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NATA

LumCAT: 3-1548-A3
Luminaire: 99.02.73.172+92.76.365.00
Report No: NATA0100 Voltage(V): 36.2000
Test No: GC2018111518 Current(A): 0.5000
LampCAT: OSRAM OPTO SOLERIQ S13 G2 Power (W): 18.1000
Lamp flux(lm): 1689.0 PF: 0.0000
Number of Lamps: 1 Ballast type: DC
Length(mm): 79 Width(mm): 79
Phm Type: C Height(mm): 0

Photometric Results

Lumens(lm): 1568.79
Efficiency(%): 92.88%
Lumens(lm)/Power(W): 86.86
Central intensity(cd): 14414.060
Maximum intensity(cd): 14414.060
Angle of maximum intensity: C=0.0 γ =0.0
Beam Angle(50%Imax): [C0/180]Total=13.1
[C90/270]Total=13.1
Field angle(10%Imax): [C0/180]Total=26.8
[C90/270]Total=26.8
Maximum s/h(1/2): C0_180=0.23 C90_270=0.23
Maximum s/h(1/4): C0_180=0.23 C90_270=0.23
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 93.08%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.530%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	14414.063	3.448	3.448	.204%	.220%
1.0	14170.078	27.119	30.568	1.606%	1.949%
2.0	13344.188	51.070	81.638	3.024%	5.204%
3.0	12253.430	70.325	151.962	4.164%	9.687%
4.0	10916.297	83.505	235.467	4.944%	15.010%
5.0	9408.656	89.924	325.391	5.324%	20.742%
6.0	7970.344	91.362	416.753	5.409%	26.565%
7.0	6527.180	87.231	503.984	5.165%	32.126%
8.0	5224.992	79.743	583.727	4.721%	37.209%
9.0	4056.820	69.594	653.321	4.120%	41.645%
10.0	3165.258	60.274	713.595	3.569%	45.487%
11.0	2402.438	50.269	763.864	2.976%	48.691%
12.0	1929.164	43.985	807.849	2.604%	51.495%
13.0	1529.944	37.741	845.59	2.235%	53.901%
14.0	1295.508	34.369	879.959	2.035%	56.092%
15.0	1118.152	31.736	911.695	1.879%	58.115%
16.0	998.388	30.178	941.872	1.787%	60.038%
17.0	901.835	28.914	970.787	1.712%	61.881%
18.0	826.355	28.003	998.79	1.658%	63.666%
19.0	778.008	27.777	1026.566	1.645%	65.437%
20.0	736.552	27.625	1054.191	1.636%	67.198%
21.0	705.375	27.720	1081.912	1.641%	68.965%
22.0	681.173	27.982	1109.894	1.657%	70.749%
23.0	658.336	28.208	1138.103	1.670%	72.547%
24.0	635.477	28.344	1166.447	1.678%	74.354%
25.0	616.022	28.549	1194.996	1.690%	76.173%
26.0	598.978	28.794	1223.79	1.705%	78.009%
27.0	583.889	29.069	1252.859	1.721%	79.862%
28.0	571.711	29.433	1282.292	1.743%	81.738%
29.0	559.526	29.747	1312.039	1.761%	83.634%
30.0	549.218	30.114	1342.153	1.783%	85.554%
31.0	538.052	30.389	1372.542	1.799%	87.491%
32.0	513.359	29.832	1402.374	1.766%	89.392%
33.0	478.835	28.599	1430.973	1.693%	91.215%
34.0	428.421	26.271	1457.244	1.555%	92.890%
35.0	365.632	22.998	1480.242	1.362%	94.356%
36.0	290.862	18.748	1498.99	1.110%	95.551%
37.0	215.297	14.209	1513.199	.841%	96.457%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	146.932	9.920	1523.119	.587%	97.089%
39.0	83.770	5.781	1528.9	.342%	97.458%
40.0	48.705	3.433	1532.333	.203%	97.676%
41.0	27.049	1.946	1534.279	.115%	97.800%
42.0	19.399	1.423	1535.703	.084%	97.891%
43.0	16.770	1.254	1536.957	.074%	97.971%
44.0	14.442	1.100	1538.057	.065%	98.041%
45.0	11.967	0.928	1538.985	.055%	98.100%
46.0	10.680	0.843	1539.828	.050%	98.154%
47.0	9.218	0.739	1540.567	.044%	98.201%
48.0	8.220	0.670	1541.237	.040%	98.244%
49.0	8.030	0.665	1541.901	.039%	98.286%
50.0	7.854	0.660	1542.561	.039%	98.328%
51.0	7.699	0.656	1543.217	.039%	98.370%
52.0	7.580	0.655	1543.872	.039%	98.412%
53.0	7.446	0.652	1544.524	.039%	98.454%
54.0	7.334	0.651	1545.175	.039%	98.495%
55.0	7.228	0.649	1545.824	.038%	98.536%
56.0	7.109	0.646	1546.47	.038%	98.578%
57.0	7.045	0.648	1547.118	.038%	98.619%
58.0	6.947	0.646	1547.764	.038%	98.660%
59.0	6.877	0.646	1548.411	.038%	98.701%
60.0	6.813	0.647	1549.058	.038%	98.743%
61.0	6.764	0.649	1549.707	.038%	98.784%
62.0	6.701	0.649	1550.355	.038%	98.825%
63.0	6.659	0.651	1551.006	.039%	98.867%
64.0	6.602	0.651	1551.657	.039%	98.908%
65.0	6.553	0.651	1552.308	.039%	98.950%
66.0	6.518	0.653	1552.961	.039%	98.991%
67.0	6.497	0.656	1553.617	.039%	99.033%
68.0	6.462	0.657	1554.274	.039%	99.075%
69.0	6.434	0.659	1554.933	.039%	99.117%
70.0	6.420	0.662	1555.594	.039%	99.159%
71.0	6.384	0.662	1556.256	.039%	99.201%
72.0	6.377	0.665	1556.921	.039%	99.244%
73.0	6.349	0.666	1557.587	.039%	99.286%
74.0	6.363	0.671	1558.258	.040%	99.329%
75.0	6.321	0.670	1558.927	.040%	99.372%

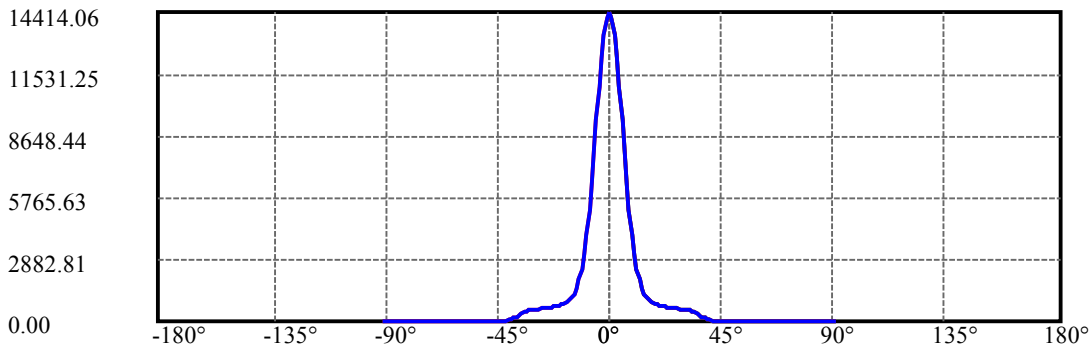
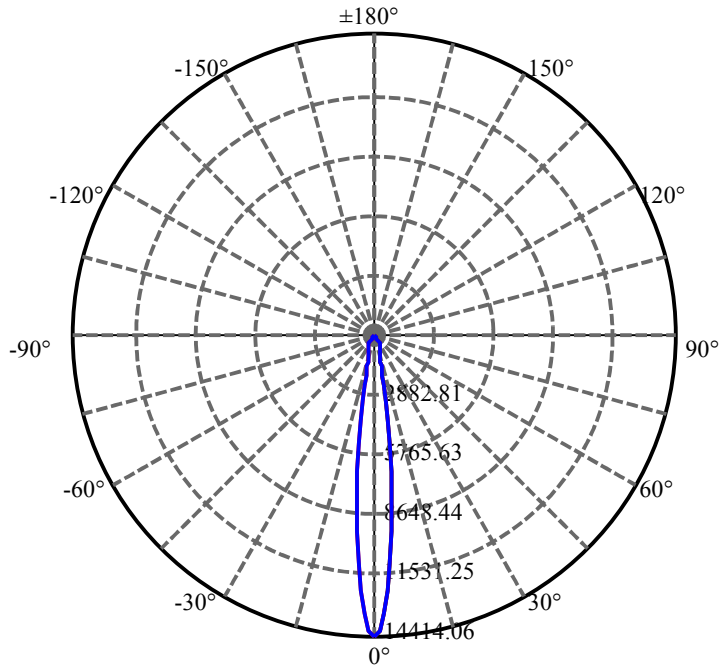
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	6.321	0.673	1559.6	.040%	99.414%
77.0	6.307	0.674	1560.274	.040%	99.457%
78.0	6.314	0.677	1560.951	.040%	99.501%
79.0	6.293	0.677	1561.628	.040%	99.544%
80.0	6.286	0.679	1562.307	.040%	99.587%
81.0	6.272	0.679	1562.987	.040%	99.630%
82.0	6.265	0.680	1563.667	.040%	99.674%
83.0	6.272	0.683	1564.35	.040%	99.717%
84.0	6.258	0.682	1565.032	.040%	99.761%
85.0	6.279	0.686	1565.718	.041%	99.804%
86.0	6.258	0.685	1566.403	.041%	99.848%
87.0	6.244	0.684	1567.086	.040%	99.892%
88.0	6.209	0.680	1567.767	.040%	99.935%
89.0	6.195	0.679	1568.446	.040%	99.978%
90.0	6.188	0.339	1568.785	.020%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	1342.15	79.46%	85.55%
0-40	1532.33	90.72%	97.68%
0-60	1549.06	91.71%	98.74%
0-90	1568.45	92.86%	99.98%
0-120	1568.45	92.86%	99.98%
0-180	1568.79	92.88%	100.00%
60-90	20.04	1.19%	1.28%
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%
0-27.07	1255.03	74.31%	80.00%

ZONAL LUMEN SUMMARY

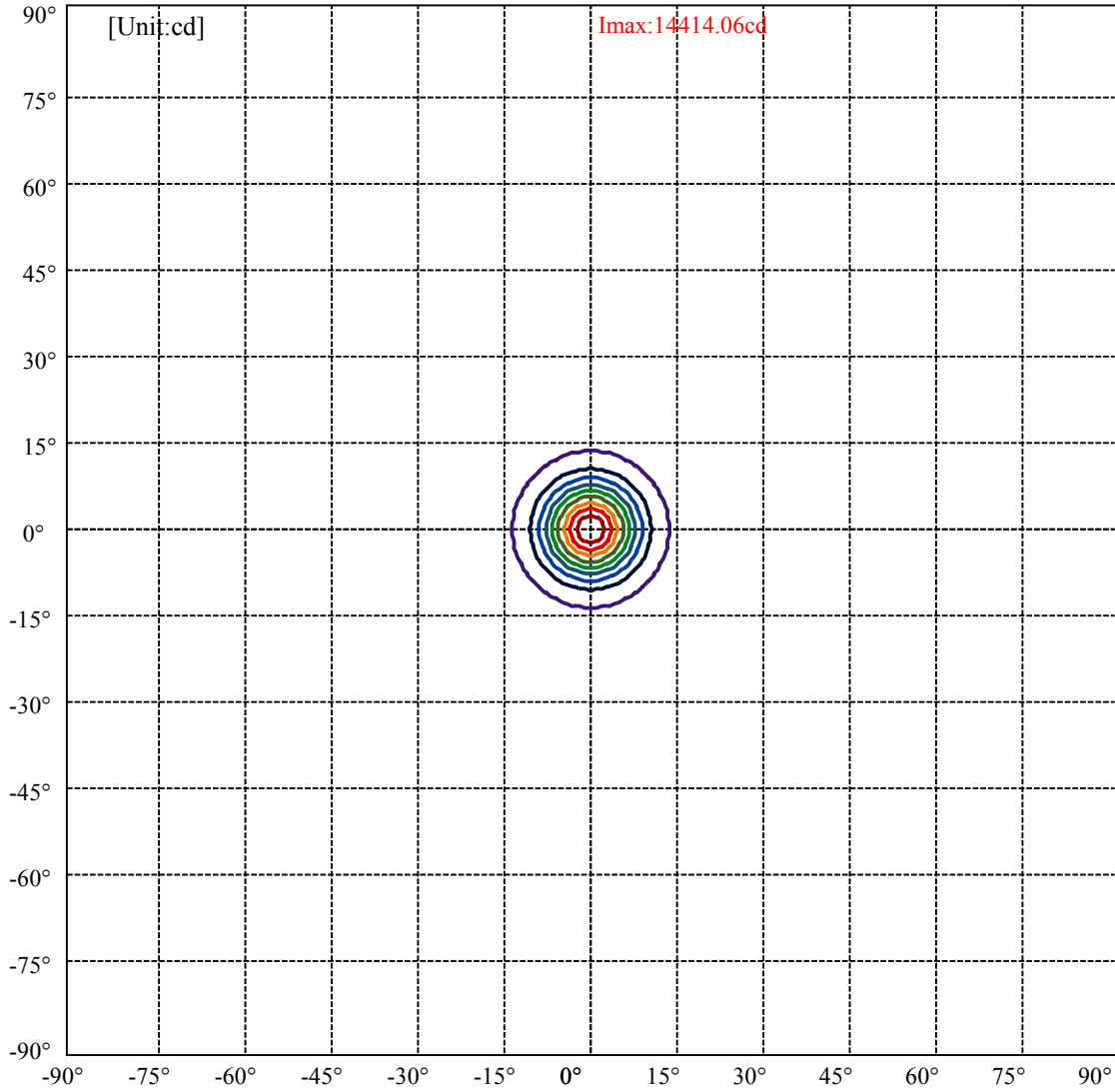
0-10	713.59
10-20	340.60
20-30	287.96
30-40	190.18
40-50	10.23
50-60	6.50
60-70	6.54
70-80	6.71
80-90	6.14
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00



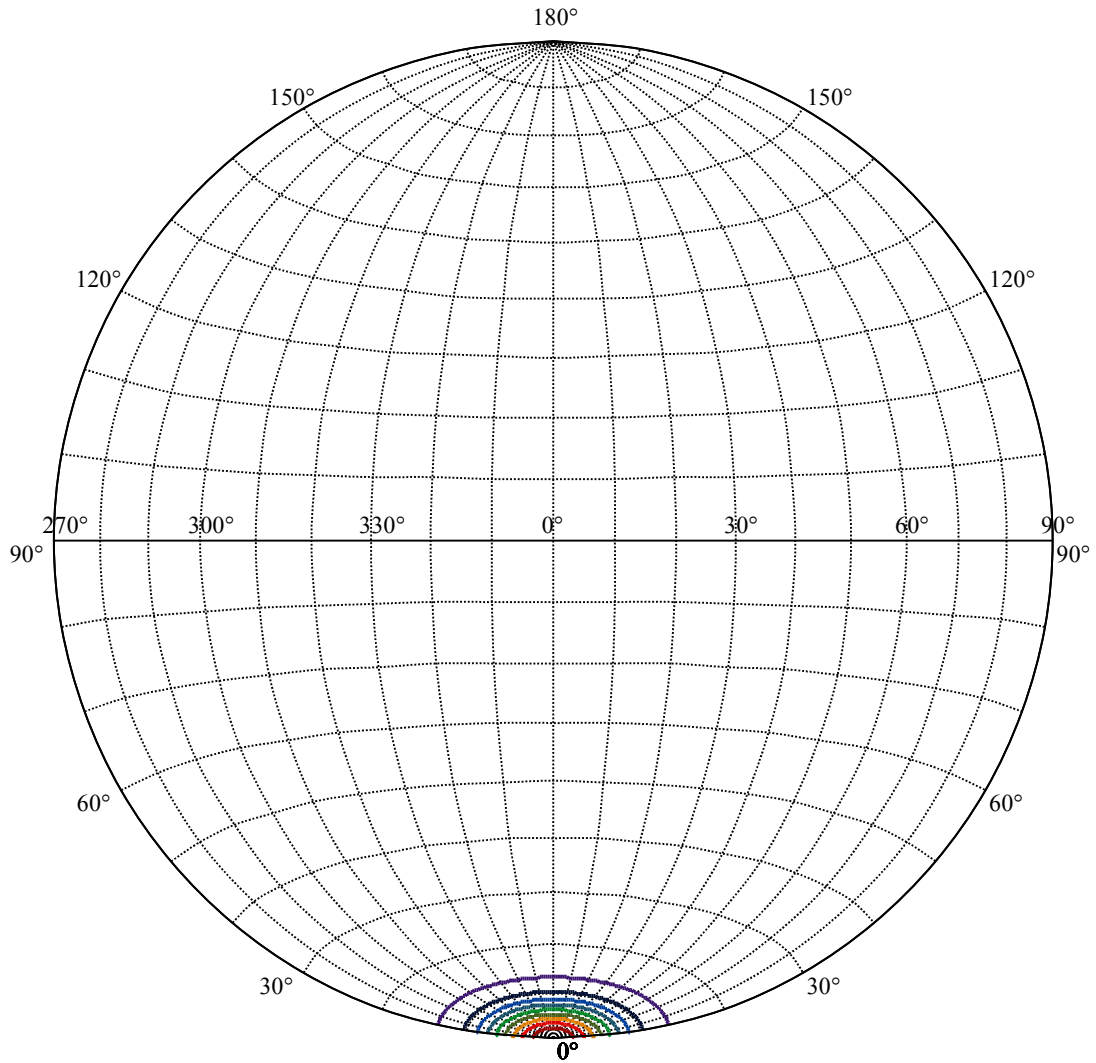
C0(Max): —————
C0/C180: —————
C90/C270: —————

Field angle(10%Imax):C0/180Left:13.4 Right:13.4
:C90/270Left:13.4 Right:13.4

Beam Angle(50%Imax):C0/180Left:6.5 Right:6.5
:C90/270Left:6.5 Right:6.5



(10%Imax) 1441.41	—
(20%Imax) 2882.81	—
(30%Imax) 4324.22	—
(40%Imax) 5765.63	—
(50%Imax) 7207.03	—
(60%Imax) 8648.44	—
(70%Imax) 10089.8	—
(80%Imax) 11531.3	—
(90%Imax) 12972.7	—



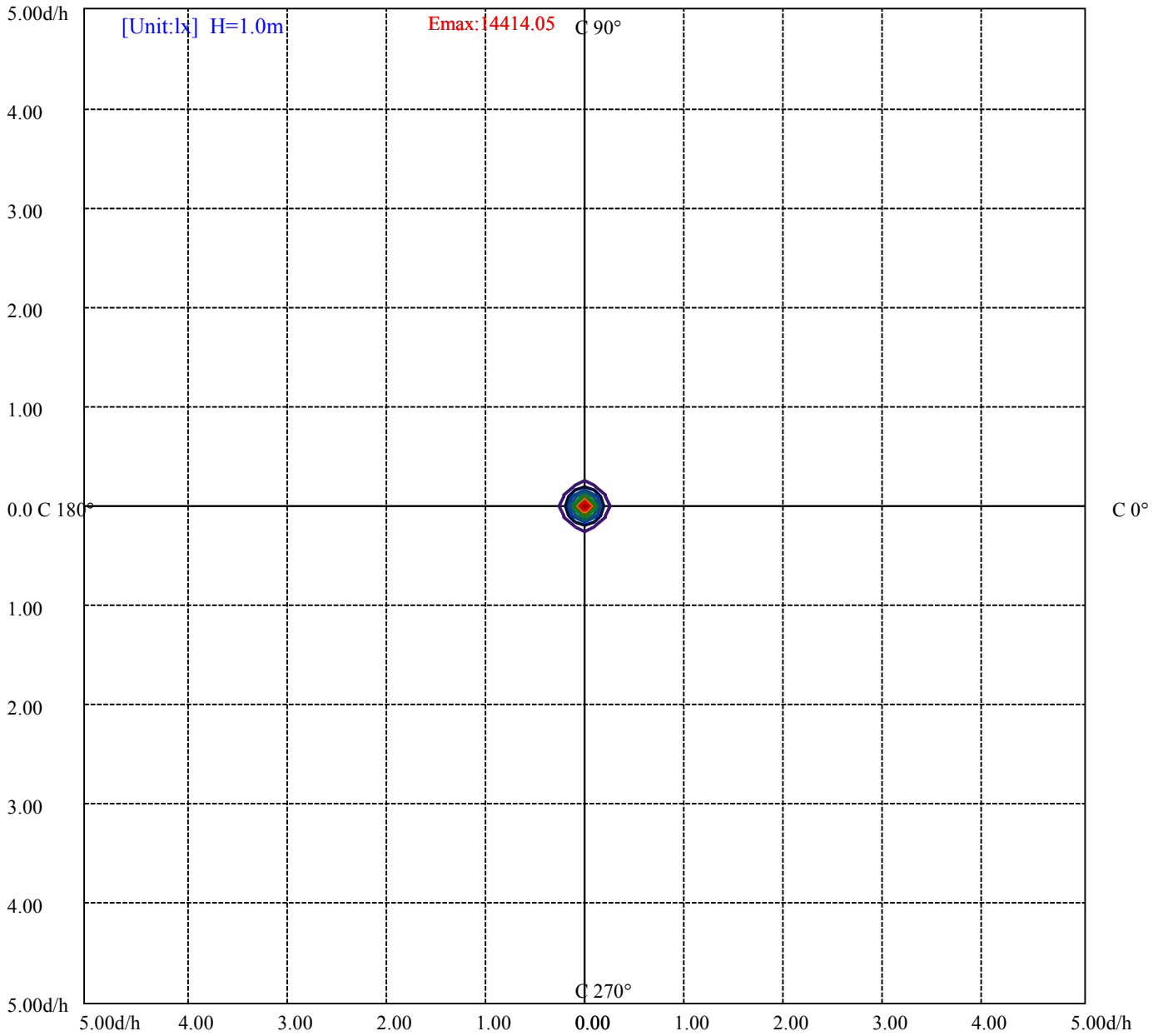
House

[Unit:cd]

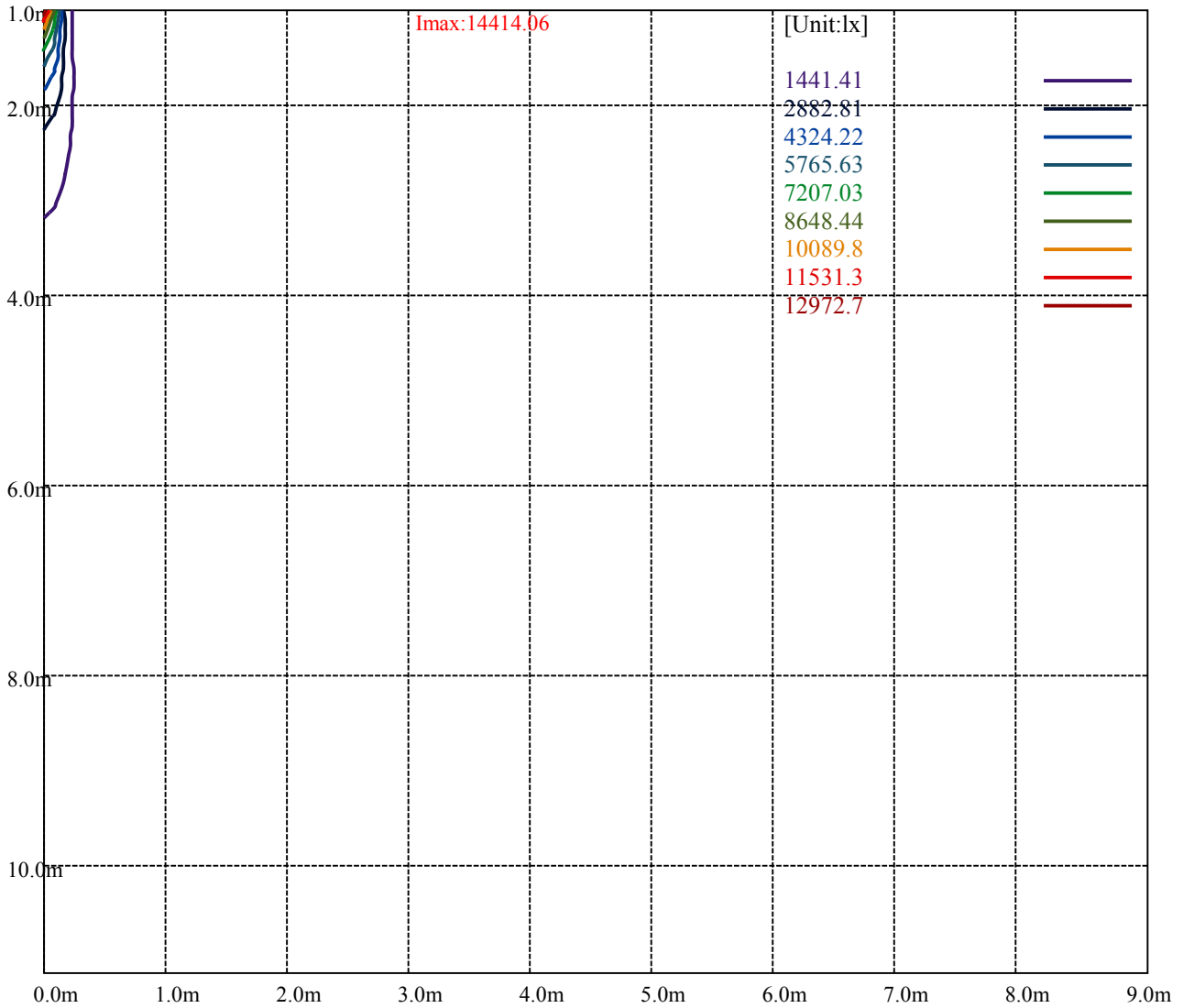
Road

Imax:14414.06

(10%Imax)	1441.41	—
(20%Imax)	2882.81	—
(30%Imax)	4324.22	—
(40%Imax)	5765.63	—
(50%Imax)	7207.03	—
(60%Imax)	8648.44	—
(70%Imax)	10089.8	—
(80%Imax)	11531.3	—
(90%Imax)	12972.7	—



(10%Emax) 1441.4	—
(20%Emax) 2882.81	—
(30%Emax) 4324.21	—
(40%Emax) 5765.61	—
(50%Emax) 7207.01	—
(60%Emax) 8648.42	—
(70%Emax) 10089.8	—
(80%Emax) 11531.2	—
(90%Emax) 12972.6	—



Luminance Table

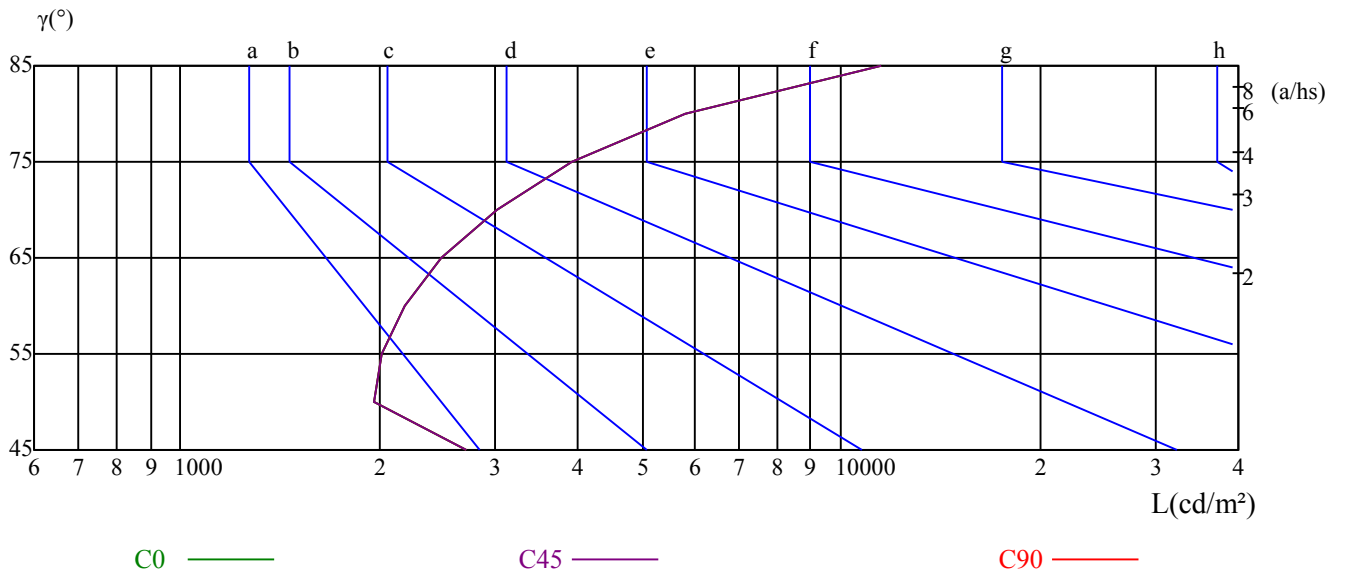
γ	45	50	55	60	65	70	75	80	85
C0	2712	1958	2019	2183	2485	3007	3913	5800	11543
C45	2712	1958	2019	2183	2485	3007	3913	5800	11543
C90	2712	1958	2019	2183	2485	3007	3913	5800	11543

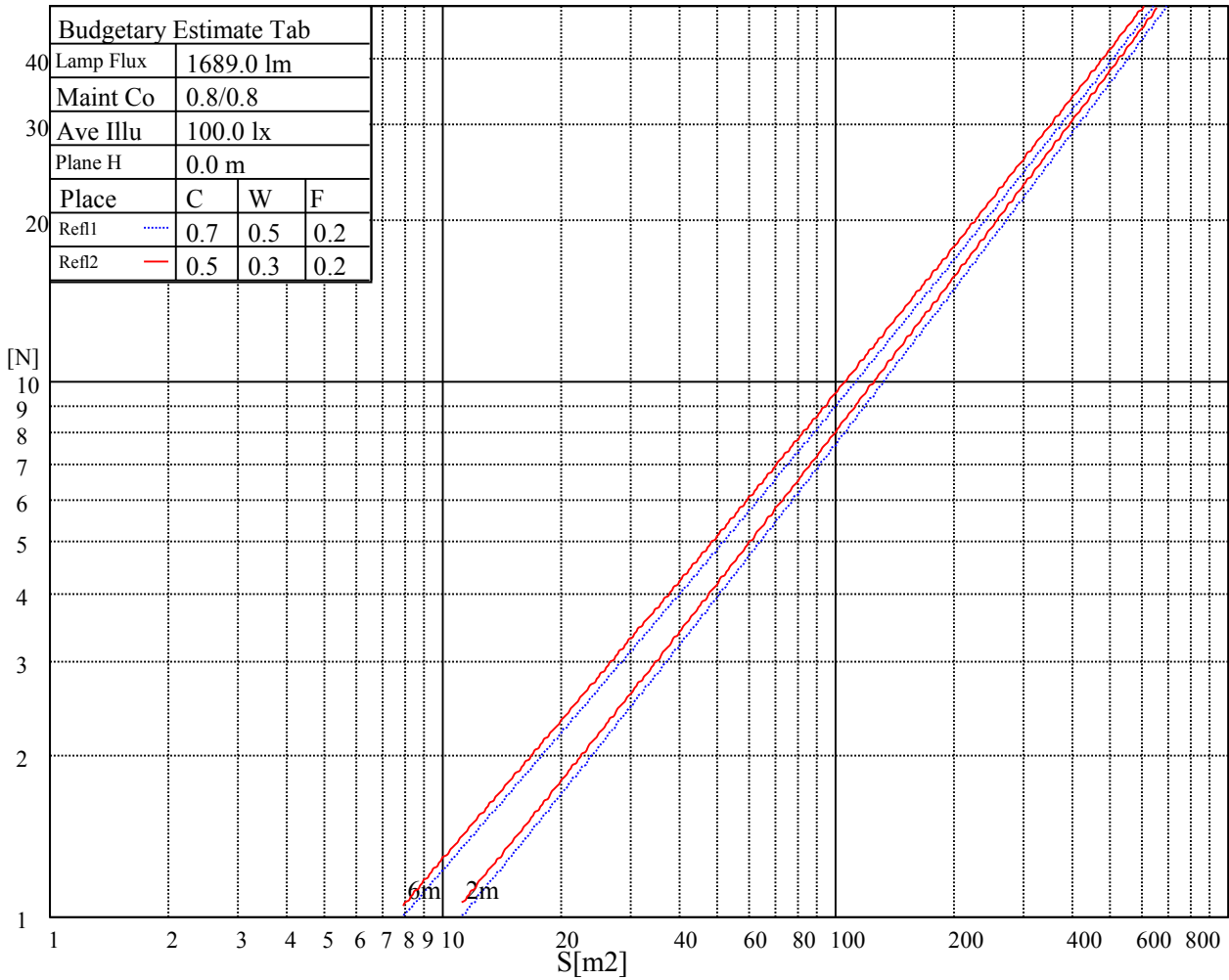
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
2485	2485	2485	3913	3913	3913	11543	11543	11543

Glare Table

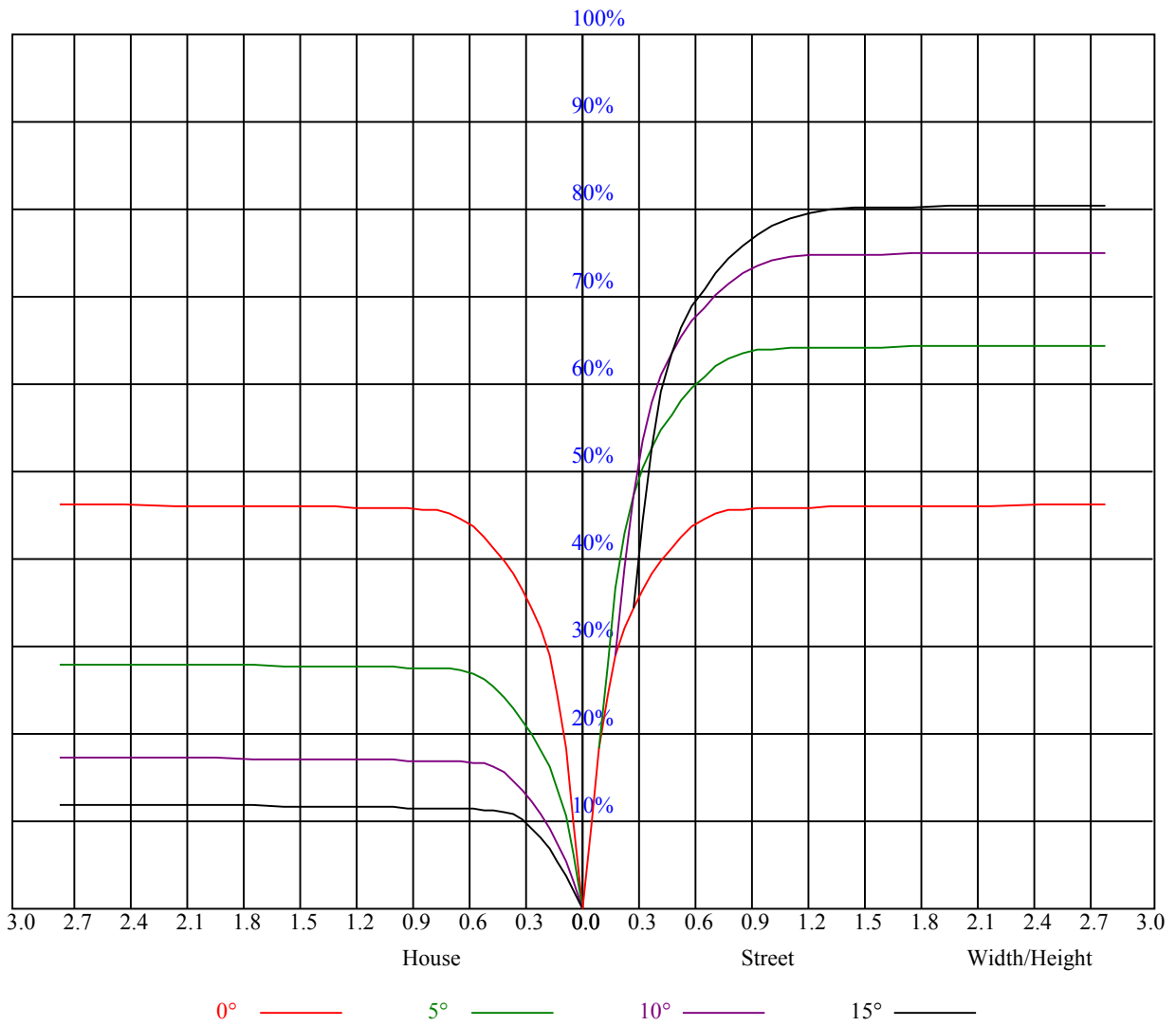
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

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	1.11	1.11	1.11	1.08	1.08	1.08	1.03	1.03	1.03	0.99	0.99	0.99	0.95	0.95	0.95	0.93
1	1.04	1.02	1.01	1.02	1.01	0.99	0.99	0.97	0.96	0.95	0.94	0.93	0.92	0.91	0.90	0.89
2	0.99	0.96	0.94	0.98	0.95	0.93	0.95	0.92	0.91	0.92	0.90	0.89	0.89	0.88	0.87	0.85
3	0.95	0.91	0.88	0.93	0.90	0.87	0.91	0.88	0.86	0.89	0.87	0.85	0.87	0.85	0.84	0.82
4	0.91	0.87	0.84	0.90	0.86	0.83	0.88	0.85	0.82	0.86	0.84	0.81	0.85	0.82	0.81	0.79
5	0.87	0.83	0.80	0.86	0.83	0.80	0.85	0.82	0.79	0.83	0.81	0.79	0.82	0.80	0.78	0.77
6	0.84	0.80	0.77	0.83	0.80	0.77	0.82	0.79	0.76	0.81	0.78	0.76	0.80	0.77	0.75	0.74
7	0.81	0.77	0.74	0.81	0.77	0.74	0.80	0.76	0.74	0.79	0.76	0.73	0.78	0.75	0.73	0.72
8	0.79	0.75	0.72	0.78	0.75	0.72	0.77	0.74	0.72	0.77	0.74	0.71	0.76	0.73	0.71	0.70
9	0.76	0.73	0.70	0.76	0.72	0.70	0.75	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.68
10	0.74	0.71	0.68	0.74	0.70	0.68	0.73	0.70	0.68	0.73	0.70	0.68	0.72	0.69	0.67	0.67



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	14602.50	14816.25	14394.38	13438.13	12268.13	10732.50	9061.88	7616.25	6266.25
45.0	14332.50	13460.63	11986.88	10620.00	9174.38	7380.00	6035.63	4848.75	3667.50
90.0	14068.13	13117.50	11055.38	10170.56	8718.75	7126.31	5808.38	4495.50	3360.38
135.0	14653.13	14040.00	13061.25	11503.13	10108.13	8651.25	6879.38	5608.13	4460.63
180.0	14602.50	13809.38	12768.75	11154.38	9896.63	8240.63	6823.13	5223.94	4090.50
225.0	14332.50	14788.13	14625.00	13865.63	12853.13	11075.06	9986.63	8333.44	6766.88
270.0	14068.13	14636.25	14636.25	14062.50	13117.50	11576.25	10141.88	8679.38	7261.88
315.0	14653.13	14692.50	14225.63	13213.13	11193.75	10487.25	9025.88	7412.06	5925.94
360.0	14602.50	14816.25	14394.38	13438.13	12268.13	10732.50	9061.88	7616.25	6266.25
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	4770.00	3729.38	2846.25	2153.81	1715.06	1452.38	1238.06	1075.50	963.00
45.0	2891.25	2117.25	1766.25	1427.63	1215.00	1086.75	948.38	862.31	811.13
90.0	2577.38	1993.50	1620.00	1384.31	1117.24	1038.26	935.27	855.90	789.53
135.0	3217.50	2902.50	1986.19	1618.31	1364.63	1203.75	1067.63	957.94	870.75
180.0	3126.94	2332.69	1835.44	1537.88	1325.81	1114.99	1012.73	915.98	834.92
225.0	5491.69	4203.56	3097.69	2358.56	1876.50	1492.88	1286.44	1112.29	979.14
270.0	5647.50	4494.38	3459.38	2908.13	1949.06	1609.31	1344.38	1157.63	1029.94
315.0	4732.31	3548.81	2608.31	2044.69	1676.25	1365.75	1112.34	1049.57	936.28
360.0	4770.00	3729.38	2846.25	2153.81	1715.06	1452.38	1238.06	1075.50	963.00
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	872.44	816.19	770.63	737.44	713.25	690.75	664.31	644.06	624.94
45.0	757.13	726.75	698.63	674.44	653.06	633.94	611.44	595.13	582.19
90.0	743.40	713.08	682.20	659.81	638.49	616.16	599.29	583.43	569.36
135.0	796.50	748.13	706.50	676.13	652.50	631.69	609.75	594.56	582.19
180.0	778.11	740.93	707.74	680.01	657.17	632.53	611.89	591.86	575.72
225.0	889.54	826.31	774.84	737.21	710.72	687.66	663.19	638.78	615.99
270.0	919.13	849.94	792.56	750.94	721.69	698.06	670.50	649.69	630.00
315.0	854.61	802.74	759.32	727.03	702.51	675.90	653.46	630.68	611.44
360.0	872.44	816.19	770.63	737.44	713.25	690.75	664.31	644.06	624.94
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	605.81	593.44	581.06	568.69	557.44	547.88	535.50	497.81	432.56
45.0	567.56	556.88	546.75	536.63	523.13	480.38	412.88	335.25	289.69
90.0	558.68	548.55	535.50	528.53	514.46	452.14	396.56	328.28	250.99
135.0	570.94	559.69	549.00	538.88	528.19	507.94	454.50	382.50	312.75
180.0	564.64	552.38	541.18	532.35	523.69	492.75	439.88	375.24	296.72
225.0	599.01	584.94	570.77	559.58	550.13	539.16	530.83	507.94	457.82
270.0	607.50	592.88	581.06	568.13	556.31	546.75	536.63	516.94	469.69
315.0	596.98	584.94	570.88	560.98	551.08	539.89	523.91	483.41	414.84
360.0	605.81	593.44	581.06	568.69	557.44	547.88	535.50	497.81	432.56
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	356.06	284.06	198.28	128.42	62.78	26.94	20.25	17.27	14.06
45.0	180.39	117.17	58.28	23.51	19.01	16.14	12.15	10.46	9.68
90.0	174.04	109.01	49.61	21.21	18.11	14.85	11.93	10.41	9.45
135.0	286.31	161.55	91.97	43.65	22.05	19.97	16.14	13.22	11.98
180.0	218.53	151.76	84.71	35.78	25.76	22.73	19.13	15.58	13.28
225.0	378.84	307.58	234.51	146.14	86.34	42.19	27.62	24.47	20.98
270.0	398.25	328.50	284.06	164.14	99.39	49.39	26.27	23.96	21.04
315.0	334.46	262.74	174.04	107.33	56.19	24.19	21.71	18.79	15.08
360.0	356.06	284.06	198.28	128.42	62.78	26.94	20.25	17.27	14.06

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	11.53	10.01	8.78	8.44	8.21	8.04	7.88	7.71	7.54
45.0	8.66	8.44	8.27	8.04	7.88	7.76	7.65	7.54	7.37
90.0	8.66	8.44	8.21	8.04	7.93	7.71	7.59	7.48	7.37
135.0	10.13	8.78	8.55	8.33	7.99	7.88	7.71	7.59	7.48
180.0	9.45	8.33	8.10	7.93	7.82	7.65	7.48	7.43	7.31
225.0	17.10	14.74	10.52	8.27	8.10	7.88	7.71	7.59	7.48
270.0	17.27	15.47	12.94	8.49	8.27	8.10	7.88	7.71	7.59
315.0	12.94	11.25	8.38	8.21	8.04	7.82	7.71	7.59	7.43
360.0	11.53	10.01	8.78	8.44	8.21	8.04	7.88	7.71	7.54
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	7.43	7.31	7.20	7.14	7.03	6.92	6.86	6.81	6.75
45.0	7.26	7.20	7.09	7.03	6.92	6.86	6.81	6.75	6.69
90.0	7.26	7.14	7.03	6.98	6.86	6.81	6.75	6.69	6.64
135.0	7.37	7.26	7.09	7.03	6.98	6.86	6.81	6.75	6.69
180.0	7.20	7.09	6.98	6.92	6.86	6.81	6.75	6.69	6.64
225.0	7.37	7.26	7.14	7.09	6.98	6.92	6.81	6.81	6.75
270.0	7.48	7.37	7.26	7.14	7.03	6.98	6.92	6.86	6.75
315.0	7.31	7.20	7.09	7.03	6.92	6.86	6.81	6.75	6.69
360.0	7.43	7.31	7.20	7.14	7.03	6.92	6.86	6.81	6.75
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	6.75	6.64	6.58	6.58	6.53	6.53	6.47	6.47	6.41
45.0	6.64	6.58	6.58	6.53	6.47	6.47	6.41	6.41	6.41
90.0	6.58	6.53	6.47	6.47	6.47	6.41	6.41	6.36	6.36
135.0	6.64	6.64	6.58	6.53	6.53	6.47	6.47	6.47	6.41
180.0	6.58	6.53	6.53	6.47	6.47	6.41	6.41	6.41	6.36
225.0	6.69	6.64	6.58	6.53	6.53	6.47	6.41	6.41	6.36
270.0	6.69	6.64	6.58	6.53	6.53	6.47	6.47	6.41	6.41
315.0	6.69	6.64	6.53	6.53	6.47	6.47	6.41	6.41	6.36
360.0	6.75	6.64	6.58	6.58	6.53	6.53	6.47	6.47	6.41
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	6.41	6.36	6.41	6.36	6.36	6.30	6.36	6.30	6.30
45.0	6.36	6.36	6.36	6.30	6.30	6.30	6.30	6.30	6.30
90.0	6.36	6.36	6.36	6.30	6.30	6.30	6.30	6.30	6.30
135.0	6.41	6.36	6.41	6.36	6.36	6.36	6.36	6.30	6.30
180.0	6.36	6.30	6.30	6.24	6.24	6.30	6.30	6.24	6.24
225.0	6.36	6.36	6.36	6.30	6.30	6.24	6.30	6.30	6.24
270.0	6.41	6.36	6.36	6.36	6.36	6.36	6.30	6.30	6.30
315.0	6.36	6.36	6.36	6.36	6.36	6.30	6.30	6.30	6.30
360.0	6.41	6.36	6.41	6.36	6.36	6.30	6.36	6.30	6.30
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	6.30	6.30	6.30	6.24	6.30	6.36	6.36	6.30	6.19
45.0	6.24	6.24	6.30	6.30	6.36	6.36	6.19	6.19	6.19
90.0	6.24	6.24	6.30	6.30	6.36	6.19	6.19	6.19	6.19
135.0	6.30	6.24	6.24	6.24	6.24	6.19	6.24	6.19	6.19
180.0	6.24	6.24	6.24	6.24	6.24	6.24	6.19	6.19	6.19
225.0	6.24	6.24	6.24	6.24	6.24	6.24	6.30	6.19	6.19
270.0	6.30	6.30	6.30	6.24	6.24	6.24	6.30	6.24	6.19
315.0	6.30	6.30	6.24	6.24	6.24	6.24	6.19	6.19	6.24
360.0	6.30	6.30	6.30	6.24	6.30	6.36	6.36	6.30	6.19

Intensity data(cd)

C/ γ (°)	90.0
0.0	6.19
45.0	6.19
90.0	6.19
135.0	6.19
180.0	6.19
225.0	6.19
270.0	6.19
315.0	6.19
360.0	6.19