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NATA

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Client:

LumCAT: 4-2275-M

Luminaire: 92.70.131.000

Report No: nata-0100

Test No: GC2018120705

LampCAT: OSRAM SOLERIQ S13

Lamp flux(lm): 1777.0

Number of Lamps: 1

Length(mm): 100

Phm Type: C

Voltage(V): 36.8000

Current(A): 0.5000

Power (W): 18.4000

PF: 0.0000

Ballast type: DC

Width(mm): 100

Height(mm): 0

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Photometric Results

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Lumens(lm): 1579.40, Efficiency(%): 88.88% , Luminous Efficacy(lm/W): 85.84

Central intensity(cd): 8445.657, Maximum intensity(cd): 8445.657

Angle of maximum intensity: C=0.0  $\gamma$ =0.0

Beam Angle(50%Imax): [C0/180]Total=19.0

[C90/270]Total=19.0

Field angle(10%Imax): [C0/180]Total=38.8

[C90/270]Total=38.8

Maximum s/h(1/2): C0\_180=0.33 C90\_270=0.33

Maximum s/h(1/4): C0\_180=0.32 C90\_270=0.32

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 88.99%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in  $\pi$  solid angle : 98.584%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	8445.656	2.021	2.021	.114%	.128%
1.0	8386.734	16.051	18.071	.903%	1.144%
2.0	8191.125	31.348	49.42	1.764%	3.129%
3.0	7930.547	45.515	94.935	2.561%	6.011%
4.0	7618.148	58.275	153.21	3.279%	9.701%
5.0	7143.680	68.276	221.487	3.842%	14.023%
6.0	6627.727	75.972	297.458	4.275%	18.834%
7.0	5995.688	80.128	377.586	4.509%	23.907%
8.0	5321.320	81.213	458.799	4.570%	29.049%
9.0	4605.258	79.002	537.801	4.446%	34.051%
10.0	3898.828	74.243	612.045	4.178%	38.752%
11.0	3247.031	67.942	679.986	3.823%	43.053%
12.0	2707.242	61.725	741.711	3.474%	46.962%
13.0	2233.266	55.091	796.802	3.100%	50.450%
14.0	1827.914	48.493	845.295	2.729%	53.520%
15.0	1524.396	43.266	888.561	2.435%	56.259%
16.0	1313.515	39.703	928.264	2.234%	58.773%
17.0	1105.713	35.451	963.715	1.995%	61.018%
18.0	987.673	33.469	997.185	1.883%	63.137%
19.0	879.082	31.385	1028.57	1.766%	65.124%
20.0	781.242	29.301	1057.871	1.649%	66.979%
21.0	712.336	27.994	1085.865	1.575%	68.752%
22.0	667.765	27.432	1113.297	1.544%	70.489%
23.0	635.273	27.220	1140.517	1.532%	72.212%
24.0	612.809	27.333	1167.85	1.538%	73.943%
25.0	597.157	27.675	1195.525	1.557%	75.695%
26.0	584.965	28.121	1223.646	1.582%	77.475%
27.0	574.678	28.610	1252.256	1.610%	79.287%
28.0	566.712	29.176	1281.432	1.642%	81.134%
29.0	557.086	29.617	1311.049	1.667%	83.009%
30.0	548.205	30.058	1341.107	1.692%	84.912%
31.0	539.423	30.466	1371.574	1.714%	86.841%
32.0	530.079	30.804	1402.378	1.733%	88.792%
33.0	517.310	30.897	1433.274	1.739%	90.748%
34.0	485.044	29.744	1463.018	1.674%	92.631%
35.0	422.930	26.602	1489.62	1.497%	94.316%
36.0	334.765	21.578	1511.198	1.214%	95.682%
37.0	254.672	16.807	1528.005	.946%	96.746%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	151.158	10.205	1538.21	.574%	97.392%
39.0	67.085	4.630	1542.84	.261%	97.685%
40.0	29.384	2.071	1544.911	.117%	97.816%
41.0	16.355	1.177	1546.088	.066%	97.891%
42.0	12.874	0.945	1547.032	.053%	97.951%
43.0	10.814	0.809	1547.841	.046%	98.002%
44.0	9.338	0.711	1548.552	.040%	98.047%
45.0	8.466	0.656	1549.209	.037%	98.088%
46.0	8.255	0.651	1549.86	.037%	98.130%
47.0	8.079	0.648	1550.508	.036%	98.171%
48.0	7.903	0.644	1551.152	.036%	98.211%
49.0	7.784	0.644	1551.796	.036%	98.252%
50.0	7.685	0.646	1552.442	.036%	98.293%
51.0	7.580	0.646	1553.088	.036%	98.334%
52.0	7.481	0.646	1553.734	.036%	98.375%
53.0	7.411	0.649	1554.383	.037%	98.416%
54.0	7.313	0.649	1555.032	.037%	98.457%
55.0	7.249	0.651	1555.683	.037%	98.498%
56.0	7.179	0.653	1556.336	.037%	98.540%
57.0	7.116	0.654	1556.99	.037%	98.581%
58.0	7.059	0.657	1557.647	.037%	98.623%
59.0	7.031	0.661	1558.308	.037%	98.665%
60.0	6.968	0.662	1558.969	.037%	98.706%
61.0	6.926	0.664	1559.634	.037%	98.748%
62.0	6.884	0.667	1560.3	.038%	98.791%
63.0	6.848	0.669	1560.969	.038%	98.833%
64.0	6.820	0.672	1561.641	.038%	98.876%
65.0	6.778	0.674	1562.315	.038%	98.918%
66.0	6.757	0.677	1562.992	.038%	98.961%
67.0	6.729	0.679	1563.671	.038%	99.004%
68.0	6.708	0.682	1564.353	.038%	99.047%
69.0	6.687	0.685	1565.038	.039%	99.091%
70.0	6.659	0.686	1565.724	.039%	99.134%
71.0	6.645	0.689	1566.413	.039%	99.178%
72.0	6.616	0.690	1567.103	.039%	99.221%
73.0	6.595	0.692	1567.795	.039%	99.265%
74.0	6.574	0.693	1568.488	.039%	99.309%
75.0	6.567	0.696	1569.183	.039%	99.353%

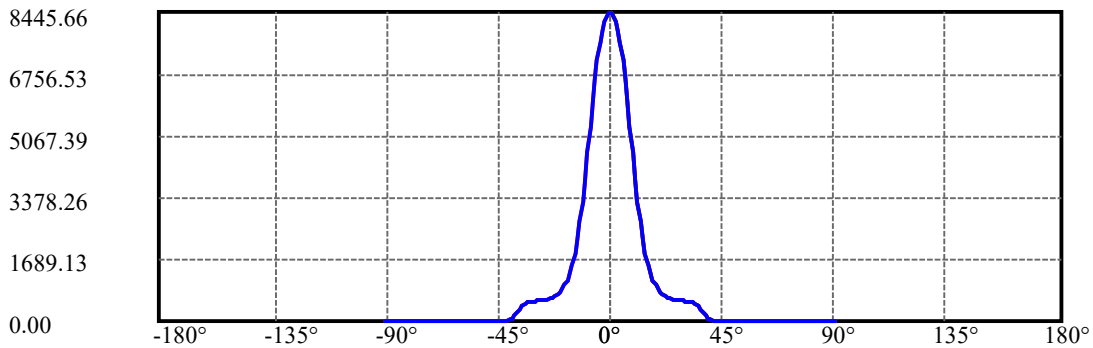
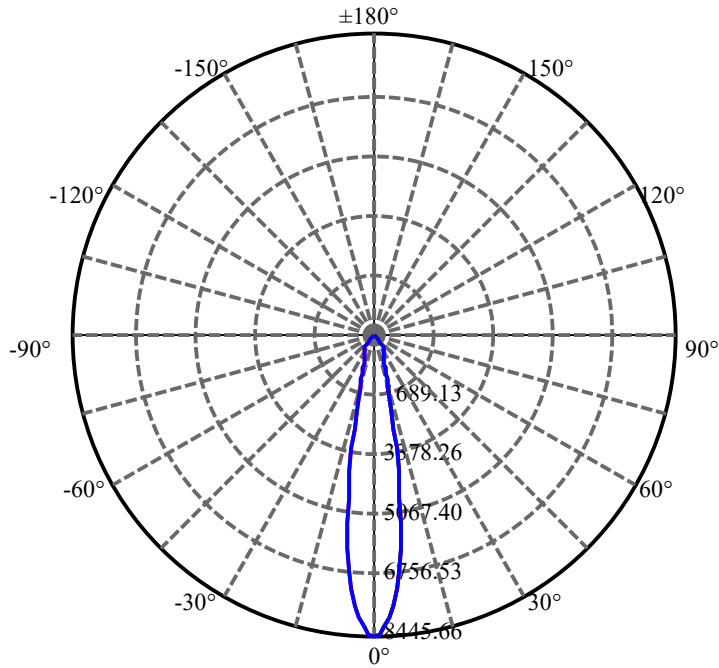
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	6.560	0.698	1569.881	.039%	99.397%
77.0	6.546	0.699	1570.581	.039%	99.442%
78.0	6.539	0.701	1571.282	.039%	99.486%
79.0	6.532	0.703	1571.985	.040%	99.531%
80.0	6.518	0.704	1572.689	.040%	99.575%
81.0	6.539	0.708	1573.398	.040%	99.620%
82.0	6.504	0.706	1574.104	.040%	99.665%
83.0	6.518	0.709	1574.813	.040%	99.710%
84.0	6.504	0.709	1575.523	.040%	99.754%
85.0	6.483	0.708	1576.231	.040%	99.799%
86.0	6.455	0.706	1576.937	.040%	99.844%
87.0	6.427	0.704	1577.641	.040%	99.889%
88.0	6.427	0.704	1578.345	.040%	99.933%
89.0	6.420	0.704	1579.049	.040%	99.978%
90.0	6.413	0.352	1579.4	.020%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	1341.11	75.47%	84.91%
0-40	1544.91	86.94%	97.82%
0-60	1558.97	87.73%	98.71%
0-90	1579.05	88.86%	99.98%
0-120	1579.05	88.86%	99.98%
0-180	1579.40	88.88%	100.00%
60-90	20.74	1.17%	1.31%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-27.39	1263.52	71.10%	80.00%

ZONAL LUMEN SUMMARY

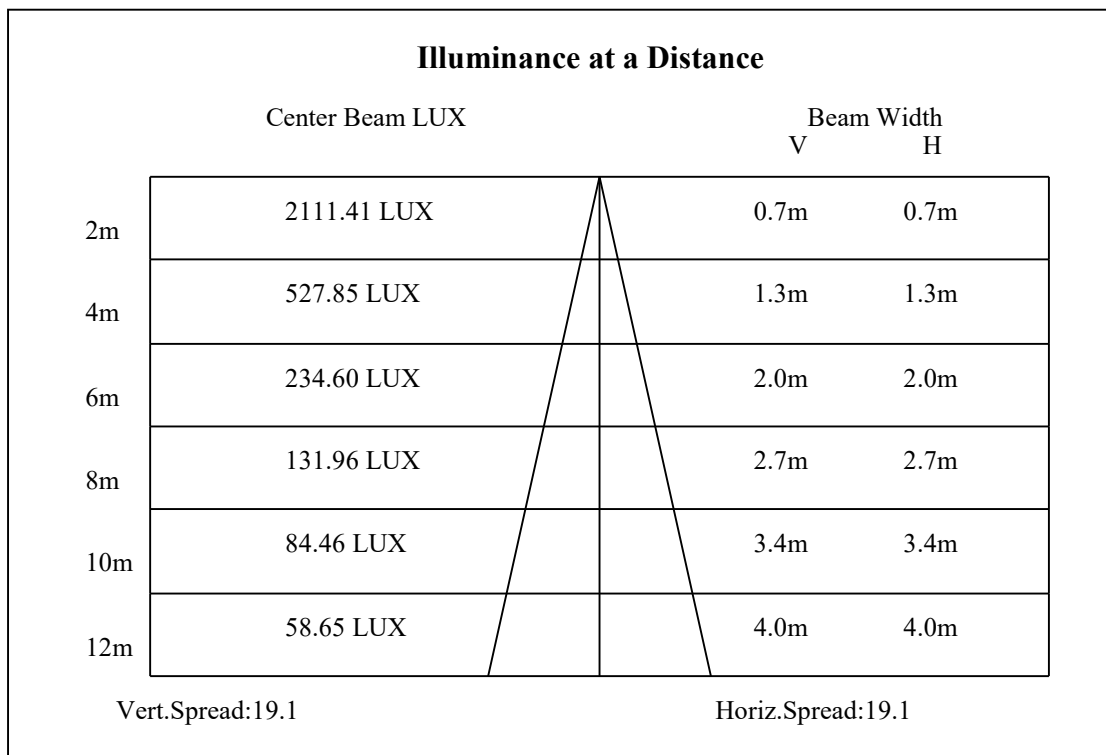
0-10	612.04
10-20	445.83
20-30	283.24
30-40	203.80
40-50	7.53
50-60	6.53
60-70	6.75
70-80	6.97
80-90	6.36
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00

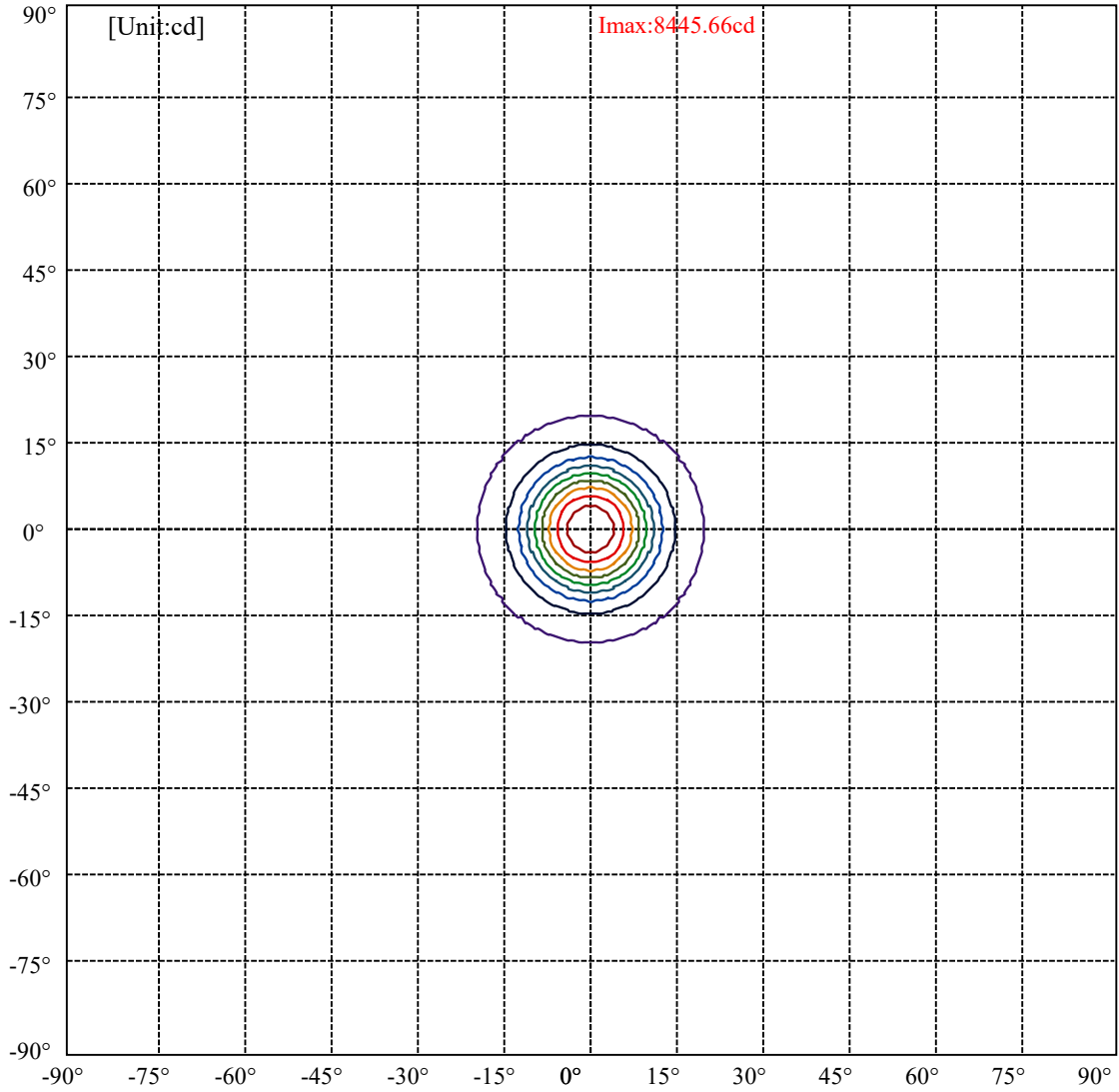


C0(Max): —————  
C0/C180: —————  
C90/C270: —————

Field angle(10%Imax):C0/180Left:19.4 Right:19.4  
:C90/270Left:19.4 Right:19.4

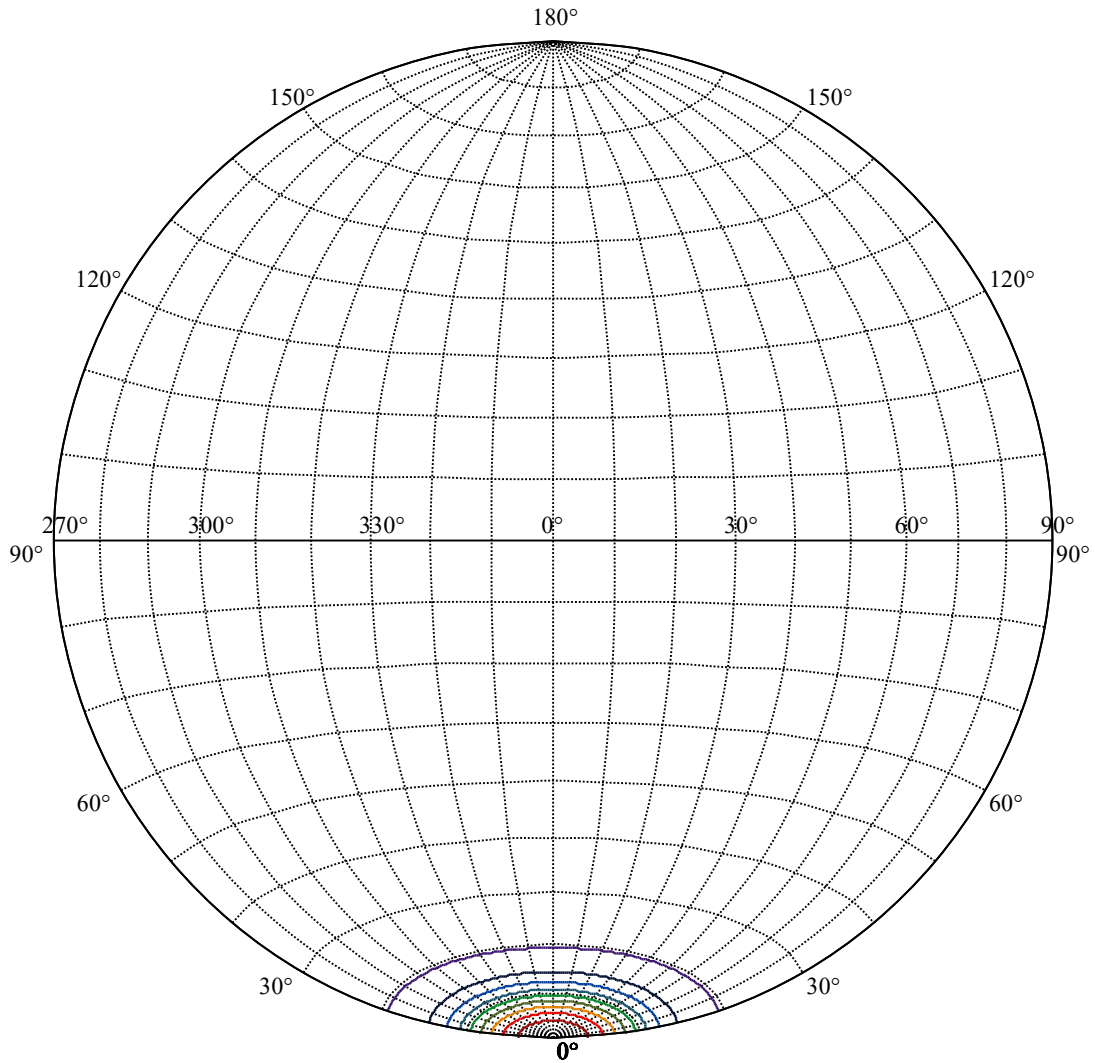
Beam Angle(50%Imax):C0/180Left:9.5 Right:9.5  
:C90/270Left:9.5 Right:9.5





(10%I <sub>max</sub> ) 844.566	—
(20%I <sub>max</sub> ) 1689.13	—
(30%I <sub>max</sub> ) 2533.7	—
(40%I <sub>max</sub> ) 3378.26	—
(50%I <sub>max</sub> ) 4222.83	—
(60%I <sub>max</sub> ) 5067.39	—
(70%I <sub>max</sub> ) 5911.96	—
(80%I <sub>max</sub> ) 6756.53	—
(90%I <sub>max</sub> ) 7601.09	—





House

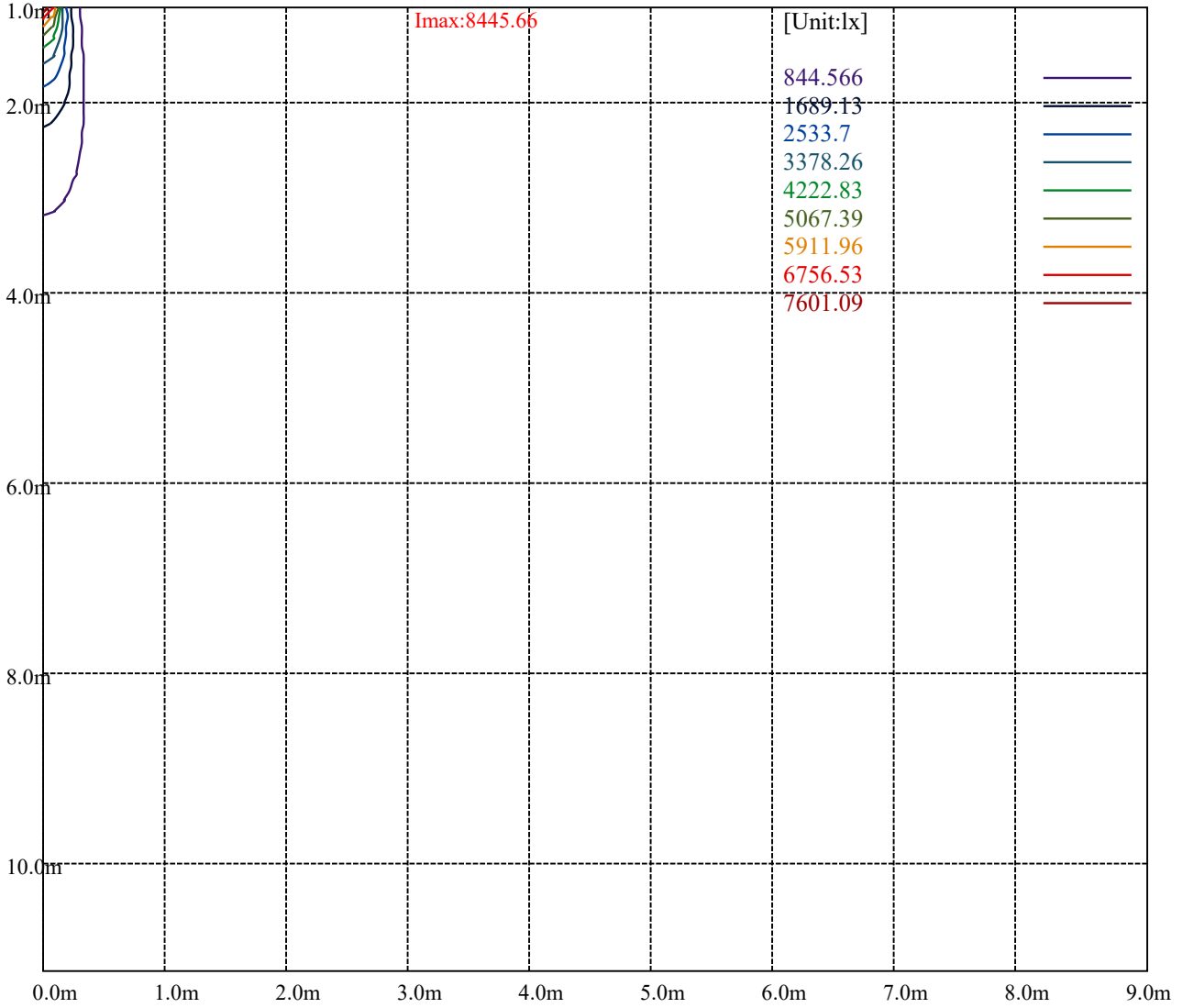
[Unit:cd]

Road

Imax:8445.66

(10%Imax) 844.566	—
(20%Imax) 1689.13	—
(30%Imax) 2533.7	—
(40%Imax) 3378.26	—
(50%Imax) 4222.83	—
(60%Imax) 5067.39	—
(70%Imax) 5911.96	—
(80%Imax) 6756.53	—
(90%Imax) 7601.09	—





Luminance Table

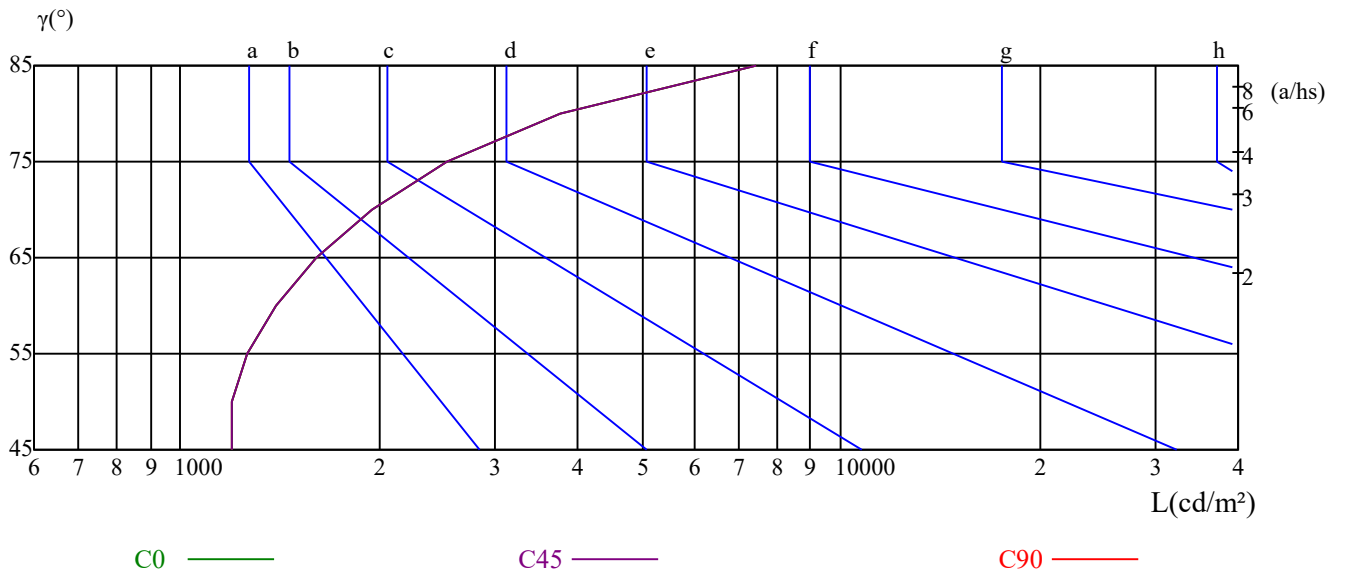
$\gamma$	45	50	55	60	65	70	75	80	85
C0	1197	1196	1264	1394	1604	1947	2537	3754	7438
C45	1197	1196	1264	1394	1604	1947	2537	3754	7438
C90	1197	1196	1264	1394	1604	1947	2537	3754	7438

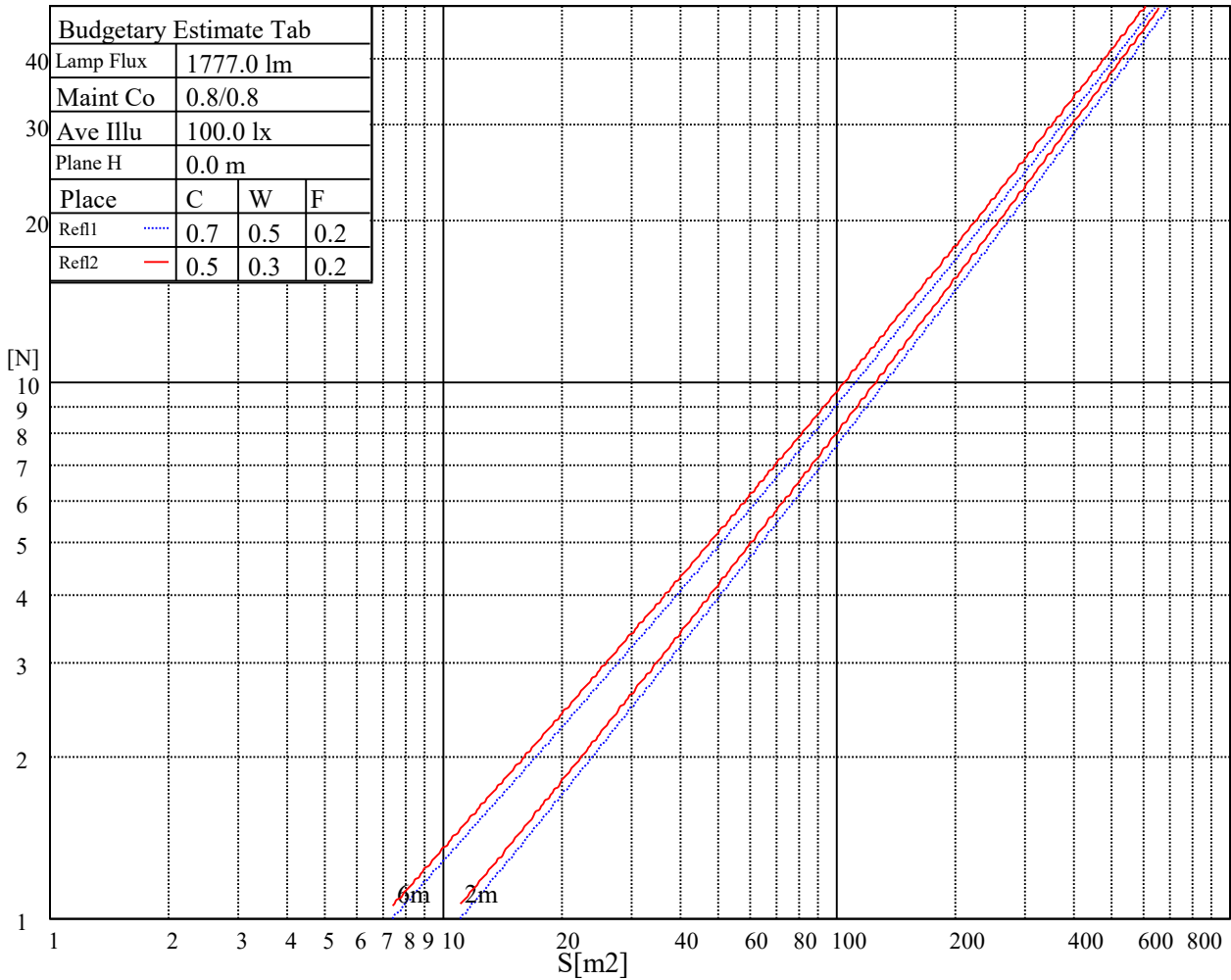
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
1604	1604	1604	2537	2537	2537	7438	7438	7438

Glare Table

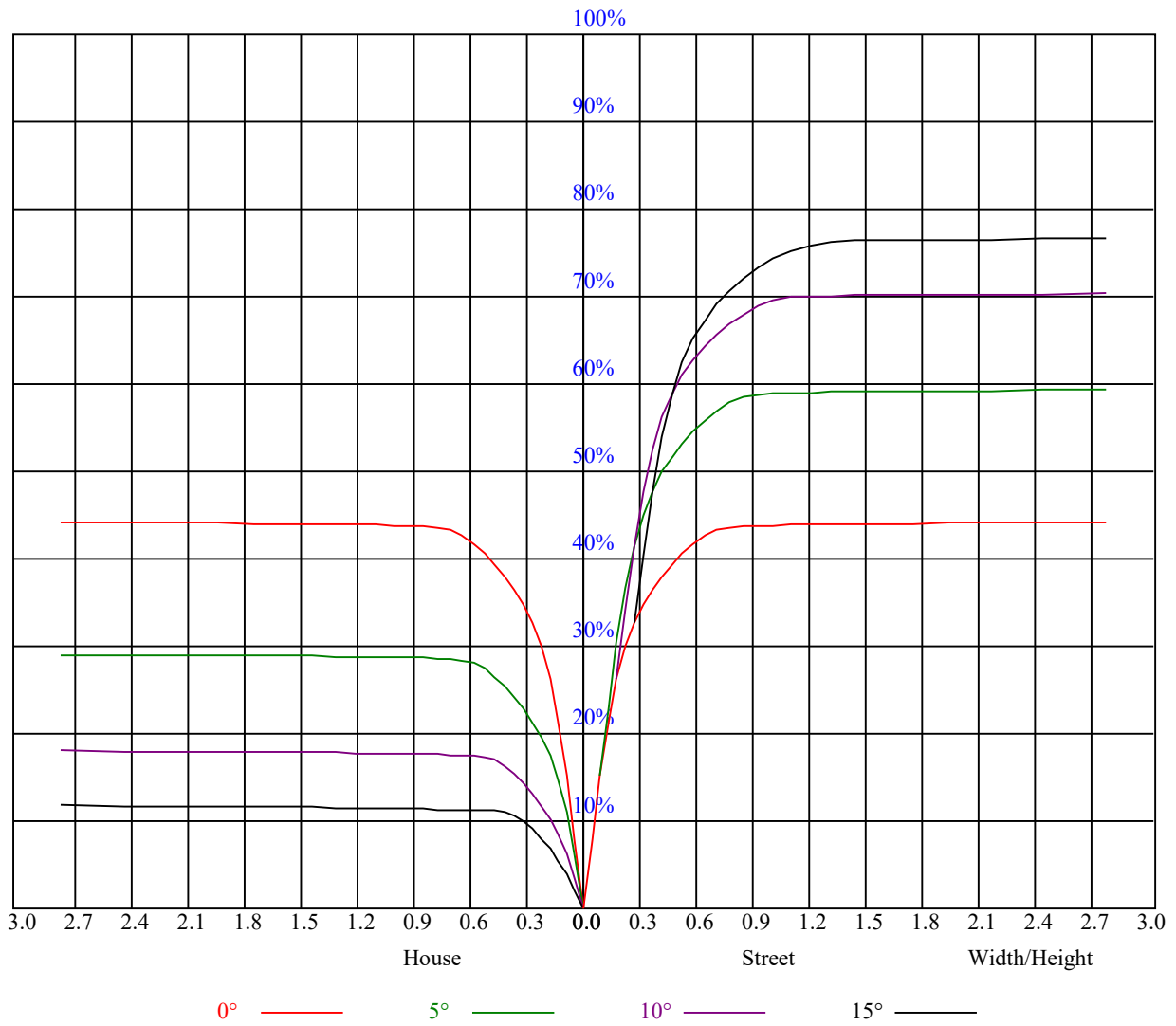
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

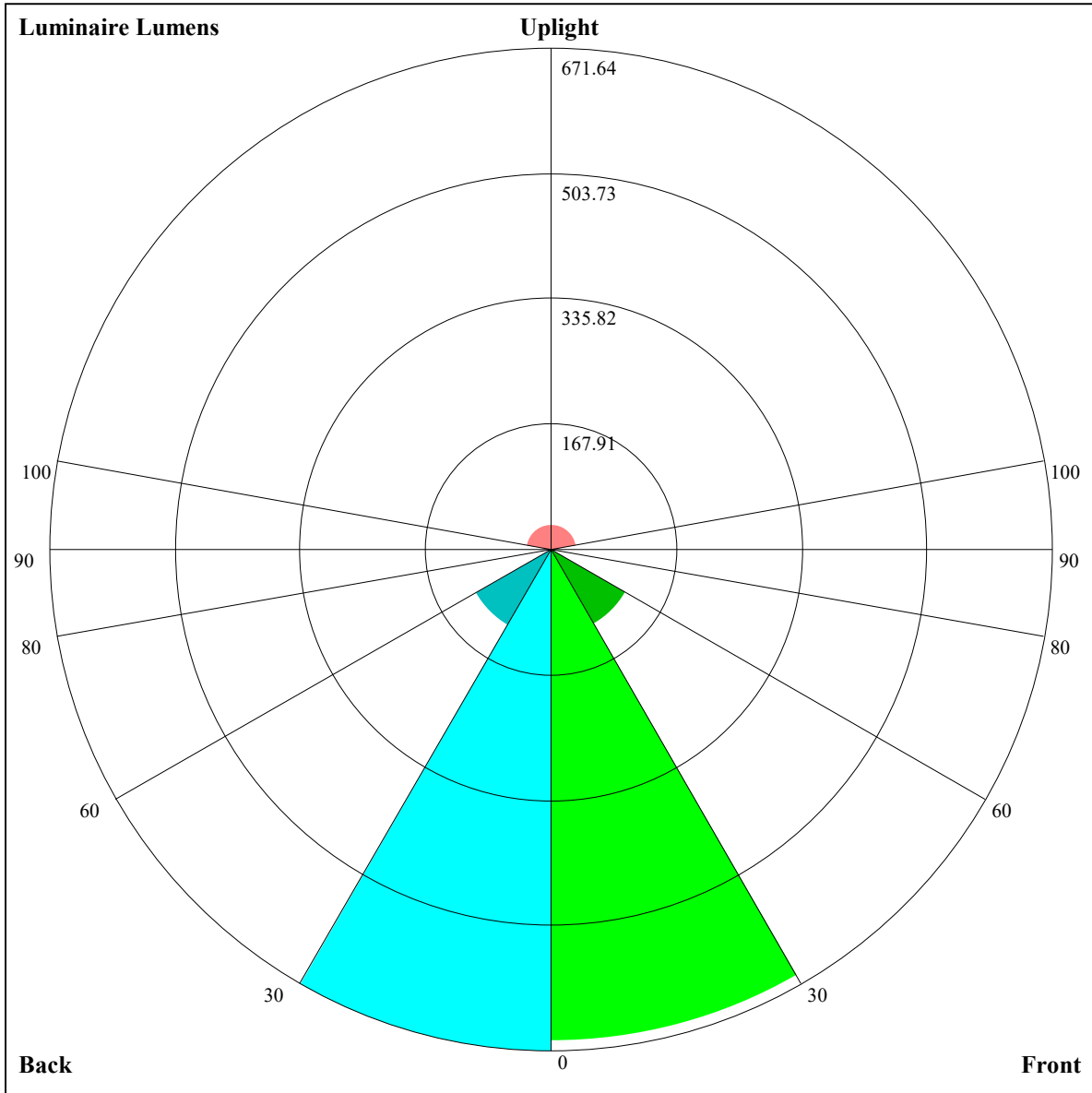
Luminance Limiting Curve





RHOCC	80			70			50			30			10			0
RHOW	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR	COEFFICIENTS OF UTILIZATION RHOFC=20 CU															
0	1.06	1.06	1.06	1.03	1.03	1.03	0.99	0.99	0.99	0.95	0.95	0.95	0.91	0.91	0.91	0.89
1	1.00	0.98	0.96	0.98	0.96	0.95	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.85
2	0.95	0.92	0.89	0.93	0.90	0.88	0.90	0.88	0.86	0.88	0.86	0.84	0.85	0.84	0.83	0.81
3	0.90	0.86	0.84	0.89	0.86	0.83	0.87	0.84	0.82	0.85	0.82	0.80	0.83	0.81	0.79	0.78
4	0.86	0.82	0.79	0.85	0.82	0.79	0.83	0.80	0.78	0.82	0.79	0.77	0.80	0.78	0.76	0.75
5	0.83	0.79	0.76	0.82	0.78	0.75	0.80	0.77	0.75	0.79	0.76	0.74	0.78	0.75	0.73	0.72
6	0.79	0.75	0.72	0.79	0.75	0.72	0.78	0.74	0.72	0.76	0.74	0.71	0.75	0.73	0.71	0.70
7	0.77	0.73	0.70	0.76	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.73	0.71	0.69	0.68
8	0.74	0.70	0.67	0.74	0.70	0.67	0.73	0.69	0.67	0.72	0.69	0.67	0.71	0.68	0.66	0.65
9	0.72	0.68	0.65	0.71	0.68	0.65	0.71	0.67	0.65	0.70	0.67	0.65	0.69	0.66	0.64	0.63
10	0.69	0.66	0.63	0.69	0.65	0.63	0.69	0.65	0.63	0.68	0.65	0.63	0.67	0.65	0.63	0.62





Luminaire Lumens:

FL=658.9,FM=115.77,FH=6.86,FVH=3.54

BL=671.64,BM=118.4,BH=6.86,BVH=3.54

UL=7,UH=33.29

BUG Rating:B2-U2-G0



Intensity data(cd)

C/γ(°)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
0.0	8442.00	8416.13	8265.38	8040.38	7685.44	7197.75	6663.94	5992.31	5368.50
45.0	8462.81	8356.50	8086.50	7799.06	7436.25	6830.44	6220.13	5549.06	4816.69
90.0	8415.56	8236.13	7934.63	7566.75	7163.44	6582.38	5959.69	5194.13	4440.38
135.0	8462.25	8403.75	8126.44	7832.81	7540.88	7001.44	6493.50	5887.69	5150.81
180.0	8442.00	8341.88	8139.94	7791.75	7454.81	7069.50	6522.19	5850.56	5197.50
225.0	8462.81	8447.63	8309.25	8093.81	7821.00	7444.69	7033.50	6473.25	5815.69
270.0	8415.56	8471.25	8385.75	8258.63	8065.13	7694.44	7296.19	6818.06	6195.38
315.0	8462.25	8420.63	8281.13	8061.19	7778.25	7328.81	6832.69	6200.44	5585.63
360.0	8442.00	8416.13	8265.38	8040.38	7685.44	7197.75	6663.94	5992.31	5368.50
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	4634.44	3882.38	3263.06	2733.75	2189.25	1825.88	1532.25	1265.63	1111.50
45.0	4075.88	3406.50	2746.69	2280.94	1872.00	1547.44	1320.75	1131.75	987.75
90.0	3787.88	3096.00	2502.56	2081.81	1753.88	1446.75	1108.86	1091.31	967.78
135.0	4406.06	3763.69	3092.06	2564.44	2080.69	1724.63	1486.69	1270.69	1096.88
180.0	4446.56	3745.13	3174.75	2602.69	2167.88	1787.06	1508.63	1312.88	1108.69
225.0	5163.19	4408.88	3692.25	3115.69	2593.13	2057.06	1738.13	1490.06	1122.24
270.0	5494.50	4821.75	4069.13	3456.00	2854.13	2319.19	1919.81	1582.31	1337.06
315.0	4833.56	4066.31	3435.75	2822.63	2355.19	1915.31	1580.06	1363.50	1113.81
360.0	4634.44	3882.38	3263.06	2733.75	2189.25	1825.88	1532.25	1265.63	1111.50
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	982.69	872.44	763.31	703.13	662.06	633.38	613.69	600.75	588.38
45.0	873.00	781.31	699.75	657.00	627.75	606.94	590.63	578.81	568.69
90.0	841.73	760.73	698.85	647.33	621.73	602.89	587.31	575.61	567.23
135.0	964.69	865.69	760.50	698.63	657.00	627.75	608.06	594.56	582.19
180.0	981.11	882.00	797.46	711.73	663.58	632.25	608.96	592.93	582.41
225.0	1086.92	964.29	857.25	770.51	708.81	660.21	631.91	610.65	595.63
270.0	1160.44	1013.63	871.88	790.88	728.44	677.25	643.50	622.13	605.25
315.0	1010.81	892.58	800.94	719.49	672.75	641.53	618.41	601.82	589.95
360.0	982.69	872.44	763.31	703.13	662.06	633.38	613.69	600.75	588.38
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	577.69	570.38	561.38	552.94	544.50	534.94	527.06	509.06	441.00
45.0	559.69	552.38	542.81	535.50	525.94	516.38	504.00	433.69	349.88
90.0	559.24	550.41	540.84	532.52	523.91	515.19	477.11	406.80	320.85
135.0	572.63	566.44	555.19	546.19	536.63	527.06	518.63	477.00	387.56
180.0	573.08	565.82	555.02	544.28	536.68	526.33	517.22	487.97	420.75
225.0	585.23	576.62	567.62	557.66	548.66	538.93	530.16	521.83	491.51
270.0	591.19	581.63	572.63	565.31	555.19	546.75	538.31	530.44	510.19
315.0	578.70	570.04	561.21	551.25	543.88	535.05	525.99	513.56	461.70
360.0	577.69	570.38	561.38	552.94	544.50	534.94	527.06	509.06	441.00
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	357.19	286.88	144.90	67.05	20.81	15.64	13.11	10.74	9.00
45.0	291.94	166.56	86.63	22.16	15.53	13.22	10.24	8.83	8.33
90.0	208.29	123.92	55.13	16.43	14.63	12.32	10.07	8.55	8.27
135.0	294.19	284.63	98.38	36.11	16.65	14.46	12.09	10.13	8.55
180.0	314.83	222.81	135.39	50.18	18.00	16.09	13.22	11.08	9.17
225.0	401.63	314.94	222.08	114.69	47.70	17.55	15.41	12.71	10.74
270.0	452.81	369.56	288.56	156.09	77.40	25.93	15.36	13.44	11.03
315.0	357.24	268.09	178.20	73.97	24.36	15.64	13.50	11.03	9.62
360.0	357.19	286.88	144.90	67.05	20.81	15.64	13.11	10.74	9.00

Intensity data(cd)

C/γ(°)	45.0	46.0	47.0	48.0	49.0	50.0	51.0	52.0	53.0
0.0	8.44	8.27	8.10	7.99	7.82	7.71	7.59	7.48	7.43
45.0	8.10	7.99	7.88	7.76	7.65	7.59	7.48	7.37	7.31
90.0	8.10	7.93	7.82	7.65	7.59	7.54	7.48	7.37	7.31
135.0	8.33	8.21	7.99	7.93	7.76	7.71	7.65	7.48	7.43
180.0	8.66	8.49	8.27	7.99	7.93	7.82	7.71	7.65	7.54
225.0	8.72	8.49	8.27	7.93	7.82	7.71	7.54	7.48	7.43
270.0	8.94	8.38	8.21	8.04	7.88	7.76	7.65	7.54	7.48
315.0	8.44	8.27	8.10	7.93	7.82	7.65	7.54	7.48	7.37
360.0	8.44	8.27	8.10	7.99	7.82	7.71	7.59	7.48	7.43
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	7.31	7.26	7.14	7.09	7.09	7.03	6.98	6.98	6.86
45.0	7.26	7.20	7.14	7.09	7.03	6.98	6.98	6.92	6.86
90.0	7.26	7.20	7.14	7.09	7.03	6.92	6.92	6.92	6.86
135.0	7.37	7.26	7.20	7.14	7.09	7.03	6.98	6.92	6.92
180.0	7.43	7.37	7.31	7.20	7.09	7.03	6.98	6.92	6.86
225.0	7.26	7.20	7.14	7.09	7.03	7.03	6.92	6.86	6.86
270.0	7.37	7.31	7.20	7.14	7.09	7.09	7.03	6.98	6.92
315.0	7.26	7.20	7.14	7.09	7.03	7.03	6.98	6.92	6.92
360.0	7.31	7.26	7.14	7.09	7.09	7.03	6.98	6.98	6.86
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	6.86	6.81	6.81	6.81	6.75	6.69	6.69	6.64	6.64
45.0	6.86	6.81	6.81	6.75	6.69	6.69	6.64	6.64	6.58
90.0	6.86	6.81	6.75	6.75	6.75	6.75	6.75	6.69	6.75
135.0	6.86	6.86	6.81	6.75	6.75	6.75	6.69	6.69	6.64
180.0	6.81	6.81	6.75	6.75	6.69	6.69	6.64	6.64	6.64
225.0	6.81	6.81	6.75	6.69	6.69	6.64	6.64	6.64	6.58
270.0	6.86	6.86	6.81	6.81	6.75	6.75	6.75	6.69	6.69
315.0	6.86	6.81	6.75	6.75	6.75	6.69	6.69	6.64	6.64
360.0	6.86	6.81	6.81	6.81	6.75	6.69	6.69	6.64	6.64
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	6.58	6.58	6.58	6.58	6.53	6.53	6.53	6.53	6.47
45.0	6.58	6.58	6.58	6.53	6.53	6.53	6.53	6.47	6.47
90.0	6.69	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64
135.0	6.64	6.58	6.58	6.58	6.58	6.53	6.53	6.53	6.53
180.0	6.58	6.58	6.53	6.53	6.53	6.47	6.47	6.47	6.47
225.0	6.58	6.58	6.53	6.53	6.53	6.53	6.53	6.47	6.47
270.0	6.69	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64
315.0	6.58	6.58	6.53	6.53	6.53	6.53	6.47	6.53	6.47
360.0	6.58	6.58	6.58	6.58	6.53	6.53	6.53	6.53	6.47
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	6.47	6.47	6.47	6.47	6.47	6.47	6.41	6.41	6.41
45.0	6.53	6.47	6.47	6.47	6.41	6.41	6.41	6.41	6.41
90.0	6.69	6.64	6.69	6.58	6.53	6.47	6.41	6.41	6.41
135.0	6.53	6.47	6.47	6.47	6.47	6.41	6.47	6.41	6.41
180.0	6.47	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41
225.0	6.47	6.47	6.47	6.47	6.41	6.47	6.41	6.41	6.41
270.0	6.64	6.64	6.69	6.69	6.69	6.53	6.47	6.47	6.47
315.0	6.53	6.47	6.47	6.47	6.47	6.47	6.41	6.47	6.41
360.0	6.47	6.47	6.47	6.47	6.47	6.47	6.41	6.41	6.41

Intensity data(cd)

C/γ(°)	90.0
0.0	6.41
45.0	6.41
90.0	6.41
135.0	6.41
180.0	6.41
225.0	6.41
270.0	6.41
315.0	6.41
360.0	6.41