

**LABORATORIUM VOOR
LICHTTECHNOLOGIE**



Laboratorium voor Lichttechnologie

Gebroeders De Smetstraat 1 - 9000 Gent

**Stralingspatroon en lumenoutput van
LED SPOT 24° en 40°**

Klant:	Eden Design
Uitvoerend medewerker:	Paul Stoop & Richard Vanraes
Meting uitgevoerd op:	01/10/2012
Rapport afgeleverd op:	11/10/2012

1. Specificaties van het object

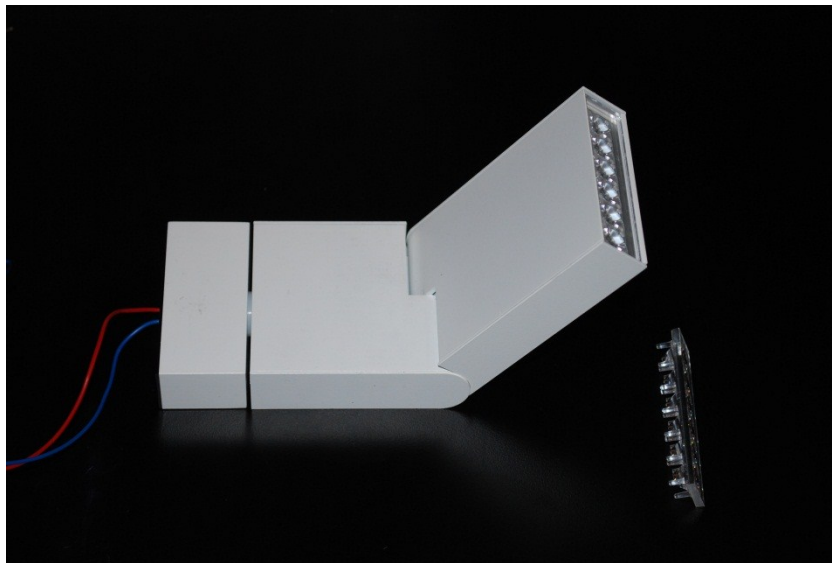
1.1. Algemeen

Productnaam: LED SPOT 24°

Type: LED armatuur met vervangbare lens 40°

Artikel nr.:

Opmerkingen: Driver: Mean Well APV-16-24, output 24VDC en 0.67A



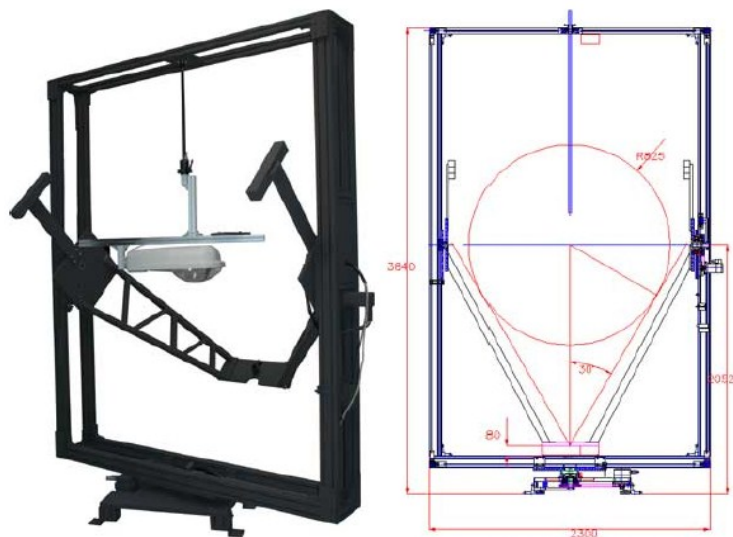
1.2. Referenties

De metingen, verwerking en procedures zijn gebaseerd op volgende normen:

- CIE TECHNICAL REPORT CIE 121: "The photometry and goniophotometry of luminaries"
- EN 13032-1 : " Measurement and presentation of photometric data of lamps and luminaires - Part 1: Measurement and file format"
- CIE 63 "The spectroradiometric measurement of light sources"
- CIE 15 "Colorimetry"

1.3. Meetapparatuur

Er werd gebruik gemaakt van de RIGO 801 near field photogoniometer met volgende eigenschappen:



Size of measuring object:	$\leq 1500 \text{ mm} \dots 1800 \text{ mm}$
Space required:	$L \times W \times H = \leq 2600 \times 2600 \times 3100 \text{ mm}^3 \dots 3300 \times 3300 \times 3900 \text{ mm}^3$
Movement:	The measuring camera and the illuminance meter are moved on a sphere around the lamp (two independent axes arranged vertically to each other (δ, ϕ)); mounted to a fixed upper point.
Travel path:	$\phi = 0^\circ \dots 360^\circ, \delta = 4.6^\circ \dots 352.5^\circ \dots \delta = 5^\circ \dots 355^\circ$
Measuring width:	270 mm
Fields of view	Type dependent, different optical lenses
Positioning accuracy:	$\phi < 0.05^\circ, \delta < 0.05^\circ$
Repetitive accuracy:	$\phi < 0.02^\circ, \delta < 0.02^\circ$

De meetonzekerheid op de fotometrische grootheden bedraagt:

- Intensiteit: 3%
- Flux: 1%

De meetonzekerheid op de temperatuur van de acclimatiseerde ruimte bedraagt:

- Temperatuur: $25 \pm 1^\circ\text{C}$

1.4. Uitlijning van het testobject

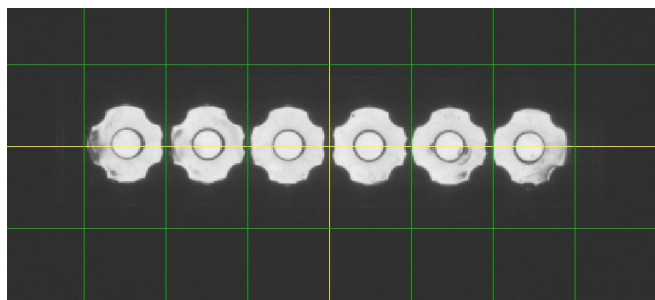


Fig 1: camerabeeld van de uitlijning van het testobject met 24° lens volgens de z-as.

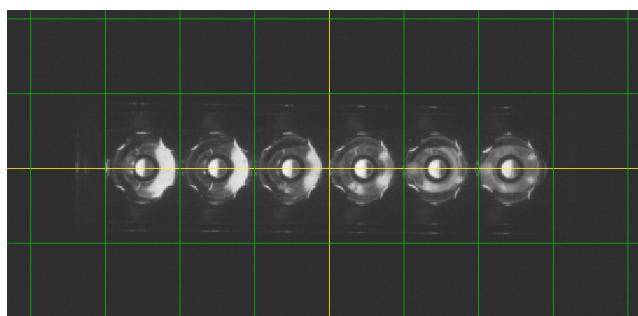


Fig 1a: camerabeeld van de uitlijning van het testobject met 40° lens volgens de z-as. Een lichte verschuiving van de lens ten opzichte van de LED's kan reeds visueel een mismatch vertonen. Deze werd in latere metingen gecorrigeerd.

1.5. Stabilisatie van het testobject

Voor het testen van de stabiliteit van het testobject werd het testobject minstens 30 min aangeschakeld zodat de lichtoutput tijd heeft om stabiel te worden. Tijdens het stabiliseren wordt de verlichtingssterkte (in lux) gemeten. Een lamp is stabiel indien de verandering in verlichtingssterkte in een periode van 5 minuten lager ligt dan 0.5% (Target). Fig 2 geeft de verlichtingssterkte (illuminance) en de variatie hierop weer.

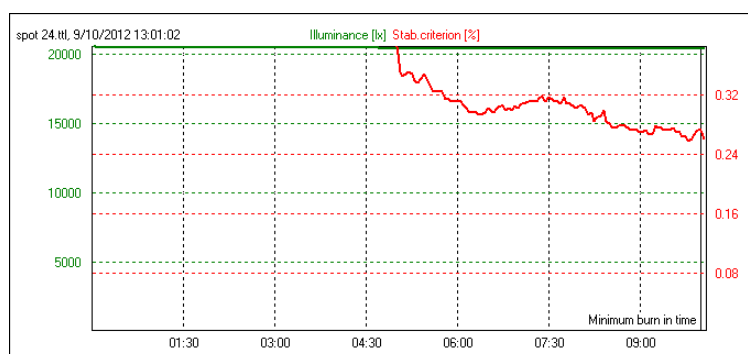


Fig 2: Controle stabiliteit van het testobject voor het uitvoeren van de meting.

1.6. Grafische voorstelling van het stralingspatroon

1.6.1. 24° lens

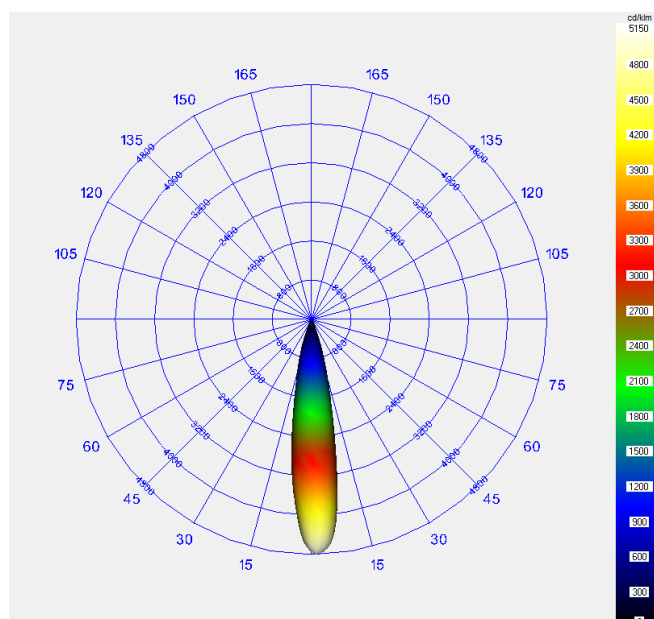


Fig 3: 3D-stralingspatroon C0-C180

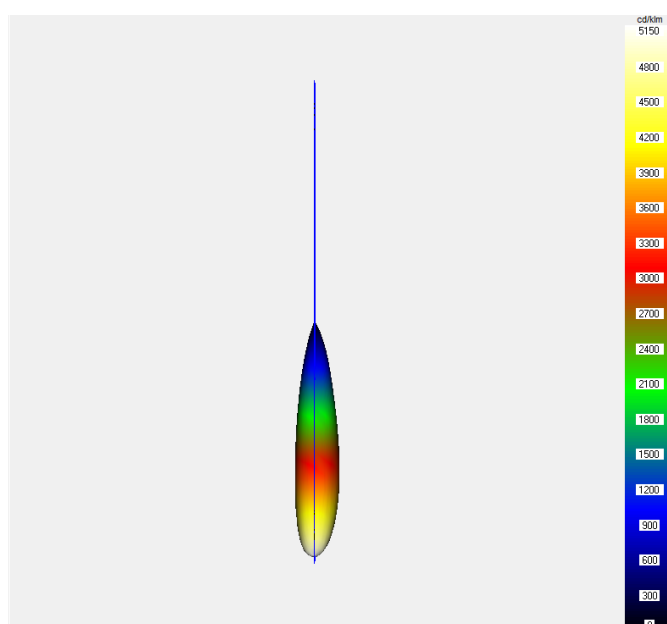


Fig 3a: 3D-stralingspatroon C90-C270

De maximale lichtintensiteit bedraagt 5155.3cd/klm onder een hoek van 1° in het 356° C*-vlak. De bundelbreedte bedraagt 20°.

Armatuurcategorie volgens CIE: 100

CIE Flux code: 95 99 100 100 105

1.6.2. 40° lens

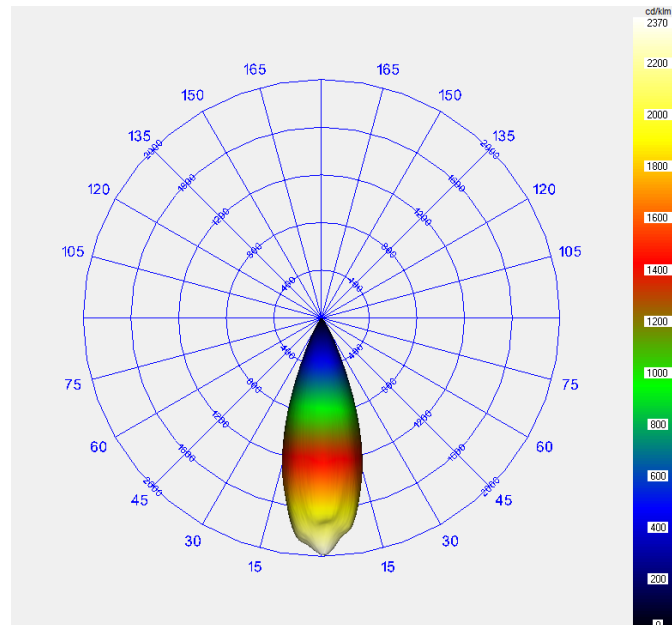


Fig 4: 3D-stralingspatroon C0-C180

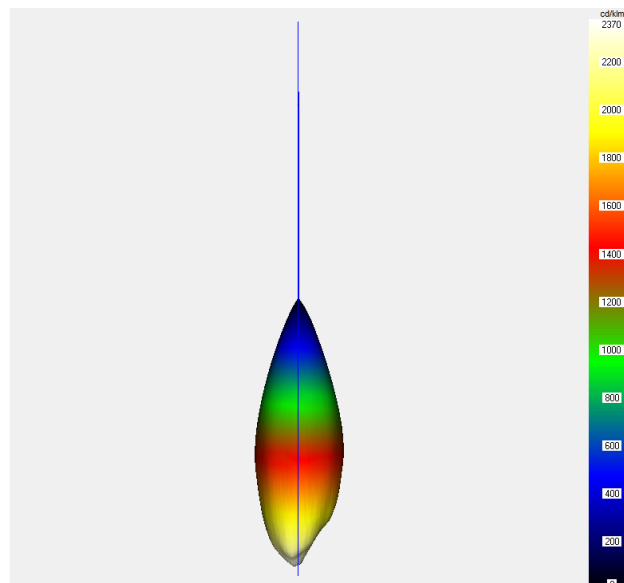


Fig 4a: 3D-stralingspatroon C90-C270

De maximale lichtintensiteit bedraagt 2378cd/klm onder een hoek van 1° in het 46° C-vlak. De bundelbreedte bedraagt 36°.

Een effen stralingspatroon zoals bij de 24° lens werd verwacht. Het lichtjes vervormde stralingspatroon is echter afkomstig van een minimale mismatch tussen de lens en de LED's. Deze kon echter niet visueel verbeterd worden.

Armatuurcategorie volgens CIE: 100

CIE Flux code: 95 99 100 100 101

1.7. Elektrische meetdata

De weergegeven elektrische waarden hebben betrekking op het volledige systeem (driver inbegrepen). De elektrische data was dezelfde voor beide lenzen, de data wordt slechts één keer weergegeven.

toegevoerde spanning [V]	230
Verbruikt vermogen [W]	10.82
Verbruikte stroom [mA]	0.107
Powerfactor [-]	0.44
Totaal Harmonische Distorsie [%]	199.6

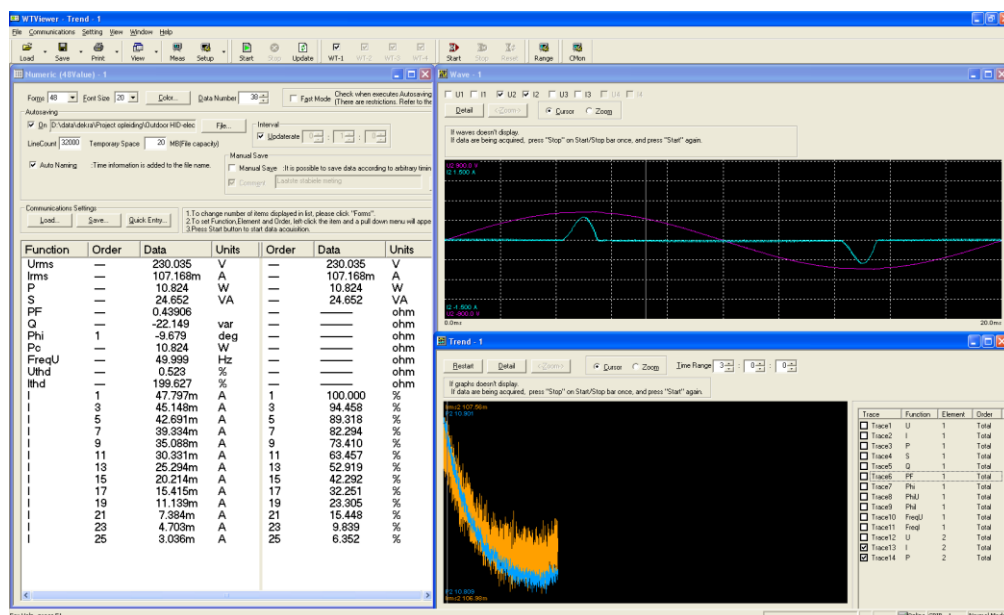


Fig 4: Elektrische meetdata

1.8. Opmerkingen bij onderstaande meetdata

De intensiteiten die niet weergegeven worden in de intensiteitstabel voor gammahoeken zijn gelijk aan 0 cd/klm. De totale en nominale lumenoutput van het armatuur werden op 607.95 lumen genomen omdat het onmogelijk is de individuele lumenpakketten van de LED's afzonderlijk te bepalen. Hierdoor kan de LOR van het toestel niet berekend worden en wordt standaard op 100% genomen.

LOR = nominale lichtstroom / totale gemeten lichtstroom: $607.95\text{lm}/607.95\text{lm} = 100\%$

Specifieke lichtstroom: $607.95\text{lm} / 10.82\text{W} = 56.19\text{lm/W}$

file : SPOT 24.TTL

meas. no.	608	measurement results		article code
meas. date	9/10/2012	flux of luminaire	607.9 lm	1
operator	User	classification / DIN	A60	
		lower flux fraction	100.00 %	lamp(s)
meas. conditions		upper flux fraction	0.00 %	1 x LED
ambient temperature	25.0 °C	intensity maximum	5155.3 cd/klm	total flux
voltage	230.00 V	in C-plane	356.0 °	608 lm
current	0.108 A	at gamma	1.0 °	LOR
power consumption	11.0 W	half value angle	C0 : 10.2 °	100 %
			C90 : 9.3 °	tilt angle
meas. lamps	lum. flux [lm]		C180 : 10.5 °	0.0 °
1	608.0 lm		C270 : 11.4 °	
		tenth value angle	C0 : 19.7 °	
			C90 : 18.7 °	
			C180 : 22.4 °	
			C270 : 23.4 °	

dimensions of luminaire	
length	69 mm
width	20 mm
height	187 mm

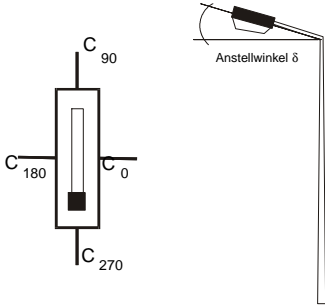
dimensions of luminous area	
length	67 mm
width	18 mm
height C0	0 mm
height C90	0 mm
height C180	0 mm
height C270	0 mm

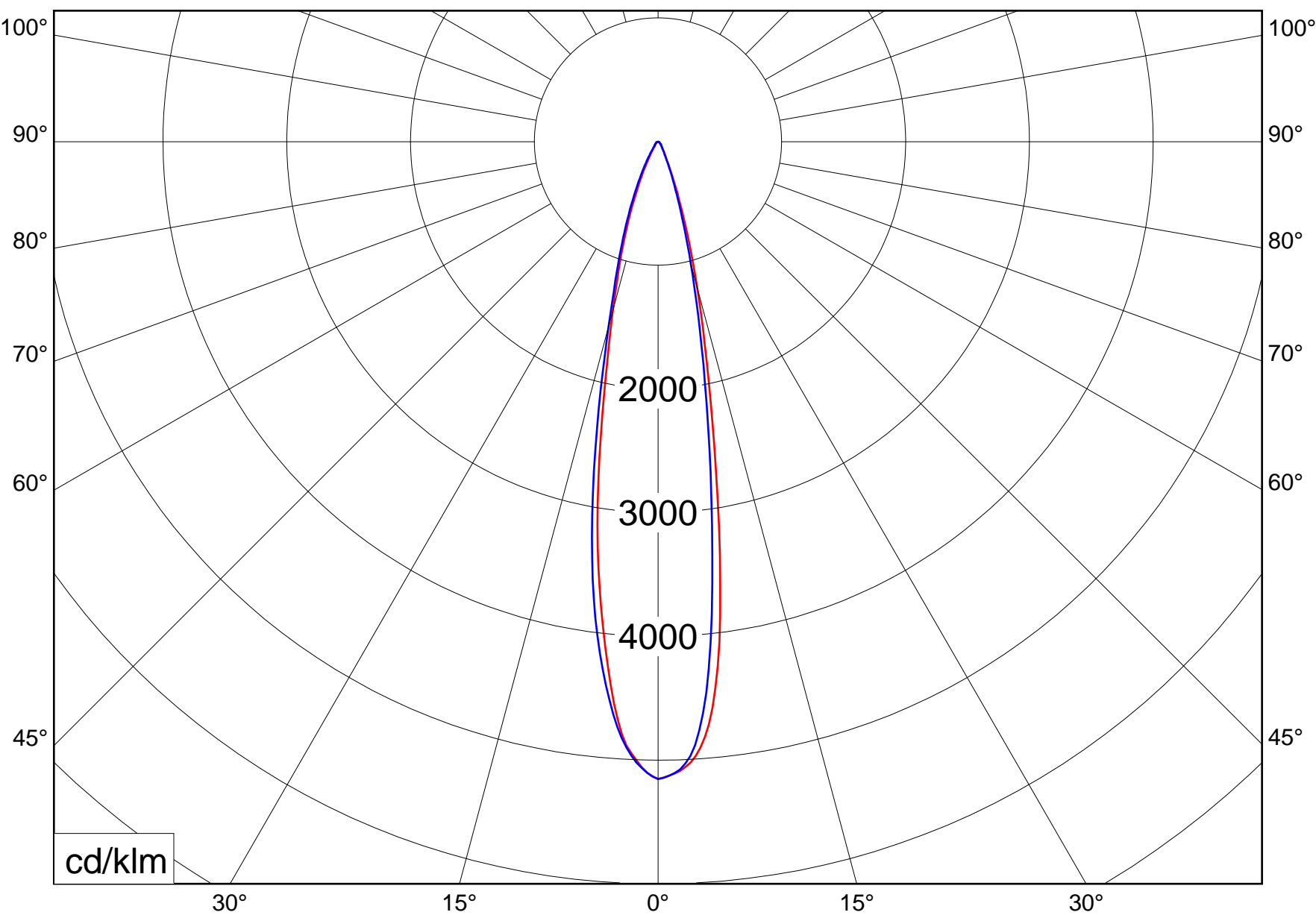
Reflektor

Abdeckung

Ausführung

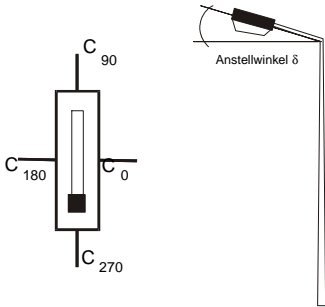
Bemerkungen
Eden Spot 24 +voeding Mean Well APV-16-24





article code
1

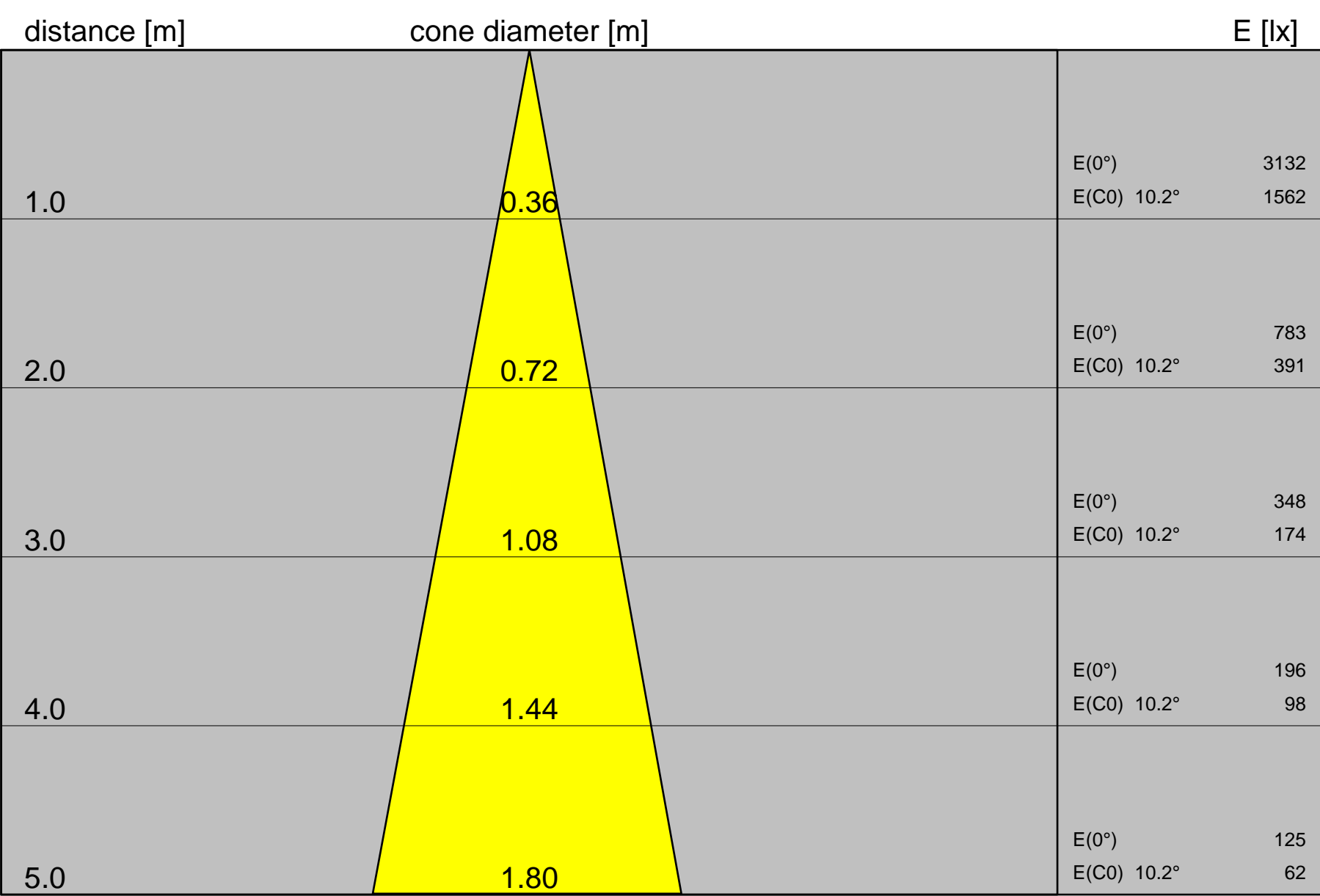
lamp(s)
1 x LED
total flux
608 lm
LOR
100 %
tilt angle
0.0 °



C0-C180

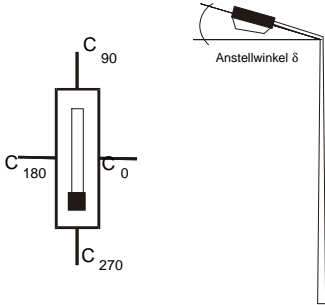
C90-C270

file : SPOT 24.TTL



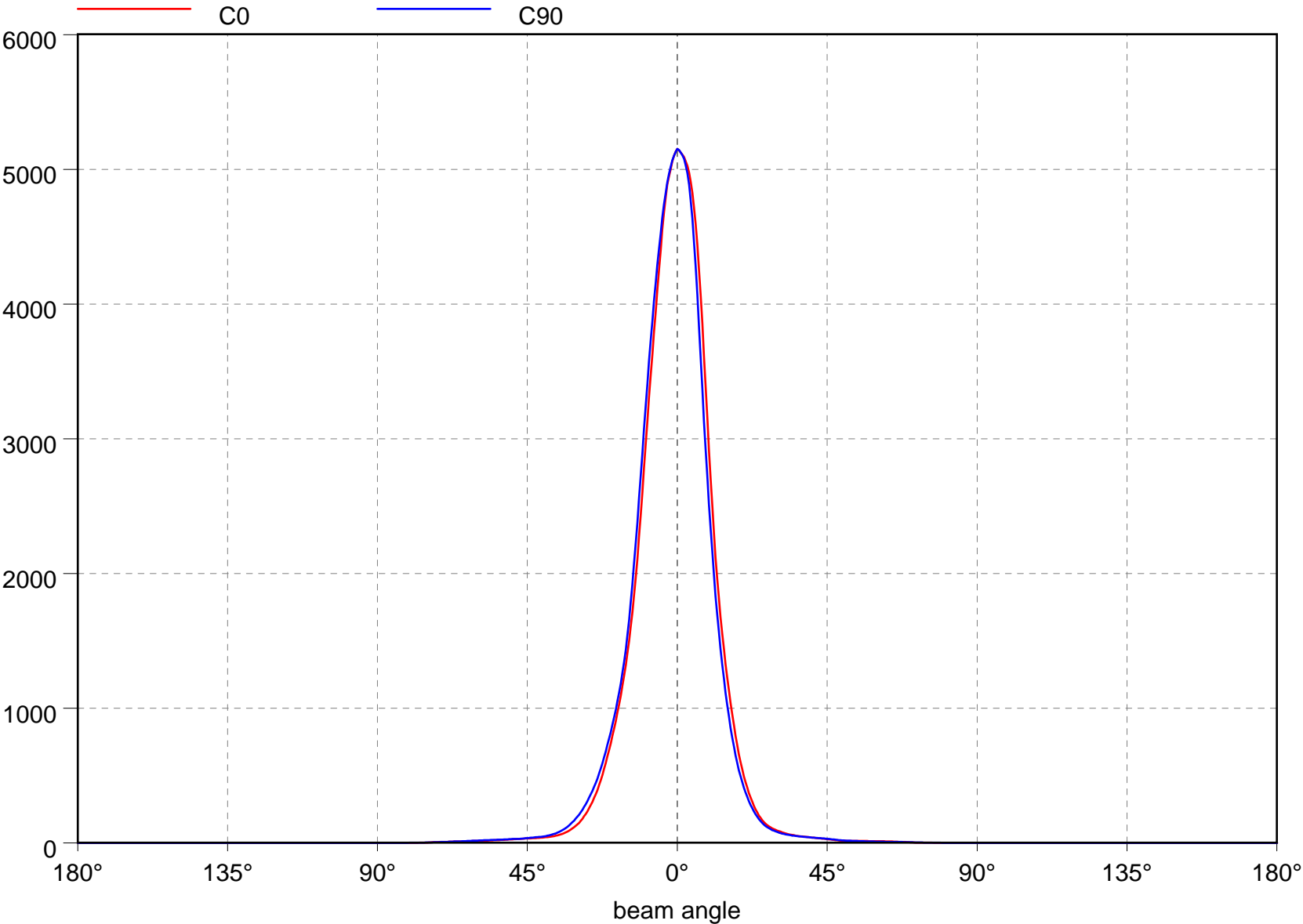
article code
1

lamp(s)
1 x LED
total flux
608 lm
LOR
100 %
tilt angle
0.0 °



file : SPOT 24.TTL

I (cd/klm)



article code

1

lamp(s)

1 x LED

total flux

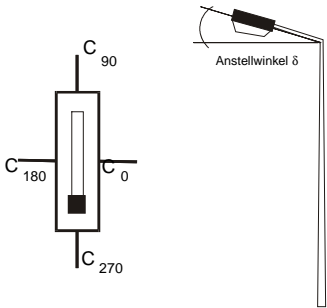
608 lm

LOR

100 %

tilt angle

0.0 °



file : SPOT 24.TTL

tilt angle : 0.0 °

swivel angle : 0.0 °

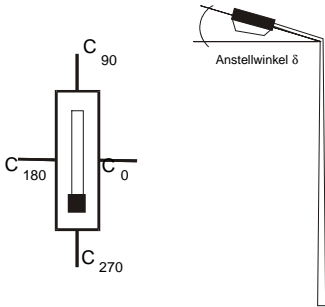
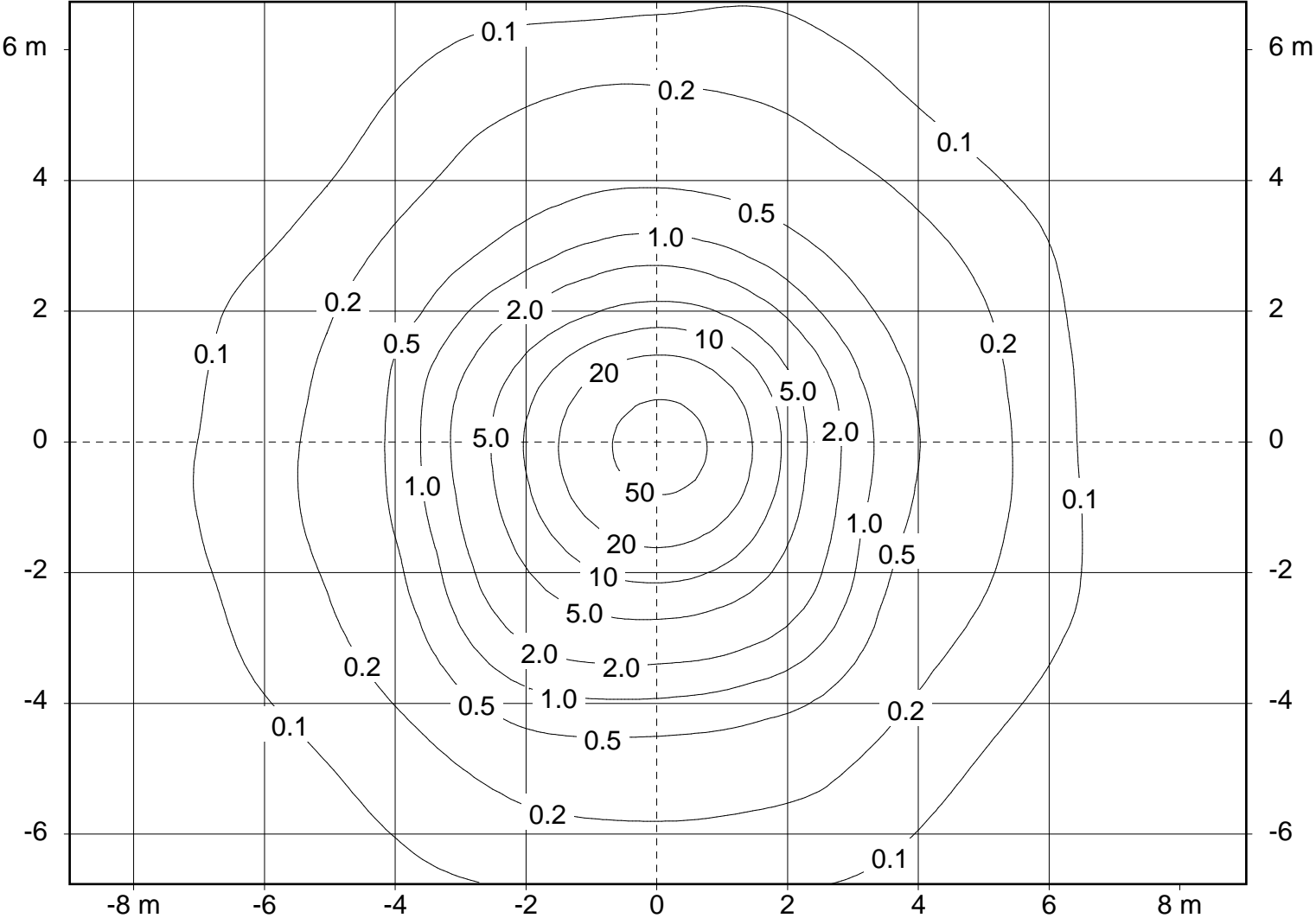
mounting height : 6.0 m

orientation : 0.0 °

light loss factor : 0.8

article code
1

lamp(s)
1 x LED
total flux
608 lm
LOR
100 %
tilt angle
0.0 °



file : SPOT 24.TTL

gamma / °	C 0	C 10	C 20	C 30	C 40	C 50	C 60	C 70	C 80	C 90	C 100	C 110	C 120	C 130	C 140	C 150	C 160	C 170
0	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152
1	5126	5127	5129	5132	5134	5134	5133	5131	5128	5127	5126	5125	5126	5119	5113	5108	5104	5102
2	5090	5096	5100	5103	5102	5101	5097	5091	5085	5078	5073	5067	5058	5049	5040	5032	5020	5009
3	5027	5030	5039	5033	5026	5019	5009	4999	4985	4974	4969	4950	4935	4922	4909	4900	4894	4889
4	4911	4914	4910	4896	4882	4859	4837	4816	4795	4774	4756	4737	4726	4719	4715	4706	4697	4687
5	4726	4712	4691	4668	4638	4603	4564	4529	4496	4472	4447	4425	4423	4430	4440	4440	4428	4413
6	4438	4414	4369	4338	4289	4245	4192	4144	4101	4068	4030	4023	4042	4063	4087	4101	4094	4098
7	4069	4016	3963	3912	3869	3821	3759	3700	3645	3601	3571	3581	3620	3658	3697	3723	3745	3771
8	3615	3551	3500	3450	3414	3369	3309	3240	3181	3133	3117	3146	3202	3255	3303	3347	3393	3440
9	3143	3080	3036	2998	2966	2929	2874	2803	2747	2709	2701	2743	2808	2870	2924	2980	3036	3088
10	2695	2637	2608	2587	2562	2526	2473	2407	2352	2325	2331	2376	2443	2507	2566	2625	2676	2726
11	2300	2256	2232	2227	2211	2175	2121	2058	2006	1988	2000	2044	2113	2175	2236	2291	2334	2383
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16	1041	1042	1050	1054	1042	1010	971	918	875	856	860	887	938	1020	1093	1160	1211	1229
17	872	880	891	894	876	850	814	767	732	713	718	741	786	868	945	1012	1062	1079
18	725	737	754	750	736	709	677	639	611	593	600	620	660	735	815	879	930	947
19	600	613	629	623	610	588	559	532	509	495	502	521	554	622	701	763	814	831
20	496	509	521	512	499	481	458	438	422	411	420	438	466	524	602	658	706	726
21	410	418	428	416	404	391	370	358	347	342	350	365	390	438	511	569	606	632
22	338	342	351	336	324	317	297	293	284	282	290	301	323	365	431	487	518	546
23	275	278	285	271	258	255	239	239	232	235	240	249	266	304	361	415	437	467
24	225	227	231	218	207	205	194	194	191	194	200	206	221	254	300	352	370	398
25	186	186	189	177	168	166	160	159	159	163	168	172	183	211	251	295	312	341
26	155	154	156	146	140	138	134	132	135	136	142	145	154	177	210	247	264	288
27	133	131	130	122	119	118	115	113	116	118	122	125	130	149	178	207	226	244
28	116	114	111	105	104	103	100	100	101	103	107	110	113	127	152	175	192	204
29	103	101	97	93	92	92	90	89	90	91	95	97	100	109	130	148	165	170
30	93	90	86	82	81	82	81	80	80	82	84	86	88	94	112	126	141	143
31	83	81	77	73	72	73	72	72	72	73	76	77	78	82	96	107	120	120
32	75	73	70	67	65	65	65	66	66	67	69	70	71	73	83	91	104	102
33	68	65	63	61	60	59	60	61	61	62	63	64	65	65	73	78	91	87
34	62	60	58	56	55	55	55	57	56	57	58	59	60	60	65	68	80	75
35	57	55	54	52	51	51	51	53	52	53	55	54	55	54	58	60	70	64
36	53	52	50	49	48	48	48	50	49	50	52	51	51	50	52	53	61	57
37	49	49	47	46	45	45	45	47	46	48	49	48	48	46	47	47	54	50
38	47	47	45	44	42	43	42	44	44	46	47	46	45	43	43	43	47	46
39	44	44	43	41	40	40	40	41	42	44	46	44	42	40	39	40	42	42

article code

1

lamp(s)

1 x LED

total flux

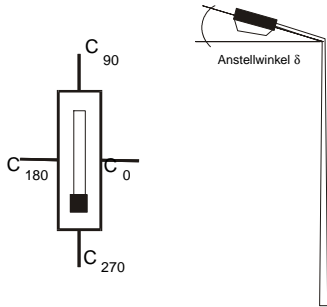
608 lm

LOR

100 %

tilt angle

0.0 °



file : SPOT 24.TTL

gamma / °	C 180	C 190	C 200	C 210	C 220	C 230	C 240	C 250	C 260	C 270	C 280	C 290	C 300	C 310	C 320	C 330	C 340	C 350
0	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152	5152
1	5102	5096	5092	5090	5090	5092	5097	5097	5099	5102	5105	5108	5111	5113	5116	5120	5123	5125
2	5005	5006	5005	5003	5003	5007	5013	5019	5021	5022	5030	5036	5039	5042	5049	5059	5069	5081
3	4887	4883	4878	4873	4876	4881	4886	4890	4896	4903	4914	4927	4936	4947	4964	4977	4993	5014
4	4683	4678	4678	4685	4689	4699	4707	4720	4731	4742	4764	4789	4813	4831	4853	4872	4889	4907
5	4402	4402	4408	4420	4437	4456	4472	4486	4505	4526	4567	4610	4646	4673	4695	4710	4729	4726
6	4097	4095	4109	4135	4161	4182	4202	4223	4252	4287	4338	4382	4417	4445	4465	4476	4481	4463
7	3790	3816	3840	3862	3879	3897	3913	3941	3978	4024	4079	4113	4139	4159	4169	4168	4145	4107
8	3472	3516	3561	3592	3602	3601	3612	3643	3681	3731	3785	3808	3822	3831	3823	3790	3734	3676
9	3137	3199	3252	3288	3306	3299	3307	3338	3370	3412	3459	3473	3471	3467	3434	3372	3295	3218
10	2781	2843	2912	2955	2984	2989	2998	3023	3047	3069	3098	3105	3092	3071	3028	2954	2865	2776
11	2431	2494	2562	2615	2653	2677	2689	2700	2710	2720	2727	2721	2702	2674	2632	2561	2473	2374
12	2108	2163	2232	2288	2330	2364	2378	2384	2383	2378	2372	2350	2330	2307	2273	2210	2125	2026
13	1829	1876	1936	1985	2031	2070	2083	2083	2079	2066	2052	2028	2008	1985	1953	1895	1812	1727
14	1602	1628	1667	1721	1769	1804	1816	1811	1802	1782	1774	1761	1743	1711	1676	1615	1538	1472
15	1408	1422	1443	1490	1537	1572	1582	1577	1563	1542	1540	1537	1521	1481	1442	1378	1304	1251
16	1242	1250	1264	1297	1345	1374	1385	1381	1366	1345	1347	1350	1335	1293	1243	1176	1109	1060
17	1094	1101	1116	1147	1186	1213	1224	1220	1202	1187	1187	1191	1177	1135	1076	1004	938	890
18	966	968	988	1016	1052	1080	1090	1086	1067	1051	1049	1054	1039	1001	934	860	792	741
19	848	852	875	907	940	966	974	973	950	932	929	934	918	883	814	736	661	612
20	740	743	768	805	840	868	873	873	847	824	820	828	812	778	709	629	554	509
21	641	644	669	712	749	779	783	782	753	727	723	733	719	684	615	533	462	421
22	550	551	577	623	668	698	702	695	665	636	634	645	634	600	532	450	381	346
23	466	469	493	543	594	626	632	613	583	553	553	563	557	526	459	379	316	284
24	394	397	421	470	525	563	569	540	509	479	483	489	489	461	397	317	261	232
25	334	338	359	404	463	506	510	475	444	416	419	423	429	404	341	267	216	192
26	281	285	306	349	408	453	457	418	386	360	363	367	376	355	295	225	179	159
27	235	239	259	300	357	404	407	367	335	311	312	319	329	311	253	190	150	135
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30	138	142	154	183	238	279	282	246	214	195	195	204	215	205	163	116	94	92
31	117	121	130	154	205	243	248	213	184	167	166	173	185	177	140	99	83	83
32	99	102	110	129	176	211	217	184	156	142	140	147	160	153	119	84	74	74
33	85	87	94	110	151	183	188	159	133	120	119	125	138	131	102	73	67	67
34	73	75	81	95	128	158	162	137	114	103	102	108	119	113	87	65	61	61
35	64	66	70	82	108	137	140	118	99	89	88	93	103	97	74	58	56	56
36	56	58	61	72	92	118	120	102	85	77	77	81	89	84	64	53	52	52
37	51	52	54	63	78	102	103	89	74	67	68	70	78	72	56	49	48	49
38	47	48	49	56	68	87	88	77	65	59	60	62	68	63	50	46	45	46
39	44	46	45	50	59	73	75	68	57	54	53	55	59	55	45	43	42	44

article code

1

lamp(s)

1 x LED

total flux

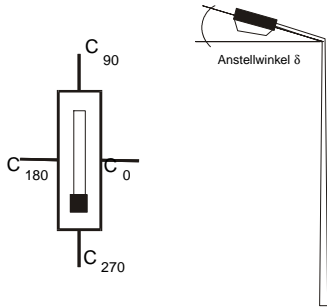
608 lm

LOR

100 %

tilt angle

0.0 °



file : SPOT 24.TTL

gamma / °	C 0	C 10	C 20	C 30	C 40	C 50	C 60	C 70	C 80	C 90	C 100	C 110	C 120	C 130	C 140	C 150	C 160	C 170
40	41	42	41	40	38	38	38	39	41	42	44	43	40	37	37	38	39	40
41	38	39	39	38	37	36	36	38	39	39	41	40	39	35	35	35	36	38
42	36	36	37	37	35	34	34	37	37	37	39	38	37	33	33	33	34	35
43	34	33	35	35	34	32	32	35	35	35	36	36	36	32	31	32	33	34
44	31	32	33	34	32	30	31	33	33	33	35	34	34	30	28	29	31	33
45	29	29	31	32	30	28	29	31	32	31	32	33	32	29	26	28	30	31
46	25	26	28	30	28	26	27	30	30	28	29	31	30	27	24	26	29	30
47	22	23	26	27	26	24	26	28	29	25	26	29	28	26	23	24	28	29
48	20	21	23	26	23	22	24	27	27	23	23	27	27	24	21	22	27	28
49	18	19	22	24	21	20	23	25	25	20	20	24	26	23	20	21	26	27
50	17	17	20	22	19	19	21	24	22	18	18	22	24	21	19	20	24	25
51	16	16	18	20	17	17	19	22	21	17	16	20	23	20	19	19	23	24
52	15	15	16	18	16	16	18	21	19	16	15	18	22	19	18	18	22	23
53	15	14	15	16	16	15	17	19	17	15	14	17	20	19	17	18	21	21
54	15	14	13	14	15	15	15	17	16	14	14	15	18	18	17	17	19	20
55	15	14	13	13	14	14	14	15	14	14	13	14	16	17	16	16	18	19
56	15	13	12	12	13	13	13	13	13	13	13	13	15	16	15	15	17	18
57	14	13	11	11	12	13	12	12	12	12	12	12	13	15	15	15	16	17
58	14	13	11	11	11	12	11	10	11	12	11	11	12	14	14	15	15	15
59	14	12	11	10	10	11	10	9	10	11	11	11	11	13	14	14	14	14
60	14	12	10	10	10	10	10	9	9	10	10	10	11	12	13	14	13	13
61	13	11	9	9	9	10	9	8	9	10	10	10	10	11	13	13	12	12
62	13	11	9	9	9	9	8	8	8	9	9	9	9	10	12	12	11	11
63	12	10	8	8	8	9	8	7	8	9	9	8	9	9	12	12	10	11
64	11	10	8	8	8	8	7	7	7	8	8	8	9	9	11	11	9	10

article code

1

lamp(s)

1 x LED

total flux

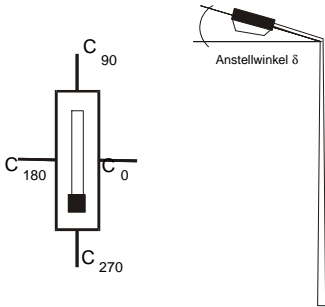
608 lm

LOR

100 %

tilt angle

0.0 °



file : SPOT 24.TTL

gamma / °	C 180	C 190	C 200	C 210	C 220	C 230	C 240	C 250	C 260	C 270	C 280	C 290	C 300	C 310	C 320	C 330	C 340	C 350
40	41	43	43	45	53	62	64	59	52	49	49	51	52	50	42	41	40	42
41	39	41	41	42	47	52	55	52	48	46	46	48	47	45	39	39	39	40
42	37	39	39	40	42	45	48	47	45	44	44	46	43	41	37	37	38	38
43	35	37	36	38	39	40	43	44	43	42	42	43	41	37	35	36	37	35
44	34	35	35	36	36	37	39	42	40	39	40	41	39	35	33	35	35	33
45	33	34	34	34	34	35	38	40	38	37	37	39	38	33	32	33	33	31
46	33	34	33	33	32	33	36	38	36	34	35	37	37	31	30	32	31	29
47	31	32	32	31	31	31	35	37	34	32	33	35	36	30	28	30	29	26
48	30	31	31	30	29	30	35	35	33	31	31	33	35	29	27	28	27	23
49	28	29	29	29	28	29	33	32	31	30	30	31	32	27	25	26	26	20
50	26	27	27	28	27	28	30	30	29	28	29	29	29	25	24	24	23	18
51	25	26	25	27	26	26	28	28	28	27	27	27	27	23	22	22	21	17
52	24	25	24	25	25	25	26	26	26	26	26	26	24	21	21	21	19	15
53	22	23	23	24	24	23	24	25	25	25	24	24	23	20	20	20	17	15
54	21	22	22	22	23	22	23	24	23	24	23	23	22	19	19	19	15	14
55	20	21	21	21	22	21	22	22	22	23	22	21	20	18	18	18	14	14
56	19	20	20	20	21	20	21	21	21	22	21	20	19	17	17	16	14	13
57	18	19	19	19	20	19	20	20	20	21	20	19	18	16	16	15	13	13
58	17	18	18	18	19	19	19	19	19	20	19	18	17	15	15	14	13	13
59	16	17	16	17	18	18	18	18	18	19	18	17	16	14	15	13	12	12
60	15	16	15	17	18	17	17	17	17	18	17	16	15	14	14	12	12	12
61	15	16	14	16	17	16	16	16	16	17	16	15	14	13	13	12	12	11
62	14	15	13	14	16	15	15	15	15	16	15	14	13	12	12	11	11	11
63	14	14	12	13	15	14	14	14	14	15	14	13	12	11	11	11	11	10
64	13	14	11	12	14	14	13	13	13	14	13	12	11	11	11	10	10	10

article code

1

lamp(s)

1 x LED

total flux

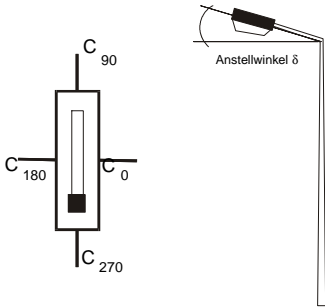
608 lm

LOR

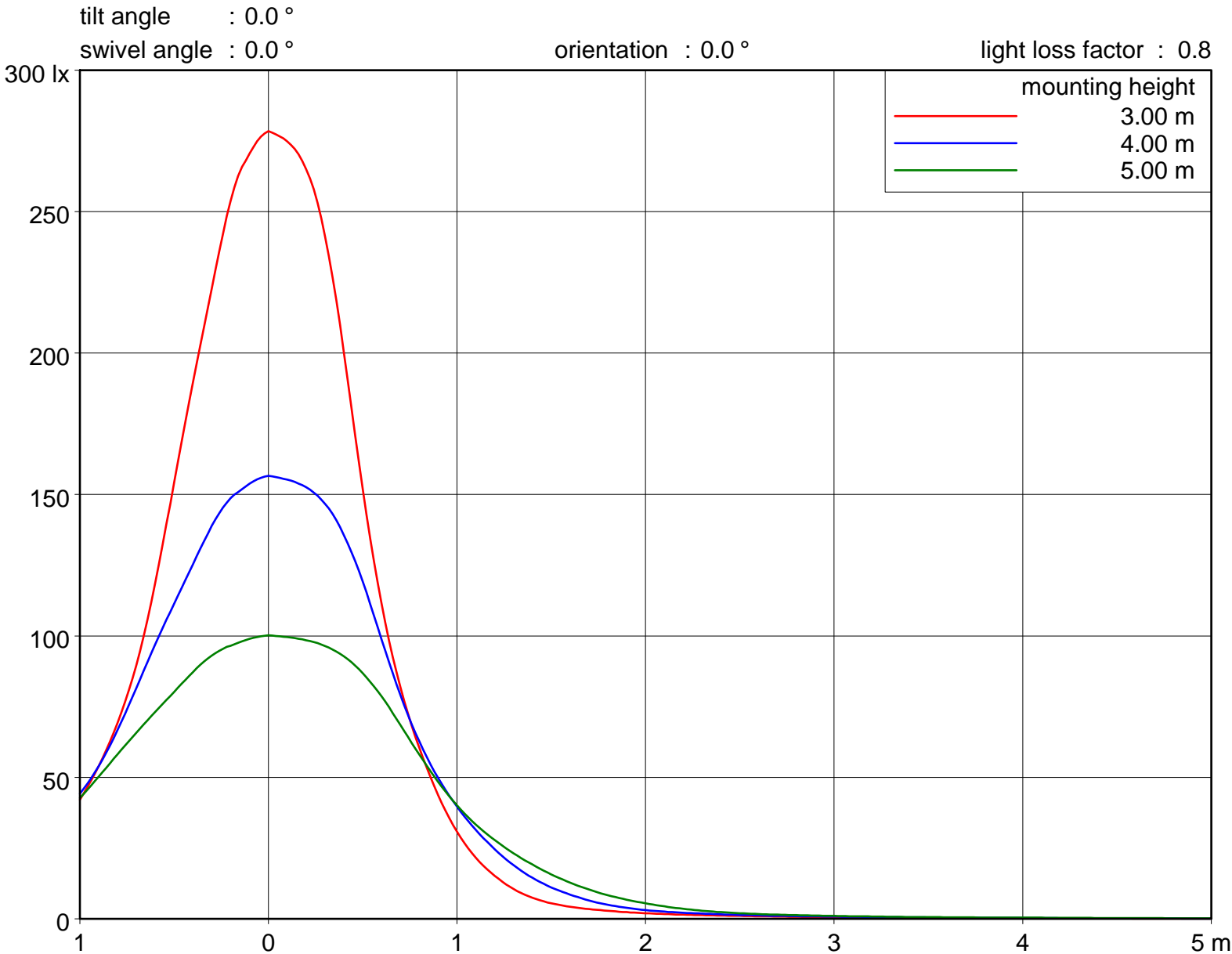
100 %

tilt angle

0.0 °



file : SPOT 24.TTL



article code

1

lamp(s)

1 x LED

total flux

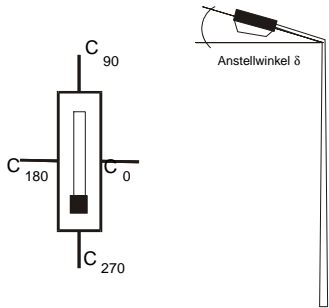
608 lm

LOR

100 %

tilt angle

0.0 °



utilization factors η_B for LED									
ρ -ceiling		70	80	80	80	50	50	30	0
ρ -walls		30	80	50	30	50	30	30	0
ρ -floor		20	10	10	10	10	10	10	0
k	0.6	80	92	83	79	82	79	79	76
	0.8	88	97	90	87	89	86	86	83
	1.0	91	99	92	89	91	88	88	85
	1.25	96	102	96	94	95	93	92	89
	1.5	99	103	98	96	97	95	94	91
	2.0	102	104	100	98	98	97	95	93
	2.5	104	105	102	100	99	98	97	94
	3.0	106	106	103	101	101	99	98	95
	4.0	107	106	104	102	101	100	99	96
	5.0	108	107	104	103	101	100	99	96
luminaire arrangement acc. to LiTG Publ. 3.5									

article code

1

lamp(s)

1 x LED

total flux

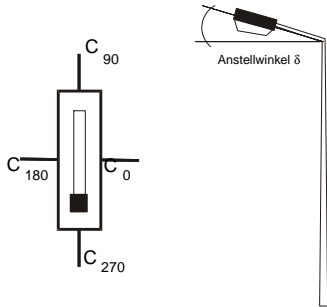
608 lm

LOR

100 %

tilt angle

0.0 °



class		glare rating for illuminance (lx)									
A	A	1000	750	500	--	≤ 300					
1	B	2000	1500	1000	750	500	≤ 300				
2	D					2000	1000	500	≤ 300		
3	E						2000	1000	500	≤ 300	

article code

1

lamp(s)

1 x LED

total flux

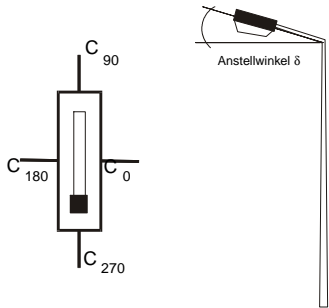
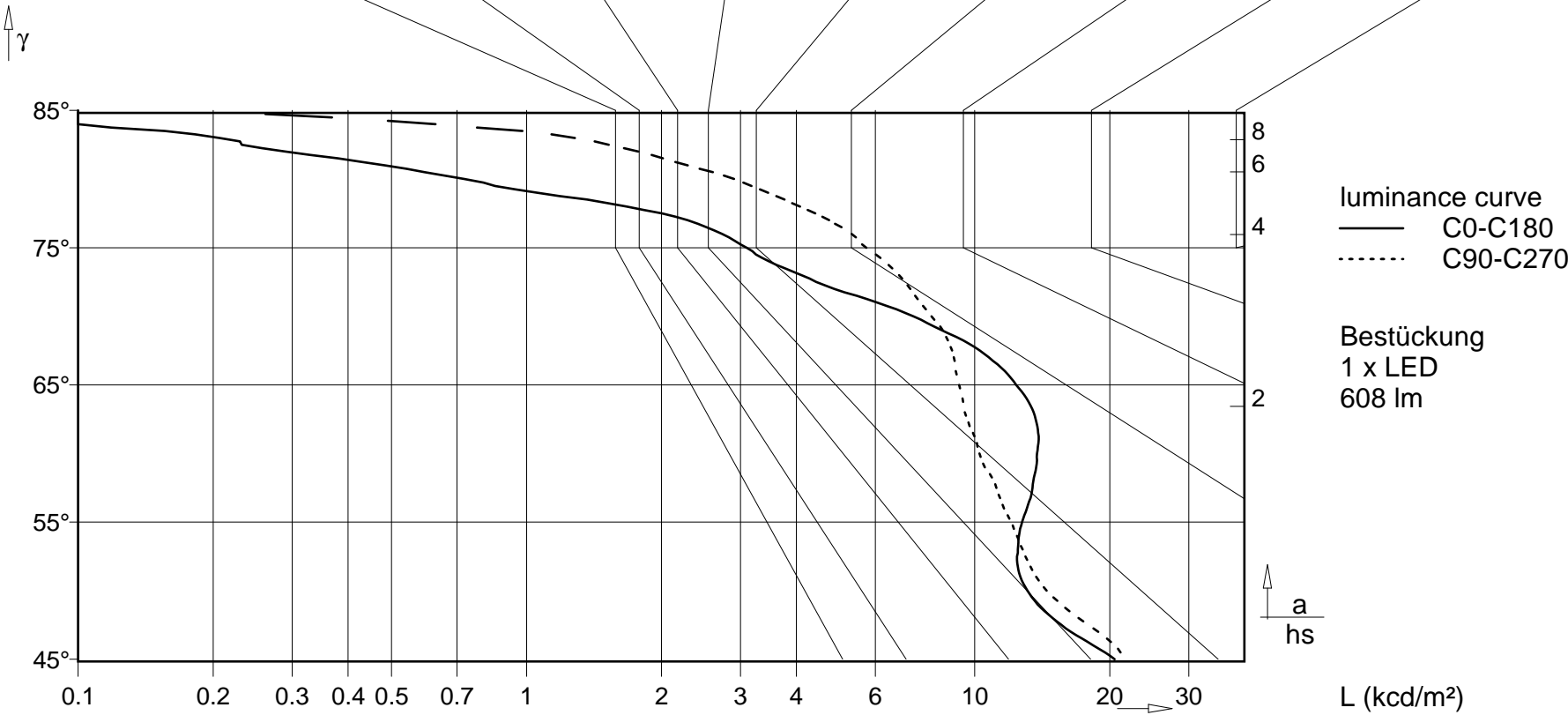
608 lm

LOR

100 %

tilt angle

0.0 °



glare rating acc. to UGR											
ρ-ceiling		70	70	50	50	30	70	70	50	50	30
ρ-walls		50	30	50	30	30	50	30	50	30	30
ρ-floor		20	20	20	20	20	20	20	20	20	20
room size X Y		crosswise to lamp axis					parallel to lamp axis				
2H	2H	14.4	15.0	14.7	15.2	15.4	14.1	14.6	14.3	14.8	15.0
	3H	14.9	15.5	15.2	15.7	15.9	14.6	15.2	14.9	15.4	15.6
	4H	14.9	15.4	15.2	15.7	15.9	14.8	15.3	15.1	15.5	15.8
	6H	14.9	15.3	15.2	15.6	15.9	14.8	15.3	15.1	15.5	15.8
	8H	14.8	15.3	15.2	15.6	15.9	14.8	15.2	15.1	15.5	15.8
	12H	14.8	15.2	15.1	15.5	15.8	14.7	15.2	15.1	15.5	15.8
4H	2H	14.8	15.3	15.1	15.6	15.8	14.4	14.9	14.7	15.2	15.4
	3H	15.4	15.9	15.8	16.2	16.5	15.1	15.5	15.4	15.8	16.1
	4H	15.4	15.8	15.7	16.1	16.4	15.2	15.6	15.6	15.9	16.3
	6H	15.3	15.7	15.7	16.0	16.4	15.2	15.6	15.6	15.9	16.3
	8H	15.2	15.6	15.7	16.0	16.4	15.2	15.5	15.6	15.9	16.3
	12H	15.2	15.5	15.6	15.9	16.3	15.1	15.4	15.6	15.8	16.3
8H	4H	15.4	15.7	15.8	16.1	16.5	15.2	15.5	15.6	15.9	16.3
	6H	15.3	15.6	15.7	16.0	16.4	15.2	15.5	15.7	15.9	16.4
	8H	15.2	15.5	15.7	15.9	16.4	15.2	15.4	15.6	15.9	16.3
	12H	15.2	15.4	15.7	15.9	16.3	15.1	15.3	15.6	15.8	16.3
12H	4H	15.3	15.6	15.8	16.0	16.5	15.1	15.5	15.6	15.9	16.3
	6H	15.2	15.5	15.7	15.9	16.4	15.2	15.4	15.6	15.8	16.3
	8H	15.2	15.4	15.7	15.9	16.4	15.1	15.3	15.6	15.8	16.3
variation of observer position											
S =	1.0H	+1.0 / -1.5				+0.5 / -1.0					
	1.5H	+2.5 / -1.7				+1.7 / -2.1					
	2.0H	+3.4 / -3.2				+3.1 / -3.2					
standard-table		BK02					BK02				
correction		-2.5					-2.7				
corrected glare indices for 608lm total flux											

article code

1

lamp(s)

1 x LED

total flux

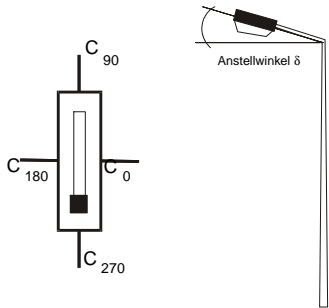
608 lm

LOR

100 %

tilt angle

0.0 °



file : SPOT 40_3.TTL

meas. no.	615	measurement results		article code
meas. date	10/10/2012	flux of luminaire	607.4 lm	1
operator	User	classification / DIN	A60	
		lower flux fraction	100.00 %	lamp(s)
meas. conditions		upper flux fraction	0.00 %	1 x LED
ambient temperature	25.0 °C	intensity maximum	2378.0 cd/klm	total flux
voltage	230.00 V	in C-plane	46.0 °	607 lm
current	0.108 A	at gamma	1.0 °	LOR
power consumption	11.0 W	half value angle	C0 : 18.3 °	100 %
			C90 : 18.3 °	tilt angle
			C270 : 18.3 °	0.0 °
meas. lamps	lum. flux [lm]			
1	607.4 lm	tenth value angle	C0 : 31.3 °	
			C90 : 31.1 °	
			C270 : 31.1 °	

dimensions of luminaire	
length	69 mm
width	20 mm
height	187 mm

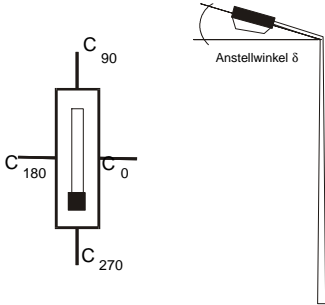
dimensions of luminous area	
length	67 mm
width	17 mm
height C0	0 mm
height C90	0 mm
height C180	0 mm
height C270	0 mm

Reflektor

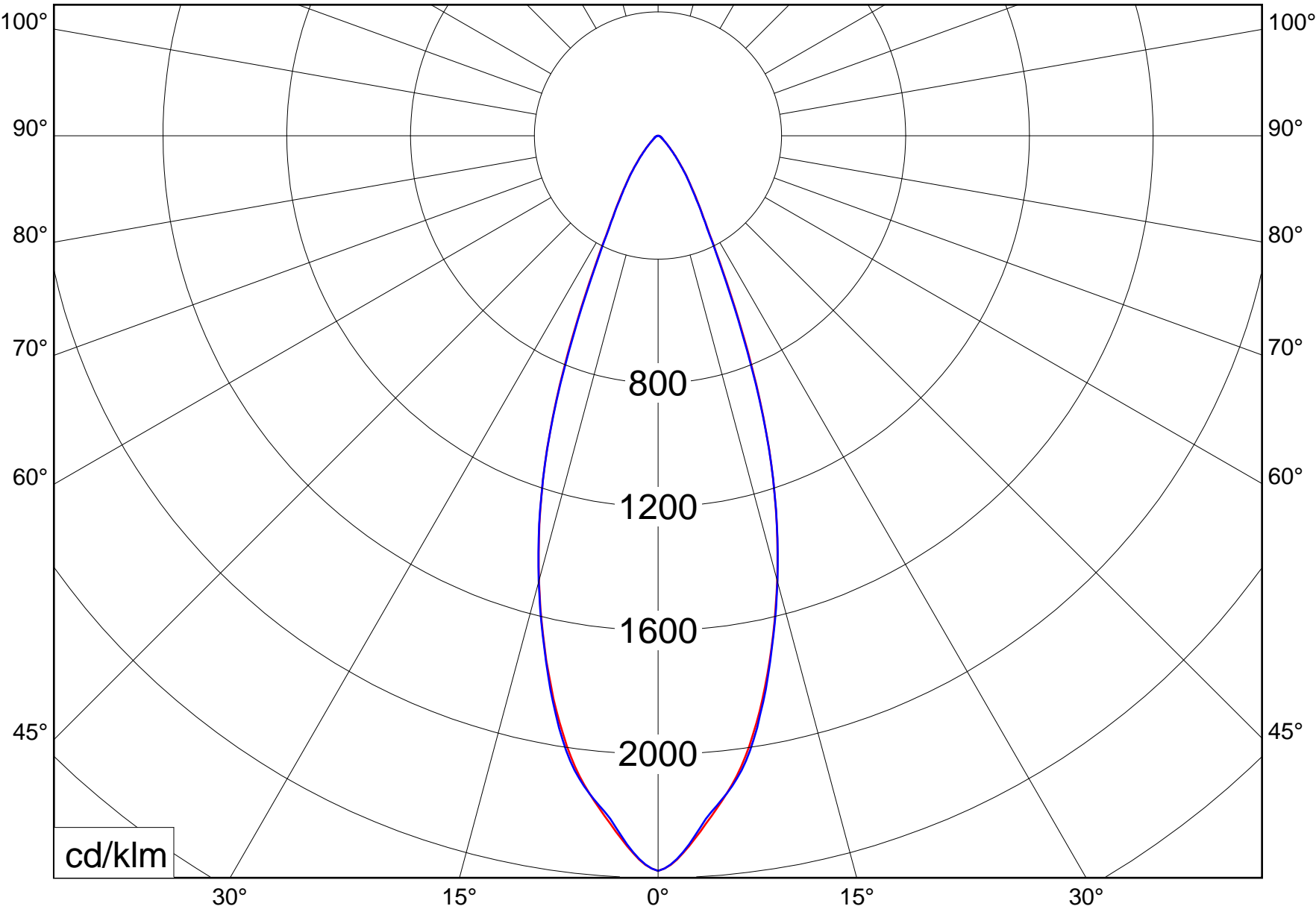
Abdeckung

Ausführung

Bemerkungen
Eden Spot 40 +voeding Mean Well APV-16-24



file : SPOT 40_3.TTL



article code
1

lamp(s)

1 x LED

total flux

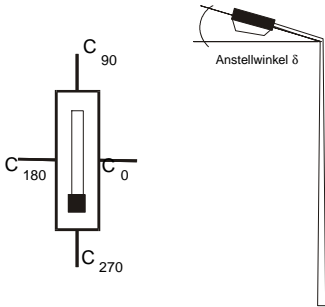
607 lm

LOR

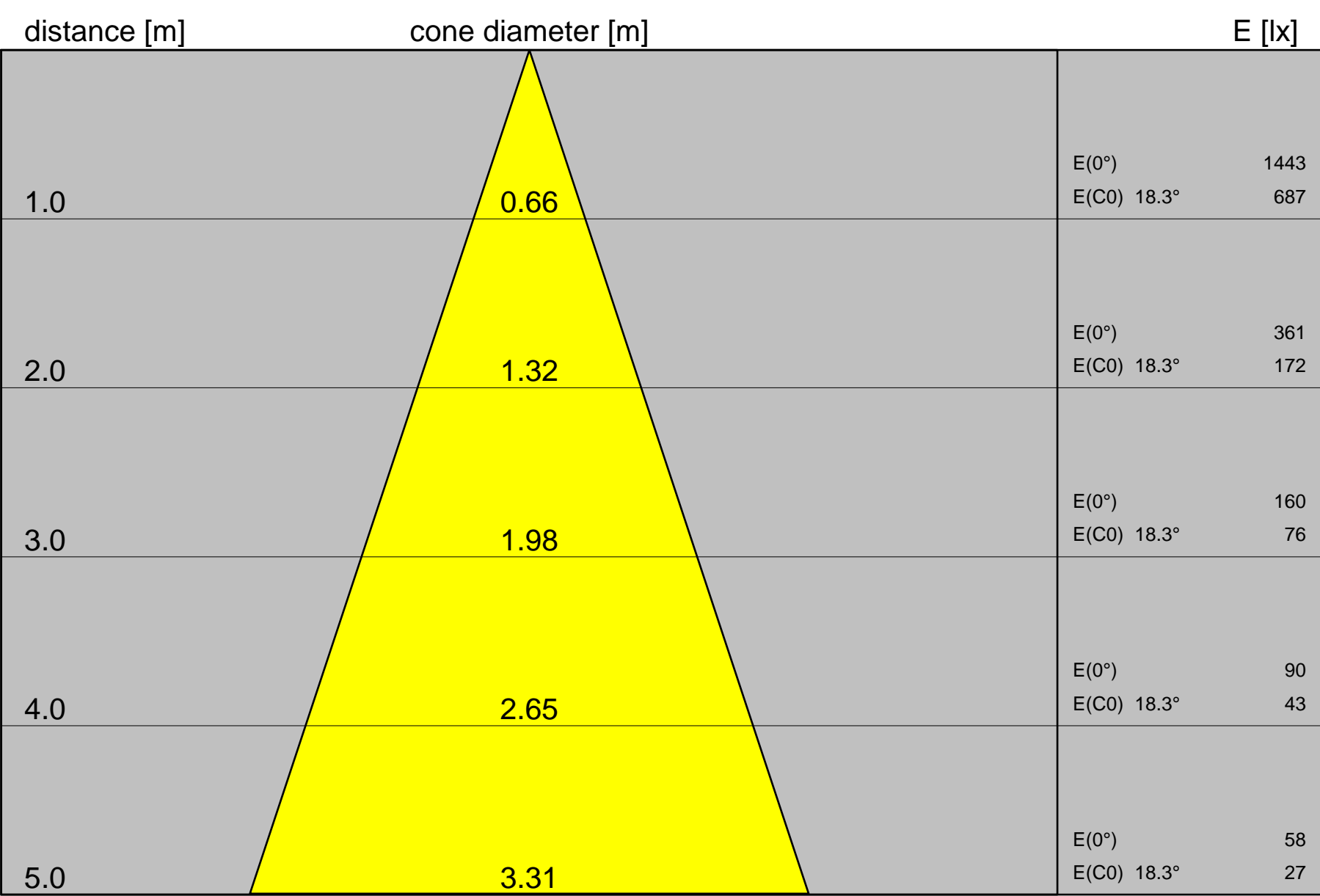
100 %

tilt angle

0.0 °



file : SPOT 40_3.TTL



half value angle 36.6°

article code
1

lamp(s)

1 x LED

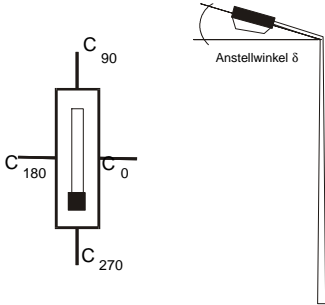
total flux
607 lm

LOR

100 %

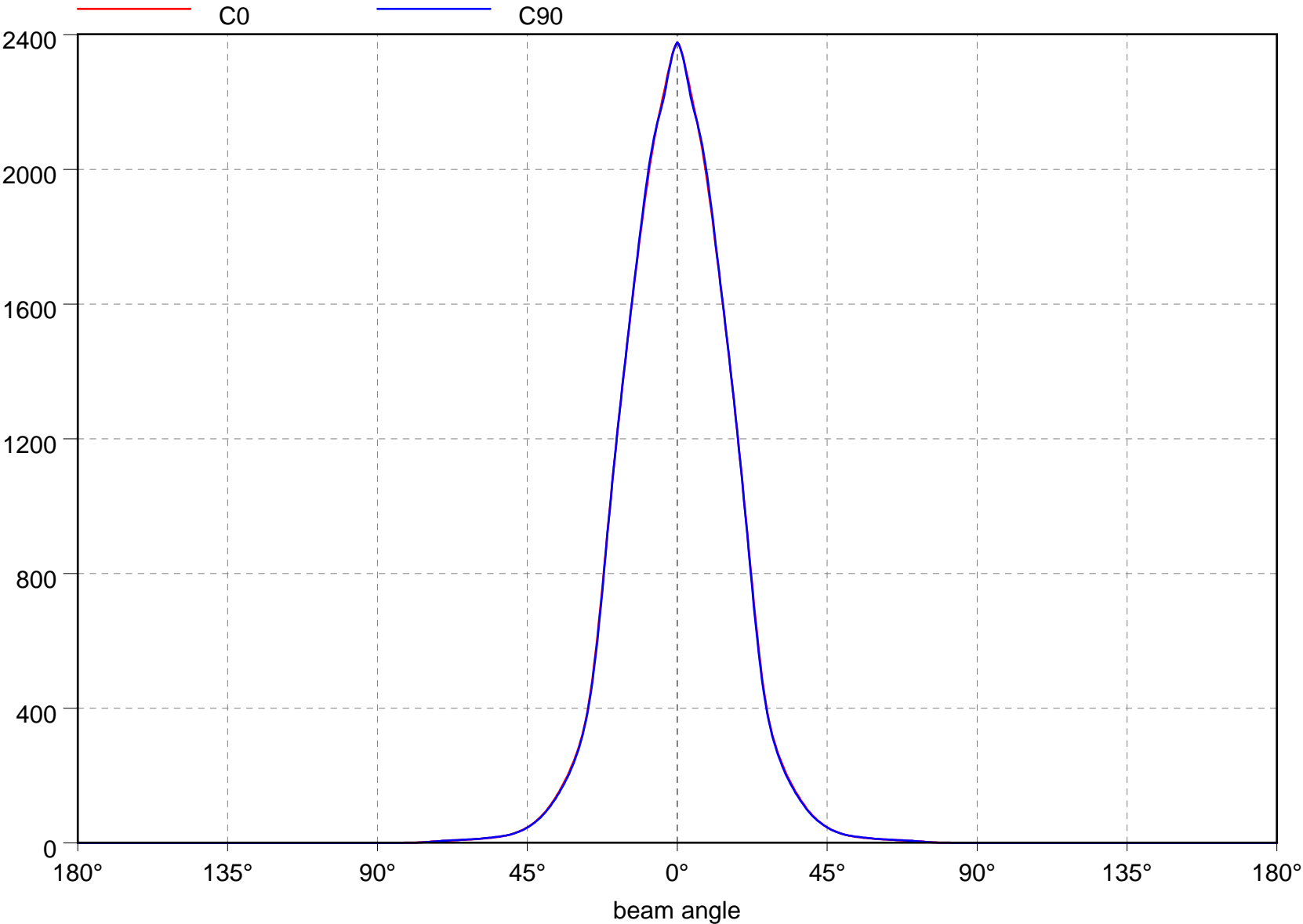
tilt angle

0.0 °



file : SPOT 40_3.TTL

I (cd/klm)



article code

1

lamp(s)

1 x LED

total flux

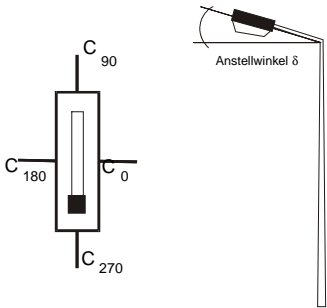
607 lm

LOR

100 %

tilt angle

0.0 °



file : SPOT 40_3.TTL

tilt angle : 0.0 °

swivel angle : 0.0 °

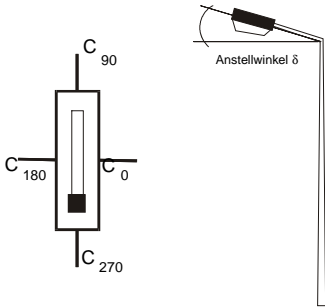
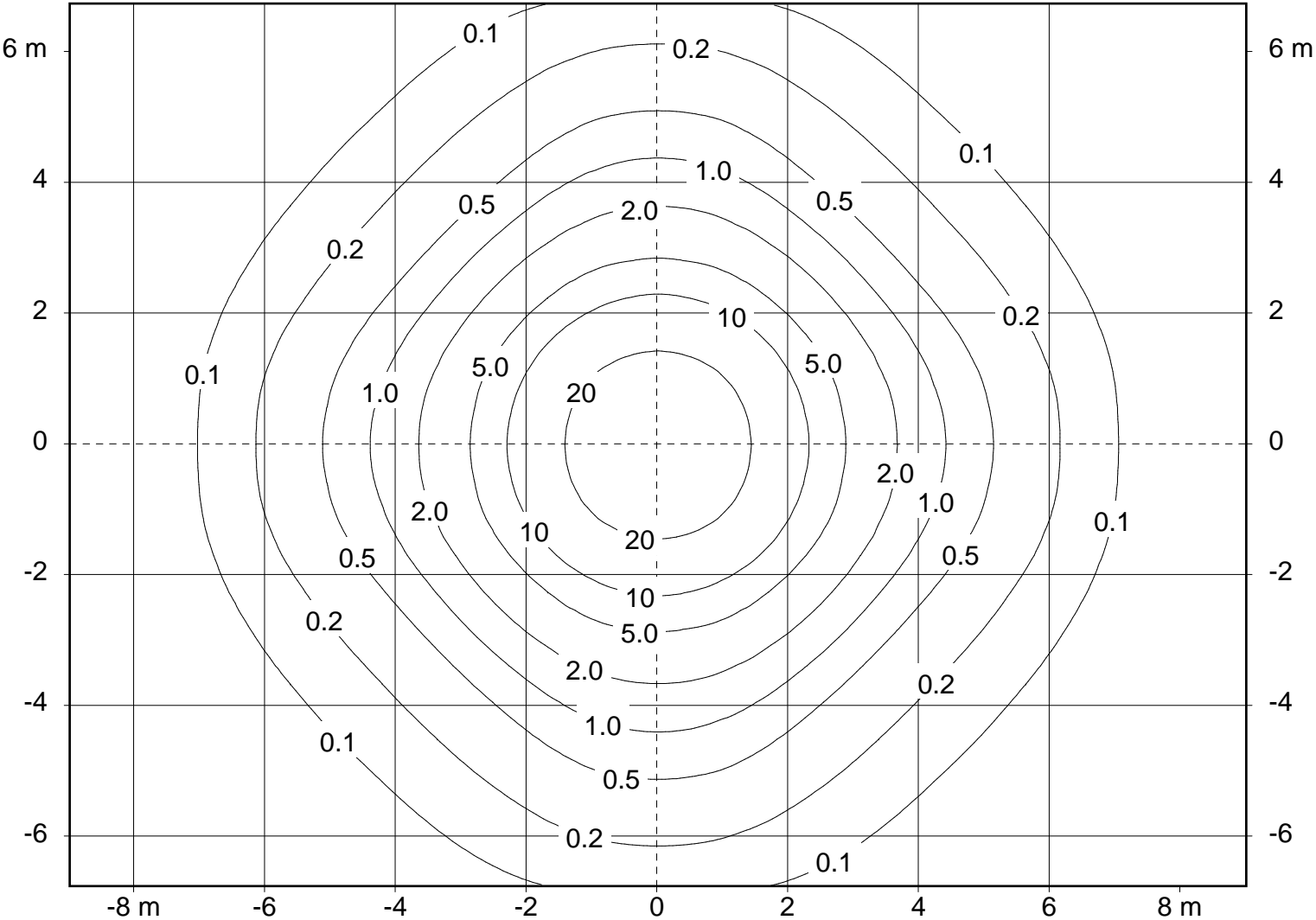
mounting height : 6.0 m

orientation : 0.0 °

light loss factor : 0.8

article code
1

lamp(s)
1 x LED
total flux
607 lm
LOR
100 %
tilt angle
0.0 °



file : SPOT 40_3.TTL

gamma / °	C 0	C 10	C 20	C 30	C 40	C 50	C 60	C 70	C 80	C 90	C 100	C 110	C 120	C 130	C 140	C 150	C 160	C 170
0	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377
1	2358	2357	2357	2357	2357	2358	2359	2358	2357	2357	2357	2358	2359	2358	2357	2357	2357	2357
2	2321	2320	2320	2320	2319	2318	2317	2317	2318	2318	2318	2317	2317	2318	2319	2320	2320	2320
3	2277	2275	2274	2272	2269	2267	2267	2266	2267	2267	2267	2266	2267	2267	2269	2272	2274	2275
4	2229	2229	2226	2223	2218	2217	2217	2217	2217	2215	2217	2217	2217	2217	2218	2223	2226	2229
5	2184	2184	2182	2179	2176	2175	2178	2178	2176	2176	2176	2178	2178	2175	2176	2179	2182	2184
6	2137	2139	2140	2139	2139	2143	2145	2143	2140	2138	2140	2143	2145	2143	2139	2139	2140	2139
7	2086	2092	2095	2099	2102	2108	2109	2104	2097	2095	2097	2104	2109	2108	2102	2099	2095	2092
8	2028	2032	2043	2048	2054	2060	2060	2054	2044	2041	2044	2054	2060	2060	2054	2048	2043	2032
9	1961	1967	1978	1988	1991	1998	2000	1991	1981	1977	1981	1991	2000	1998	1991	1988	1978	1967
10	1890	1895	1906	1916	1918	1924	1928	1919	1908	1902	1908	1919	1928	1924	1918	1916	1906	1895
11	1814	1821	1831	1836	1839	1846	1846	1838	1828	1824	1828	1838	1846	1846	1839	1836	1831	1821
12	1736	1738	1748	1755	1760	1765	1759	1752	1745	1741	1745	1752	1759	1765	1760	1755	1748	1738
13	1654	1657	1660	1672	1681	1684	1673	1662	1659	1658	1659	1662	1673	1684	1681	1672	1660	1657
14	1572	1571	1573	1587	1599	1604	1586	1573	1573	1576	1573	1573	1586	1604	1599	1587	1573	1571
15	1488	1485	1484	1499	1515	1519	1497	1483	1484	1490	1484	1483	1497	1519	1515	1499	1484	1485
16	1402	1396	1394	1408	1427	1428	1405	1392	1397	1403	1397	1392	1405	1428	1427	1408	1394	1396
17	1312	1305	1301	1316	1333	1331	1310	1301	1306	1313	1306	1301	1310	1331	1333	1316	1301	1305
18	1220	1212	1207	1218	1233	1230	1213	1205	1212	1221	1212	1205	1213	1230	1233	1218	1207	1212
19	1124	1118	1111	1118	1127	1124	1112	1108	1116	1124	1116	1108	1112	1124	1127	1118	1111	1118
20	1023	1019	1012	1013	1016	1014	1007	1008	1015	1020	1015	1008	1007	1014	1016	1013	1012	1019
21	920	915	909	905	902	900	901	905	911	916	911	905	901	900	902	905	909	915
22	814	810	805	800	790	789	794	800	805	807	805	800	794	789	790	800	805	810
23	712	710	706	696	683	681	690	698	702	700	702	698	690	681	683	696	706	710
24	614	615	611	599	583	581	593	603	606	603	606	603	593	581	583	599	611	615
25	527	528	524	510	495	494	507	517	520	518	520	517	507	494	495	510	524	528
26	452	452	448	433	419	419	432	443	447	444	447	443	432	419	419	433	448	452
27	391	391	384	369	356	356	369	381	386	386	386	381	369	356	356	369	384	391
28	342	341	333	316	303	304	316	330	337	338	337	330	316	304	303	316	333	341
29	305	301	290	273	261	261	272	288	297	300	297	288	272	261	261	273	290	301
30	273	268	255	237	225	225	235	252	263	268	263	252	235	225	225	237	255	268
31	246	240	225	207	195	195	205	222	235	241	235	222	205	195	195	207	225	240
32	222	215	199	180	169	169	178	196	210	216	210	196	178	169	169	180	199	215
33	199	193	176	157	146	146	156	173	189	195	189	173	156	146	146	157	176	193
34	181	172	155	137	126	126	136	153	169	175	169	153	136	126	126	137	155	172
35	161	154	137	119	108	107	118	136	152	157	152	136	118	107	108	119	137	154
36	145	137	120	103	92	92	102	120	136	141	136	120	102	92	92	103	120	137
37	128	121	106	89	79	78	88	105	121	125	121	105	88	78	79	89	106	121
38	114	107	93	76	67	67	76	92	107	111	107	92	76	67	67	76	93	107
39	100	95	81	66	58	59	65	80	95	98	95	80	65	59	58	66	81	95

article code

1

lamp(s)

1 x LED

total flux

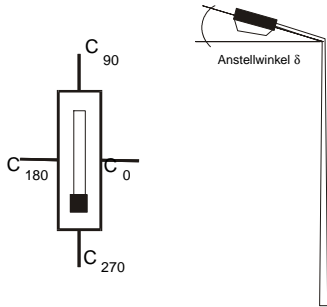
607 lm

LOR

100 %

tilt angle

0.0 °



file : SPOT 40_3.TTL

gamma / °	C 180	C 190	C 200	C 210	C 220	C 230	C 240	C 250	C 260	C 270	C 280	C 290	C 300	C 310	C 320	C 330	C 340	C 350
0	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377	2377
1	2358	2357	2357	2357	2357	2358	2359	2358	2357	2357	2357	2358	2359	2358	2357	2357	2357	2357
2	2321	2320	2320	2320	2319	2318	2317	2317	2318	2318	2318	2317	2317	2318	2319	2320	2320	2320
3	2277	2275	2274	2272	2269	2267	2267	2266	2267	2267	2267	2266	2267	2267	2269	2272	2274	2275
4	2229	2229	2226	2223	2218	2217	2217	2217	2217	2215	2217	2217	2217	2217	2218	2223	2226	2229
5	2184	2184	2182	2179	2176	2175	2178	2176	2176	2176	2176	2178	2178	2175	2176	2179	2182	2184
6	2137	2139	2140	2139	2139	2143	2145	2143	2140	2138	2140	2143	2145	2143	2139	2139	2140	2139
7	2086	2092	2095	2099	2102	2108	2109	2104	2097	2095	2097	2104	2109	2108	2102	2099	2095	2092
8	2028	2032	2043	2048	2054	2060	2060	2054	2044	2041	2044	2054	2060	2060	2054	2048	2043	2032
9	1961	1967	1978	1988	1991	1998	2000	1991	1981	1977	1981	1991	2000	1998	1991	1988	1978	1967
10	1890	1895	1906	1916	1918	1924	1928	1919	1908	1902	1908	1919	1928	1924	1918	1916	1906	1895
11	1814	1821	1831	1836	1839	1846	1846	1838	1828	1824	1828	1838	1846	1846	1839	1836	1831	1821
12	1736	1738	1748	1755	1760	1765	1759	1752	1745	1741	1745	1752	1759	1765	1760	1755	1748	1738
13	1654	1657	1660	1672	1681	1684	1673	1662	1659	1658	1659	1662	1673	1684	1681	1672	1660	1657
14	1572	1571	1573	1587	1599	1604	1586	1573	1573	1576	1573	1573	1586	1604	1599	1587	1573	1571
15	1488	1485	1484	1499	1515	1519	1497	1483	1484	1490	1484	1483	1497	1519	1515	1499	1484	1485
16	1402	1396	1394	1408	1427	1428	1405	1392	1397	1403	1397	1392	1405	1428	1427	1408	1394	1396
17	1312	1305	1301	1316	1333	1331	1310	1301	1306	1313	1306	1301	1310	1331	1333	1316	1301	1305
18	1220	1212	1207	1218	1233	1230	1213	1205	1212	1221	1212	1205	1213	1230	1233	1218	1207	1212
19	1124	1118	1111	1118	1127	1124	1112	1108	1116	1124	1116	1108	1112	1124	1127	1118	1111	1118
20	1023	1019	1012	1013	1016	1014	1007	1008	1015	1020	1015	1008	1007	1014	1016	1013	1012	1019
21	920	915	909	905	902	900	901	905	911	916	911	905	901	900	902	905	909	915
22	814	810	805	800	790	789	794	800	805	807	805	800	794	789	790	800	805	810
23	712	710	706	696	683	681	690	698	702	700	702	698	690	681	683	696	706	710
24	614	615	611	599	583	581	593	603	606	603	606	603	593	581	583	599	611	615
25	527	528	524	510	495	494	507	517	520	518	520	517	507	494	495	510	524	528
26	452	452	448	433	419	419	432	443	447	444	447	443	432	419	419	433	448	452
27	391	391	384	369	356	356	369	381	386	386	386	381	369	356	356	369	384	391
28	342	341	333	316	303	304	316	330	337	338	337	330	316	304	303	316	333	341
29	305	301	290	273	261	261	272	288	297	300	297	288	272	261	261	273	290	301
30	273	268	255	237	225	225	235	252	263	268	263	252	235	225	225	237	255	268
31	246	240	225	207	195	195	205	222	235	241	235	222	205	195	195	207	225	240
32	222	215	199	180	169	169	178	196	210	216	210	196	178	169	169	180	199	215
33	199	193	176	157	146	146	156	173	189	195	189	173	156	146	146	157	176	193
34	181	172	155	137	126	126	136	153	169	175	169	153	136	126	126	137	155	172
35	161	154	137	119	108	107	118	136	152	157	152	136	118	107	108	119	137	154
36	145	137	120	103	92	92	102	120	136	141	136	120	102	92	92	103	120	137
37	128	121	106	89	79	78	88	105	121	125	121	105	88	78	79	89	106	121
38	114	107	93	76	67	67	76	92	107	111	107	92	76	67	67	76	93	107
39	100	95	81	66	58	59	65	80	95	98	95	80	65	59	58	66	81	95

article code

1

lamp(s)

1 x LED

total flux

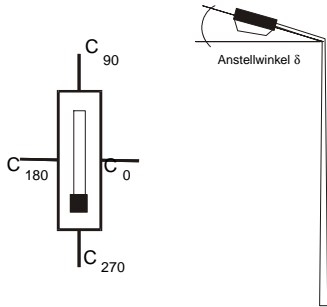
607 lm

LOR

100 %

tilt angle

0.0 °



file : SPOT 40_3.TTL

gamma / °	C 0	C 10	C 20	C 30	C 40	C 50	C 60	C 70	C 80	C 90	C 100	C 110	C 120	C 130	C 140	C 150	C 160	C 170
40	89	83	70	57	51	52	57	70	84	87	84	70	57	52	51	57	70	83
41	78	74	62	51	46	46	50	61	74	76	74	61	50	46	46	51	62	74
42	69	65	54	45	41	41	45	54	65	67	65	54	45	41	41	45	54	65
43	61	58	48	40	37	37	41	48	57	60	57	48	41	37	37	40	48	58
44	53	51	43	37	34	34	37	43	50	52	50	43	37	34	34	37	43	51
45	47	45	39	34	31	31	34	39	44	46	44	39	34	31	31	34	39	45
46	41	40	35	31	28	29	31	35	39	41	39	35	31	29	28	31	35	40
47	36	35	32	28	26	26	29	32	35	36	35	32	29	26	26	28	32	35
48	32	32	29	26	24	24	26	29	31	32	31	29	26	24	24	26	29	32
49	29	28	26	24	23	23	24	26	28	28	28	26	24	23	23	24	26	28
50	26	26	24	22	21	21	23	25	26	26	26	25	23	21	21	22	24	26
51	23	23	22	20	20	20	21	23	23	23	23	23	21	20	20	20	22	23
52	21	22	20	19	19	19	20	21	21	21	21	21	20	19	19	19	20	22
53	19	20	19	18	18	19	18	19	20	20	20	19	18	19	18	18	19	20
54	18	18	17	17	18	18	17	18	18	18	18	18	17	18	18	17	17	18
55	16	17	16	16	17	17	16	17	17	17	17	17	16	17	17	16	16	17
56	15	15	15	15	16	17	16	15	15	16	15	15	16	17	16	15	15	15
57	14	14	14	15	16	16	15	14	14	15	14	14	15	16	16	15	14	14
58	14	13	13	14	15	15	14	14	13	14	13	14	14	15	15	14	13	13
59	13	12	13	13	14	14	13	13	12	13	12	13	13	14	14	13	13	12
60	12	12	12	13	13	14	12	12	12	12	12	12	12	14	13	13	12	12
61	11	11	11	12	13	13	12	11	11	11	11	11	12	13	13	12	11	11
62	11	10	11	11	12	13	11	11	11	11	11	11	11	13	12	11	11	10
63	10	10	10	10	12	12	10	10	10	10	10	10	10	12	12	10	10	10

article code

1

lamp(s)

1 x LED

total flux

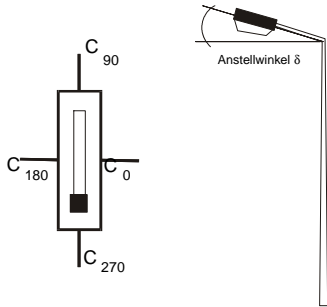
607 lm

LOR

100 %

tilt angle

0.0 °



file : SPOT 40_3.TTL

gamma / °	C 180	C 190	C 200	C 210	C 220	C 230	C 240	C 250	C 260	C 270	C 280	C 290	C 300	C 310	C 320	C 330	C 340	C 350
40	89	83	70	57	51	52	57	70	84	87	84	70	57	52	51	57	70	83
41	78	74	62	51	46	46	50	61	74	76	74	61	50	46	46	51	62	74
42	69	65	54	45	41	41	45	54	65	67	65	54	45	41	41	45	54	65
43	61	58	48	40	37	37	41	48	57	60	57	48	41	37	37	40	48	58
44	53	51	43	37	34	34	37	43	50	52	50	43	37	34	34	37	43	51
45	47	45	39	34	31	31	34	39	44	46	44	39	34	31	31	34	39	45
46	41	40	35	31	28	29	31	35	39	41	39	35	31	29	28	31	35	40
47	36	35	32	28	26	26	29	32	35	36	35	32	29	26	26	28	32	35
48	32	32	29	26	24	24	26	29	31	32	31	29	26	24	24	26	29	32
49	29	28	26	24	23	23	24	26	28	28	28	26	24	23	23	24	26	28
50	26	26	24	22	21	21	23	25	26	26	26	25	23	21	21	22	24	26
51	23	23	22	20	20	20	21	23	23	23	23	23	21	20	20	20	22	23
52	21	22	20	19	19	19	20	21	21	21	21	21	20	19	19	19	20	22
53	19	20	19	18	18	19	18	19	20	20	20	19	18	19	18	18	19	20
54	18	18	17	17	18	18	17	18	18	18	18	18	17	18	18	17	17	18
55	16	17	16	16	17	17	16	17	17	17	17	17	16	17	17	16	16	17
56	15	15	15	15	16	17	16	15	15	16	15	15	16	17	16	15	15	15
57	14	14	14	15	16	16	15	14	14	15	14	14	15	16	16	15	14	14
58	14	13	13	14	15	15	14	14	13	14	13	14	14	15	15	14	13	13
59	13	12	13	13	14	14	13	13	12	13	12	13	13	14	14	13	13	12
60	12	12	12	13	13	14	12	12	12	12	12	12	12	14	13	13	12	12
61	11	11	11	12	13	13	12	11	11	11	11	11	12	13	13	12	11	11
62	11	10	11	11	12	13	11	11	11	11	11	11	11	13	12	11	11	10
63	10	10	10	10	12	12	10	10	10	10	10	10	10	12	12	10	10	10

article code

1

lamp(s)

1 x LED

total flux

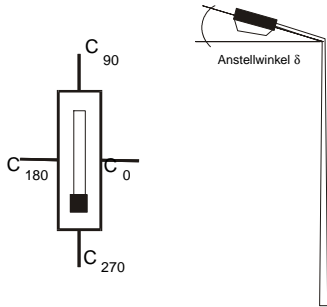
607 lm

LOR

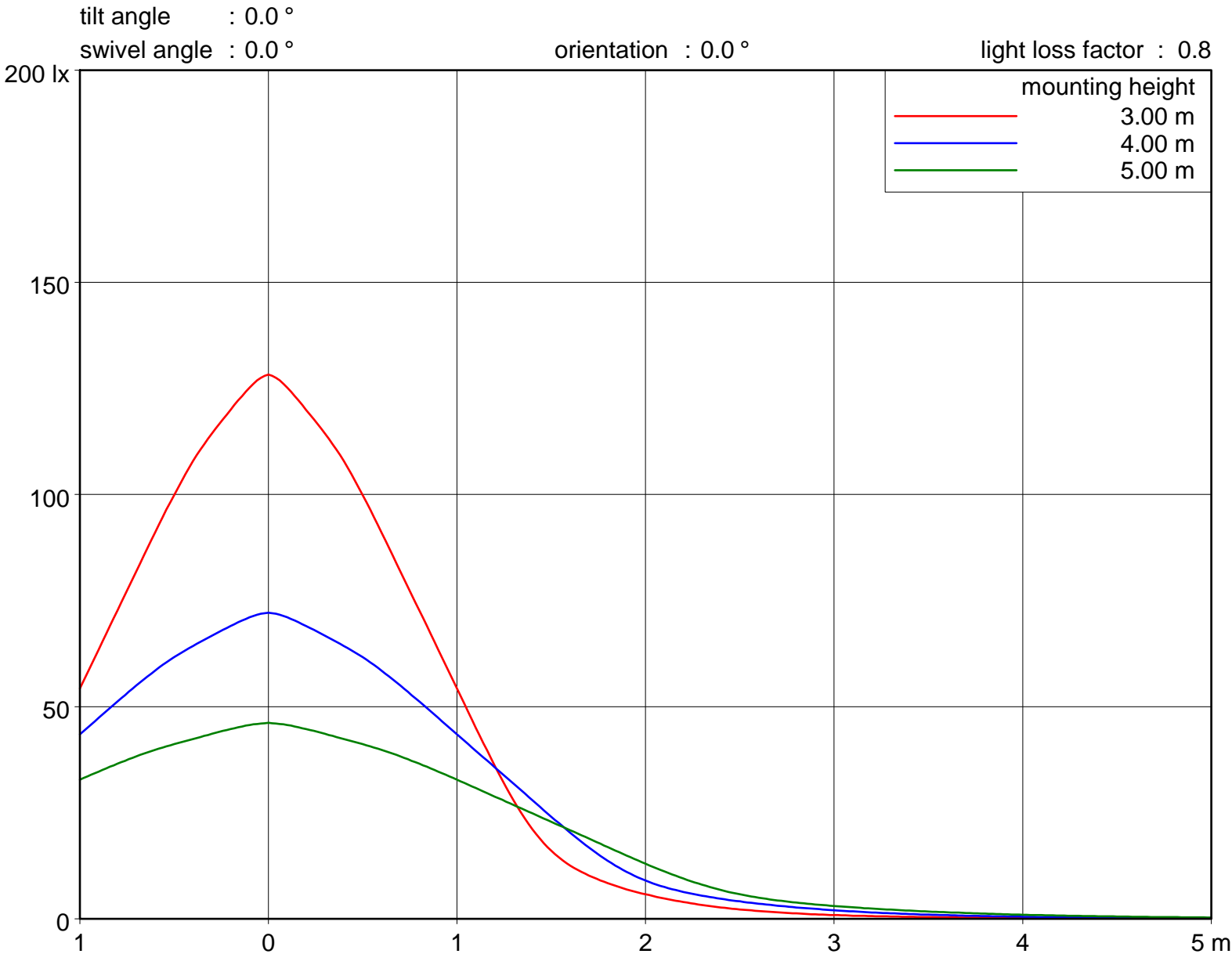
100 %

tilt angle

0.0 °



file : SPOT 40_3.TTL



article code

1

lamp(s)

1 x LED

total flux

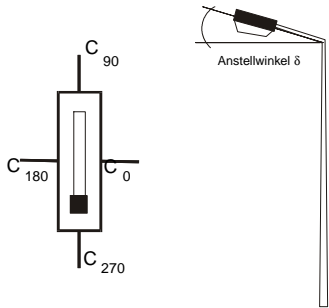
607 lm

LOR

100 %

tilt angle

0.0 °



utilization factors η_B for LED									
ρ -ceiling		70	80	80	80	50	50	30	0
ρ -walls		30	80	50	30	50	30	30	0
ρ -floor		20	10	10	10	10	10	10	0
k	0.6	39	67	46	39	45	38	38	31
	0.8	43	72	51	42	48	41	40	33
	1.0	46	76	55	45	52	44	43	35
	1.25	50	79	58	49	55	47	46	38
	1.5	52	81	61	51	57	49	48	39
	2.0	55	83	64	53	59	51	49	40
	2.5	56	85	65	55	61	52	50	40
	3.0	58	86	67	56	62	53	52	41
	4.0	60	87	68	58	63	54	52	41
	5.0	61	88	69	59	64	55	53	42
luminaire arrangement acc. to LiTG Publ. 3.5									

article code

1

lamp(s)

1 x LED

total flux

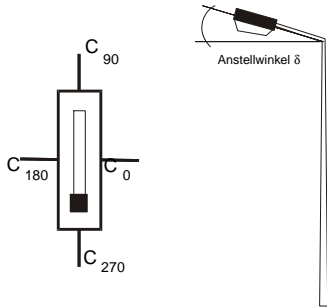
607 lm

LOR

100 %

tilt angle

0.0 °



class		glare rating for illuminance (lx)									
A	A	1000	750	500	--	≤ 300					
1	B	2000	1500	1000	750	500	≤ 300				
2	D					2000	1000	500	≤ 300		
3	E						2000	1000	500	≤ 300	

article code

1

lamp(s)

1 x LED

total flux

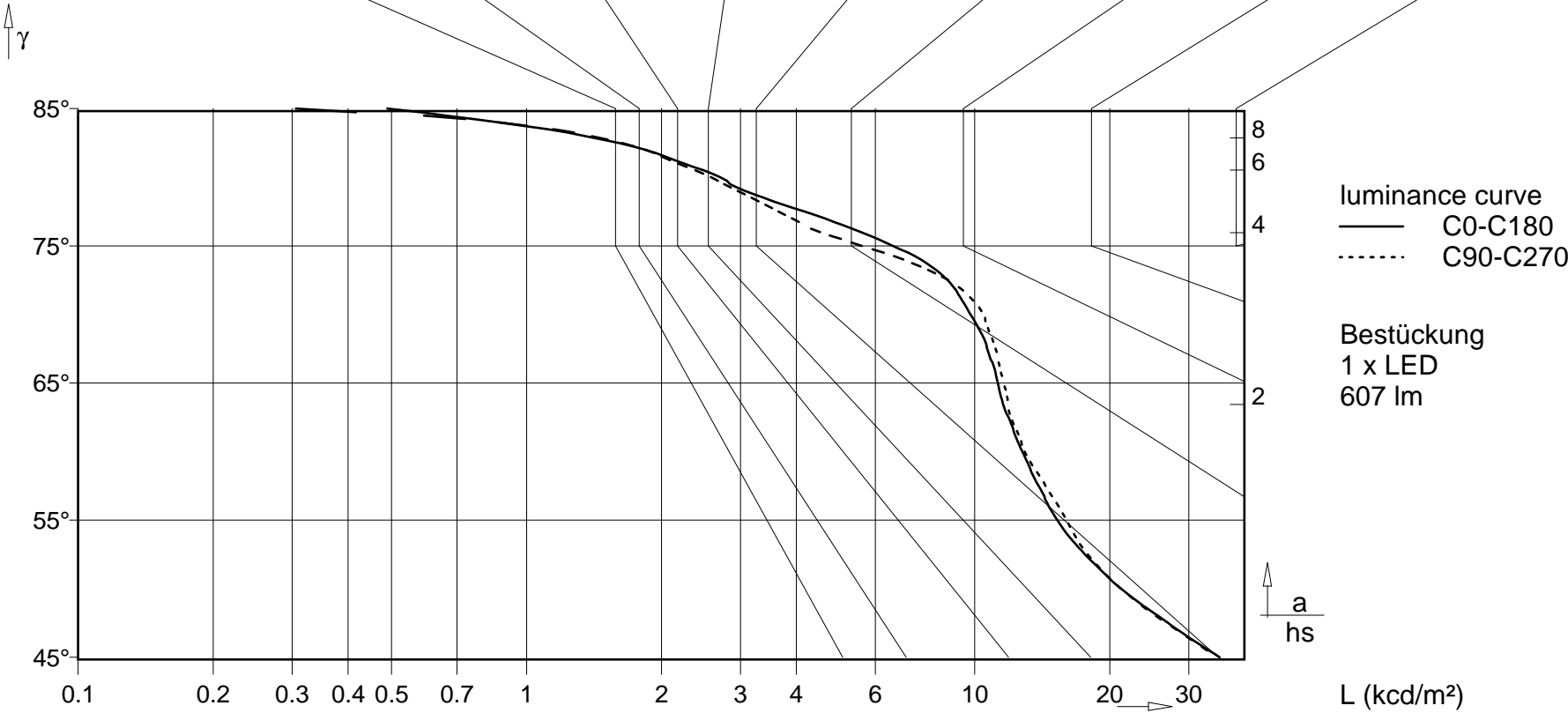
607 lm

LOR

100 %

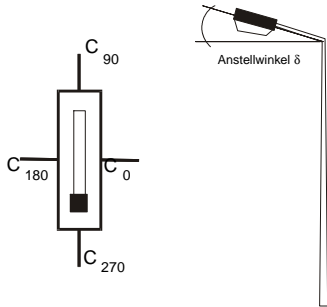
tilt angle

0.0 °



luminance curve
—— C0-C180
- - - - C90-C270

Bestückung
1 x LED
607 lm



—— limit curve type A

glare rating acc. to UGR											
ρ-ceiling		70	70	50	50	30	70	70	50	50	30
ρ-walls		50	30	50	30	30	50	30	50	30	30
ρ-floor		20	20	20	20	20	20	20	20	20	20
room size X Y		crosswise to lamp axis					parallel to lamp axis				
2H	2H	17.6	18.3	17.9	18.5	18.7	17.6	18.3	17.8	18.5	18.7
	3H	17.9	18.5	18.2	18.7	19.0	17.8	18.5	18.1	18.7	18.9
	4H	17.9	18.5	18.2	18.8	19.0	17.9	18.5	18.2	18.7	19.0
	6H	17.9	18.5	18.2	18.7	19.0	17.9	18.4	18.2	18.7	19.0
	8H	17.9	18.4	18.2	18.7	19.0	17.8	18.4	18.2	18.7	19.0
	12H	17.9	18.4	18.2	18.7	19.0	17.8	18.3	18.2	18.6	18.9
4H	2H	17.7	18.3	18.0	18.6	18.8	17.7	18.3	18.0	18.5	18.8
	3H	18.1	18.6	18.5	18.9	19.3	18.1	18.6	18.4	18.9	19.2
	4H	18.2	18.7	18.6	19.0	19.4	18.2	18.7	18.6	19.0	19.3
	6H	18.3	18.7	18.7	19.0	19.4	18.2	18.6	18.6	19.0	19.3
	8H	18.2	18.6	18.6	19.0	19.4	18.2	18.5	18.6	18.9	19.3
	12H	18.2	18.5	18.6	18.9	19.3	18.1	18.5	18.6	18.9	19.3
8H	4H	18.3	18.7	18.7	19.1	19.5	18.3	18.6	18.7	19.0	19.4
	6H	18.3	18.7	18.8	19.1	19.5	18.3	18.6	18.8	19.0	19.5
	8H	18.3	18.6	18.8	19.0	19.5	18.3	18.5	18.7	19.0	19.4
	12H	18.3	18.5	18.8	19.0	19.5	18.2	18.4	18.7	18.9	19.4
12H	4H	18.3	18.6	18.7	19.0	19.4	18.2	18.6	18.7	19.0	19.4
	6H	18.3	18.6	18.8	19.0	19.5	18.3	18.5	18.7	19.0	19.5
	8H	18.3	18.5	18.8	19.0	19.5	18.2	18.5	18.7	18.9	19.4
variation of observer position											
S =	1.0H 1.5H 2.0H	+3.3 / -2.2 +5.7 / -2.7 +7.5 / -3.4				+3.2 / -2.1 +5.6 / -2.8 +7.4 / -3.5					
standard-table		BK01					BK01				
correction		0.1					0.0				
corrected glare indices for 607lm total flux											

article code

1

lamp(s)

1 x LED

total flux

607 lm

LOR

100 %

tilt angle

0.0 °

