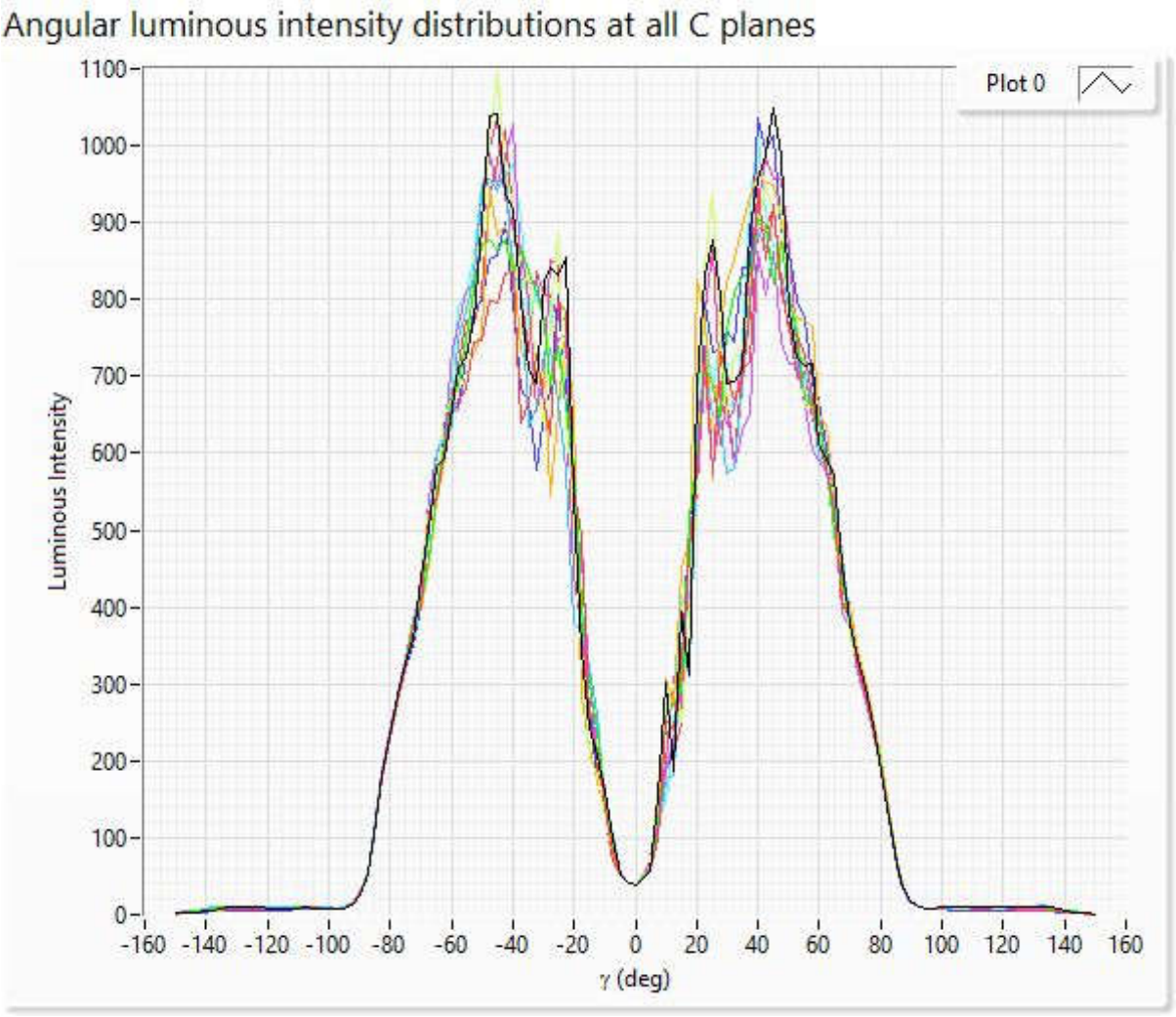
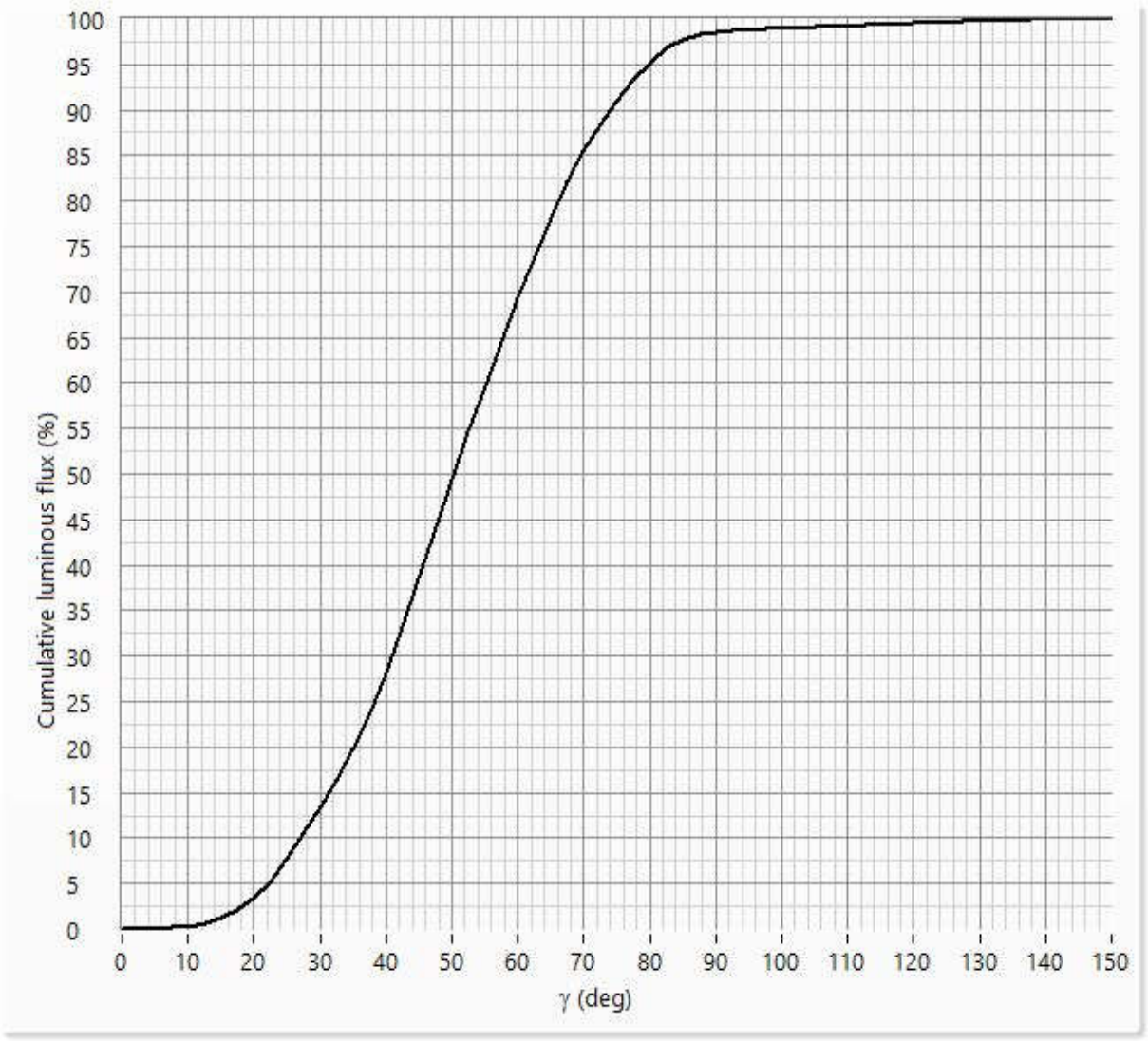


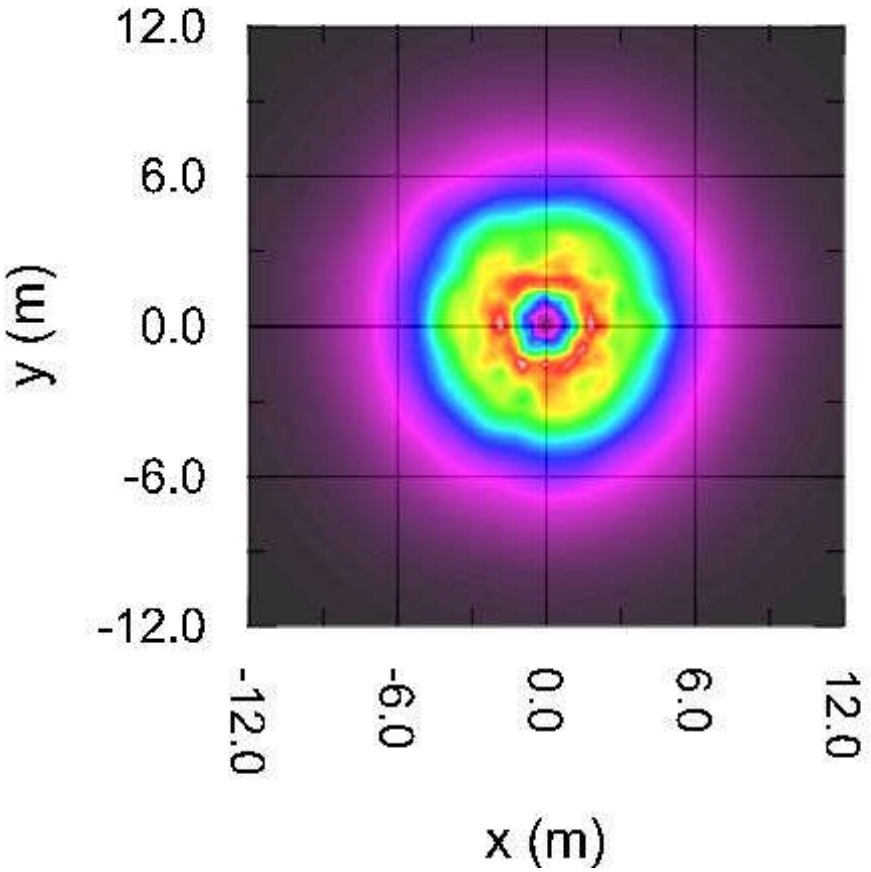
Table. Zonal lumen summary

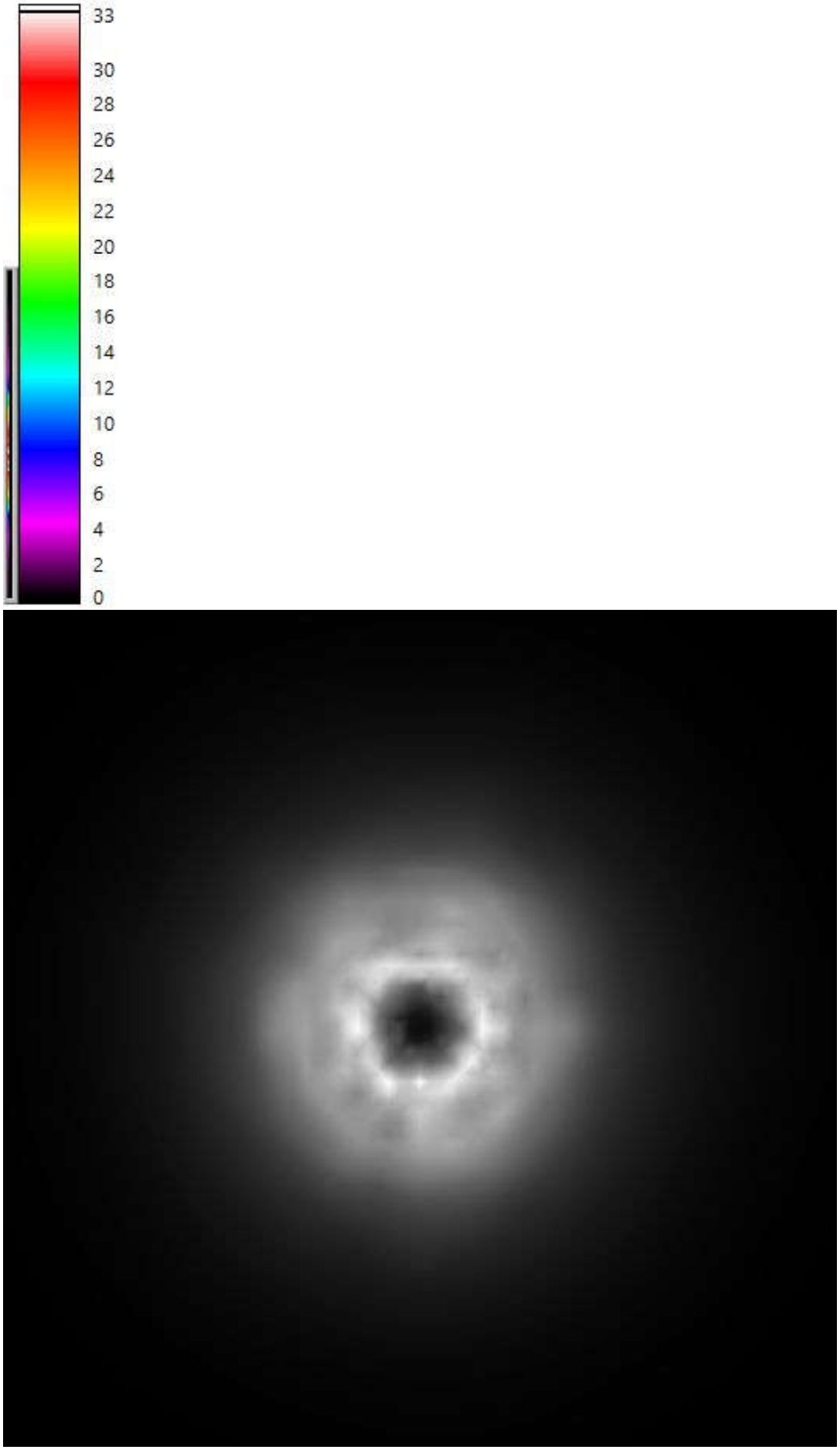
	Lumens	Relative lumens (%)
0-20	110.20	3.35
0-30	439.20	13.36
0-40	926.40	28.18
0-60	2277.40	69.29
0-80	3131.20	95.26
0-90	3241.10	98.60
10-90	3231.10	98.30
20-40	816.20	24.83
20-50	1514.50	46.08
40-70	1881.90	57.25
40-90	2314.70	70.42
60-80	853.80	25.98
60-90	963.70	29.32
70-80	322.90	9.82
80-90	109.90	3.34
90-110	21.40	0.65
90-120	29.90	0.91
90-130	37.90	1.15
90-150	45.90	1.40
90-180	45.90	1.40
110-180	24.50	0.75
0-180	3287.00	100.00

Figure. Cumulative luminous flux



Floor illuminance figures. Mounting height of 4.0 m. C rotation of 0.0 deg. Gamma rotation of 0.0 deg.Maintenance factor = 0.80.





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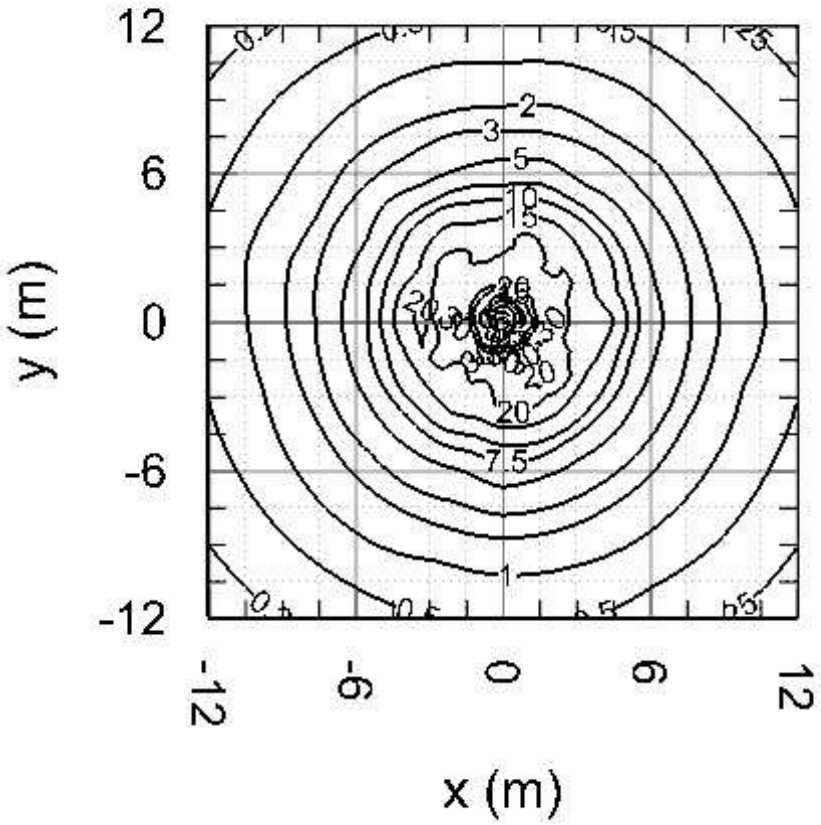
12
6
0
-6
-12
y (m)
-12
-6
0
6
12
x (m)
2
3
5
10
15
20
20
7.5
1