



NATA LIGHTING CO.,LTD.  
www.nata.cn  
Email:info@nata.com  
Tel:+86-750-3770000 Fax:+86-750-3771111  
Address:380JinOu Road,GaoXin Zone,Jiang Men City,Guangdong,China

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## Nata

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LumCAT: LN01D05024DA-N

Luminaire: 97.70.234.00

Report No: 201231-B012

Test No: 201231-C012

LampCAT: CITIZEN CLU028 LES9.8

Lamp flux(lm): 1521.0

Number of Lamps: 1

Length(mm): 92

Phm Type: C

Voltage(V): 36.9700

Current(A): 0.3800

Power (W): 14.0480

PF: 0.0000

Ballast type: DC

Width(mm): 92

Height(mm): 50

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## Photometric Results

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Lumens(lm): 1352.39

Efficiency(%): 88.91%

Lumens(lm)/Power(W): 96.27

Central intensity(cd): 4697.297

Maximum intensity(cd): 4697.297

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

Beam Angle(50%Imax): [C0/180]Total=28.7

[C90/270]Total=28.7

Field angle(10%Imax): [C0/180]Total=48.5

[C90/270]Total=48.5

Maximum s/h(1/2): C0\_180=0.48 C90\_270=0.48

Maximum s/h(1/4): C0\_180=0.46 C90\_270=0.46

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 88.91%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in  $\pi$  solid angle : 96.513%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	4697.297	0.000	0	.000%	.000%
1.0	4686.117	4.490	4.49	.295%	.332%
2.0	4649.836	13.400	17.89	.881%	1.323%
3.0	4589.297	22.097	39.987	1.453%	2.957%
4.0	4510.266	30.459	70.446	2.003%	5.209%
5.0	4403.672	38.347	108.793	2.521%	8.045%
6.0	4267.125	45.567	154.36	2.996%	11.414%
7.0	4112.016	52.009	206.37	3.419%	15.260%
8.0	3940.313	57.629	263.999	3.789%	19.521%
9.0	3731.414	62.175	326.174	4.088%	24.118%
10.0	3502.266	65.462	391.636	4.304%	28.959%
11.0	3266.648	67.635	459.271	4.447%	33.960%
12.0	3007.406	68.584	527.856	4.509%	39.031%
13.0	2723.484	68.011	595.867	4.471%	44.060%
14.0	2445.469	66.162	662.029	4.350%	48.953%
15.0	2175.117	63.433	725.462	4.171%	53.643%
16.0	1915.523	59.939	785.402	3.941%	58.075%
17.0	1634.168	55.278	840.68	3.634%	62.163%
18.0	1406.728	50.138	890.818	3.296%	65.870%
19.0	1210.395	45.533	936.35	2.994%	69.237%
20.0	1009.195	40.625	976.975	2.671%	72.241%
21.0	853.102	35.760	1012.735	2.351%	74.885%
22.0	720.858	31.629	1044.364	2.080%	77.224%
23.0	596.341	27.638	1072.003	1.817%	79.267%
24.0	490.465	23.761	1095.764	1.562%	81.024%
25.0	408.790	20.447	1116.211	1.344%	82.536%
26.0	340.151	17.679	1133.89	1.162%	83.844%
27.0	284.709	15.287	1149.177	1.005%	84.974%
28.0	240.933	13.308	1162.486	.875%	85.958%
29.0	208.097	11.748	1174.233	.772%	86.827%
30.0	176.787	10.392	1184.625	.683%	87.595%
31.0	155.440	9.245	1193.871	.608%	88.279%
32.0	137.236	8.385	1202.255	.551%	88.899%
33.0	122.576	7.654	1209.91	.503%	89.465%
34.0	110.630	7.057	1216.967	.464%	89.987%
35.0	99.844	6.537	1223.504	.430%	90.470%
36.0	90.661	6.066	1229.569	.399%	90.918%
37.0	83.447	5.678	1235.248	.373%	91.338%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	76.465	5.338	1240.585	.351%	91.733%
39.0	69.884	4.995	1245.581	.328%	92.102%
40.0	64.652	4.692	1250.273	.308%	92.449%
41.0	59.730	4.429	1254.702	.291%	92.777%
42.0	55.076	4.171	1258.873	.274%	93.085%
43.0	51.005	3.930	1262.803	.258%	93.376%
44.0	47.208	3.707	1266.509	.244%	93.650%
45.0	43.720	3.494	1270.004	.230%	93.908%
46.0	40.514	3.294	1273.298	.217%	94.152%
47.0	37.427	3.100	1276.398	.204%	94.381%
48.0	34.763	2.918	1279.316	.192%	94.597%
49.0	32.323	2.755	1282.071	.181%	94.801%
50.0	29.890	2.594	1284.665	.171%	94.992%
51.0	27.984	2.449	1287.114	.161%	95.173%
52.0	26.409	2.334	1289.448	.153%	95.346%
53.0	24.848	2.230	1291.677	.147%	95.511%
54.0	23.534	2.132	1293.81	.140%	95.669%
55.0	22.493	2.055	1295.865	.135%	95.820%
56.0	21.488	1.987	1297.852	.131%	95.967%
57.0	20.552	1.922	1299.774	.126%	96.110%
58.0	19.786	1.865	1301.639	.123%	96.248%
59.0	19.083	1.817	1303.457	.119%	96.382%
60.0	18.373	1.770	1305.226	.116%	96.513%
61.0	17.761	1.724	1306.95	.113%	96.640%
62.0	17.198	1.685	1308.635	.111%	96.765%
63.0	16.692	1.648	1310.283	.108%	96.887%
64.0	16.214	1.615	1311.898	.106%	97.006%
65.0	15.870	1.588	1313.486	.104%	97.123%
66.0	15.659	1.573	1315.059	.103%	97.240%
67.0	15.595	1.572	1316.63	.103%	97.356%
68.0	15.933	1.597	1318.227	.105%	97.474%
69.0	16.242	1.641	1319.869	.108%	97.595%
70.0	16.734	1.694	1321.562	.111%	97.721%
71.0	17.318	1.760	1323.323	.116%	97.851%
72.0	17.880	1.830	1325.153	.120%	97.986%
73.0	18.316	1.893	1327.046	.124%	98.126%
74.0	18.809	1.952	1328.997	.128%	98.270%
75.0	19.294	2.013	1331.01	.132%	98.419%

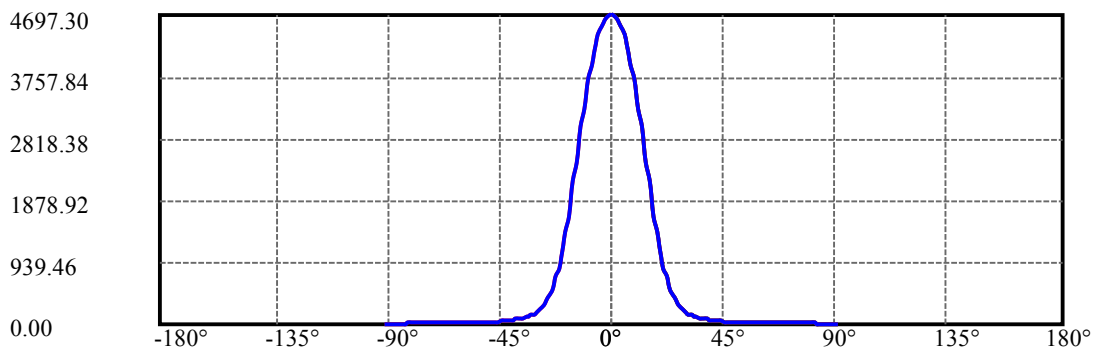
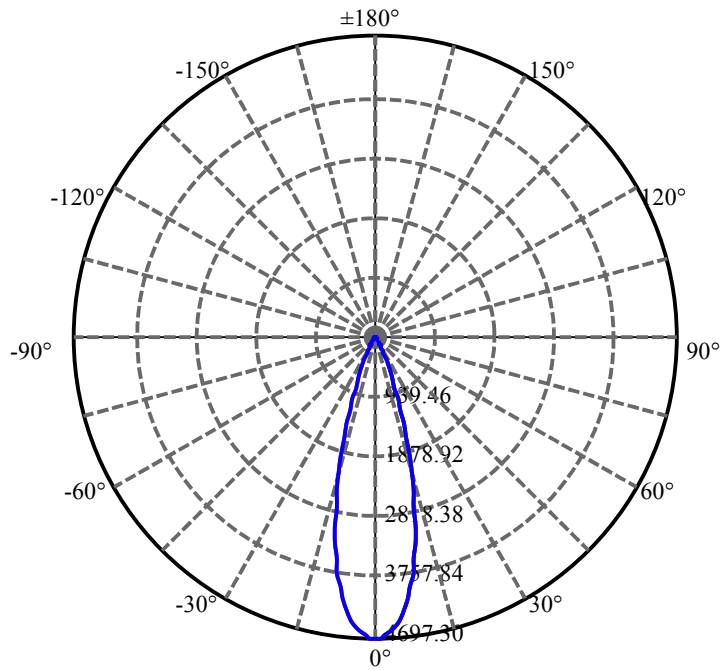
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	19.589	2.064	1333.075	.136%	98.572%
77.0	19.856	2.103	1335.178	.138%	98.727%
78.0	19.779	2.122	1337.299	.139%	98.884%
79.0	19.125	2.090	1339.39	.137%	99.039%
80.0	18.042	2.004	1341.393	.132%	99.187%
81.0	16.298	1.857	1343.25	.122%	99.324%
82.0	14.435	1.667	1344.917	.110%	99.448%
83.0	12.122	1.444	1346.361	.095%	99.554%
84.0	10.230	1.218	1347.578	.080%	99.644%
85.0	8.726	1.035	1348.613	.068%	99.721%
86.0	7.341	0.878	1349.491	.058%	99.786%
87.0	6.877	0.778	1350.269	.051%	99.843%
88.0	6.511	0.733	1351.003	.048%	99.898%
89.0	6.293	0.702	1351.704	.046%	99.949%
90.0	6.166	0.683	1352.388	.045%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	1184.63	77.88%	87.60%
0-40	1250.27	82.20%	92.45%
0-60	1305.23	85.81%	96.51%
0-90	1351.70	88.87%	99.95%
0-120	1351.70	88.87%	99.95%
0-180	1352.39	88.91%	100.00%
60-90	48.25	3.17%	3.57%
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%
0-23.42	1081.91	71.13%	80.00%

ZONAL LUMEN SUMMARY

0-10	391.64
10-20	585.34
20-30	207.65
30-40	65.65
40-50	34.39
50-60	20.56
60-70	16.34
70-80	19.83
80-90	10.31
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: —————

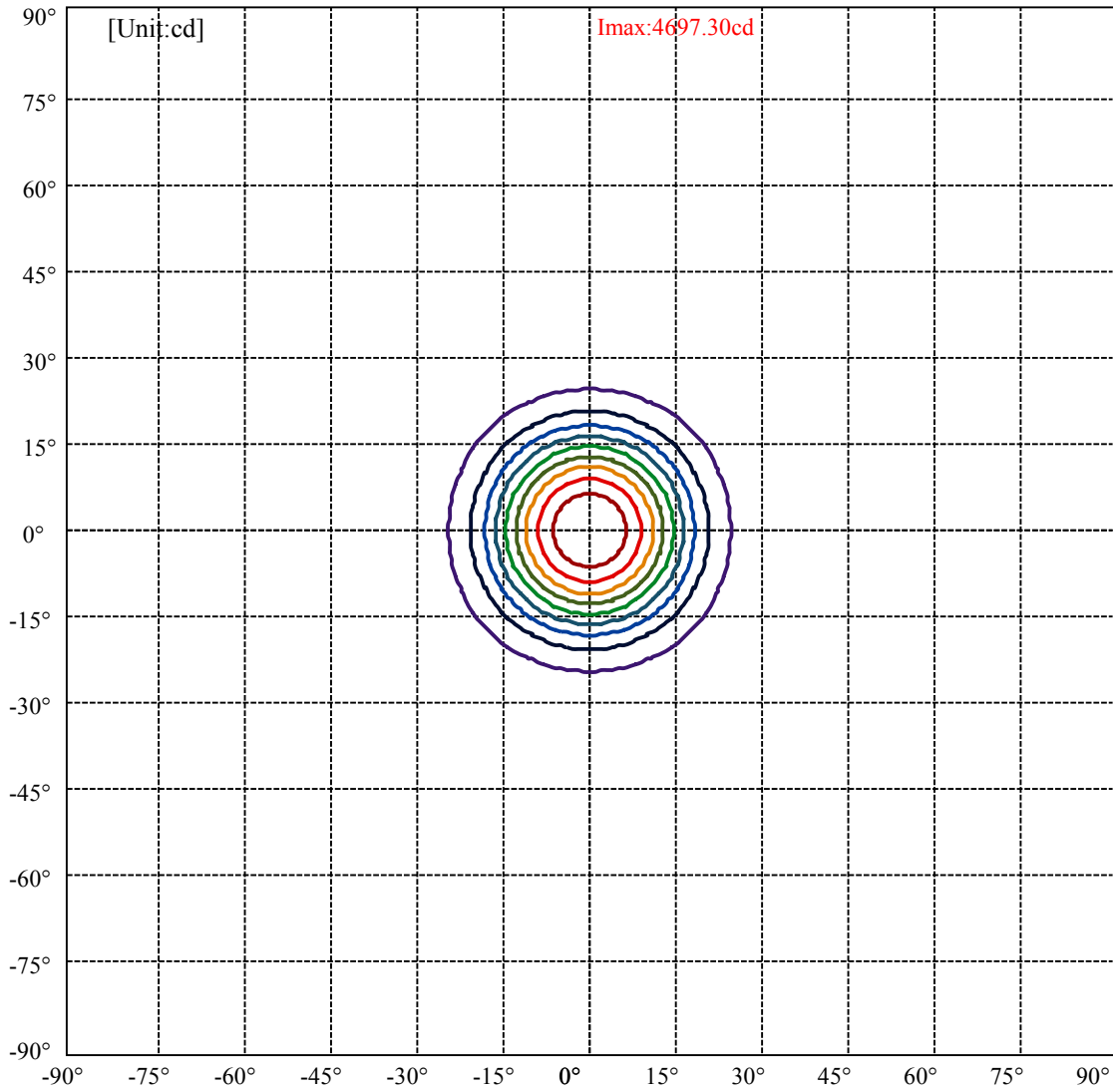
Field angle(10%Imax):C0/180Left:24.3 Right:24.3

:C90/270Left:24.3 Right:24.3

Beam Angle(50%Imax):C0/180Left:14.4 Right:14.4

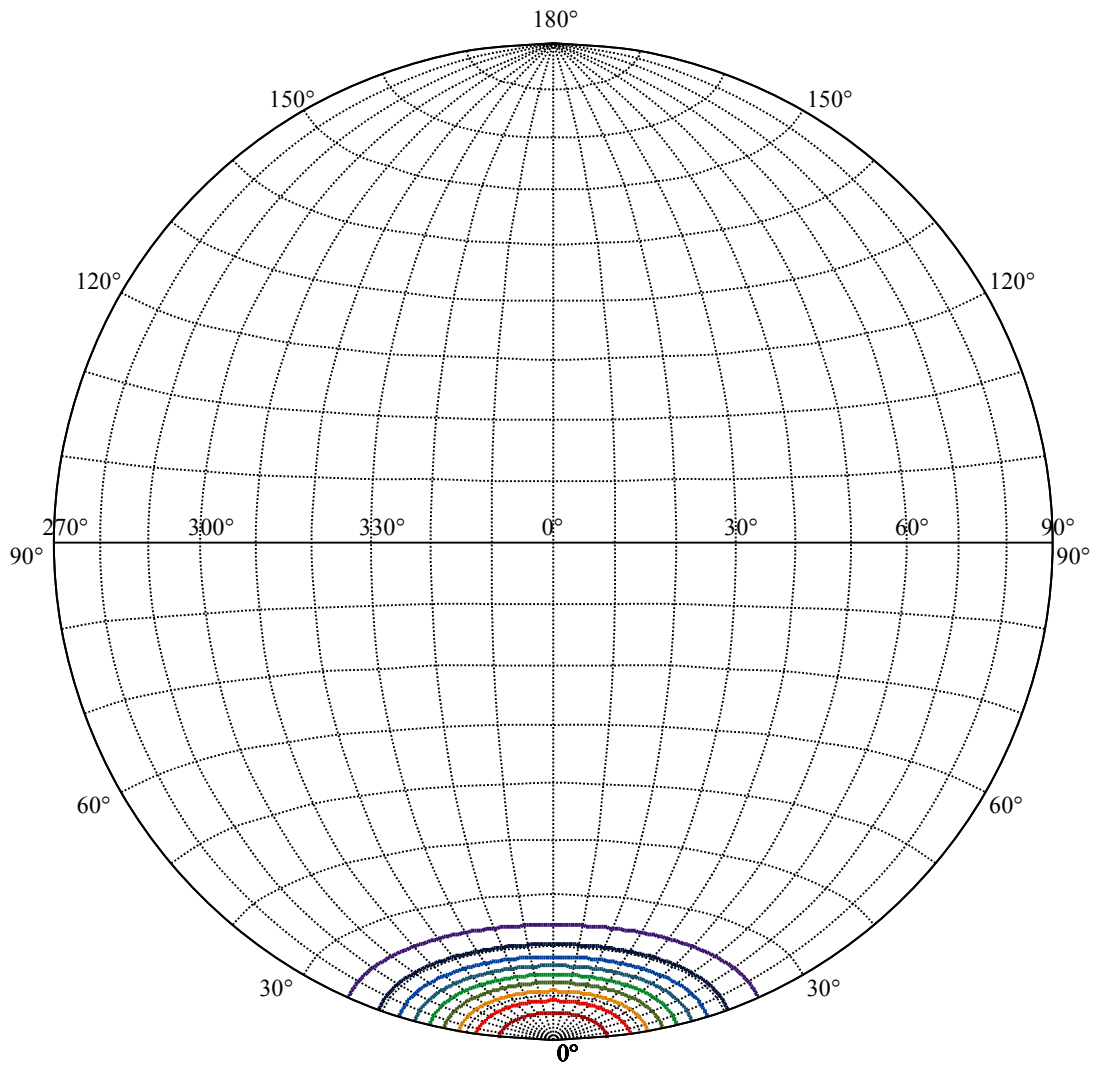
:C90/270Left:14.4 Right:14.4





(10%Imax) 469.73	—
(20%Imax) 939.459	—
(30%Imax) 1409.19	—
(40%Imax) 1878.92	—
(50%Imax) 2348.65	—
(60%Imax) 2818.38	—
(70%Imax) 3288.11	—
(80%Imax) 3757.84	—
(90%Imax) 4227.57	—





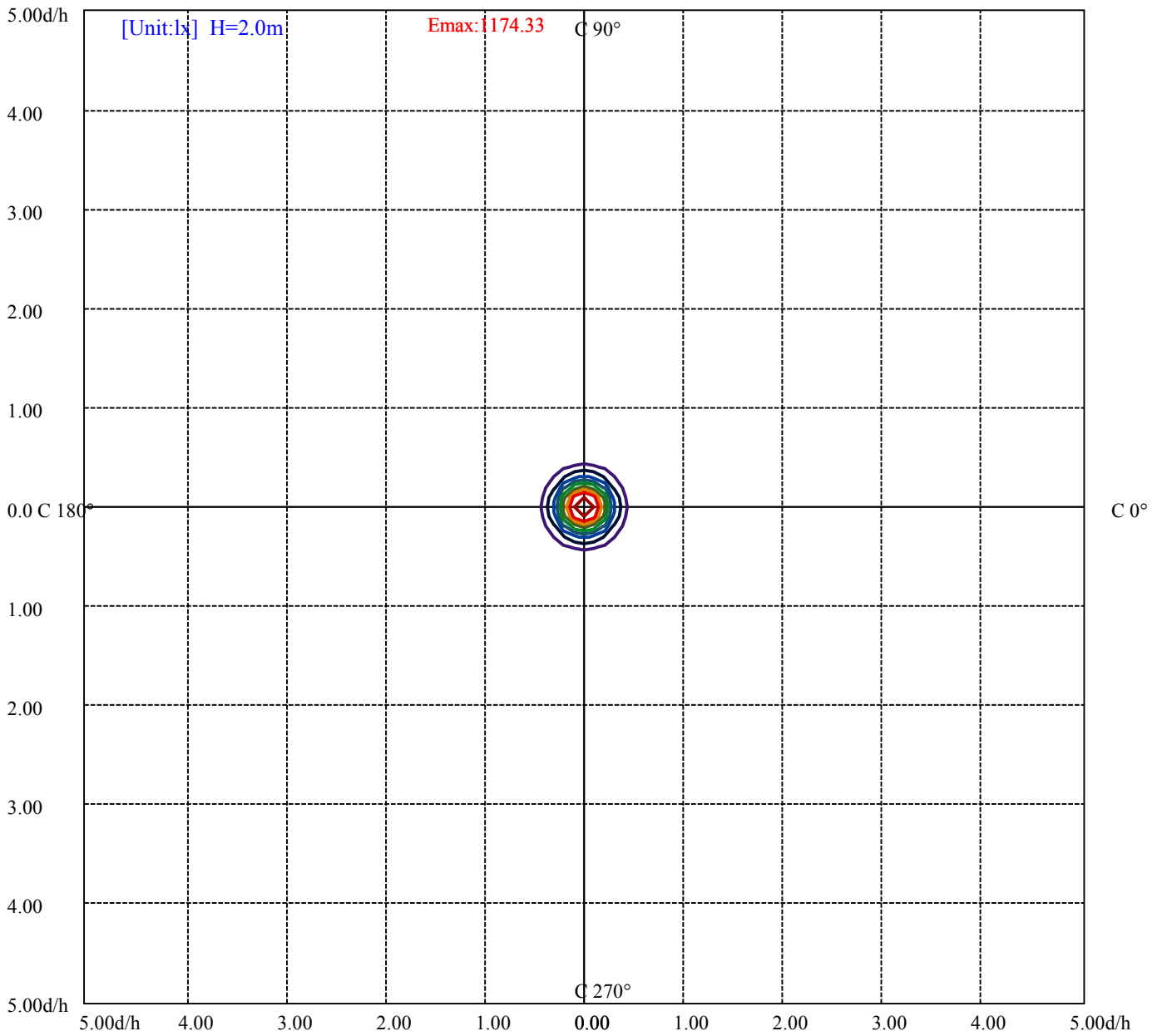
House

[Unit:cd]

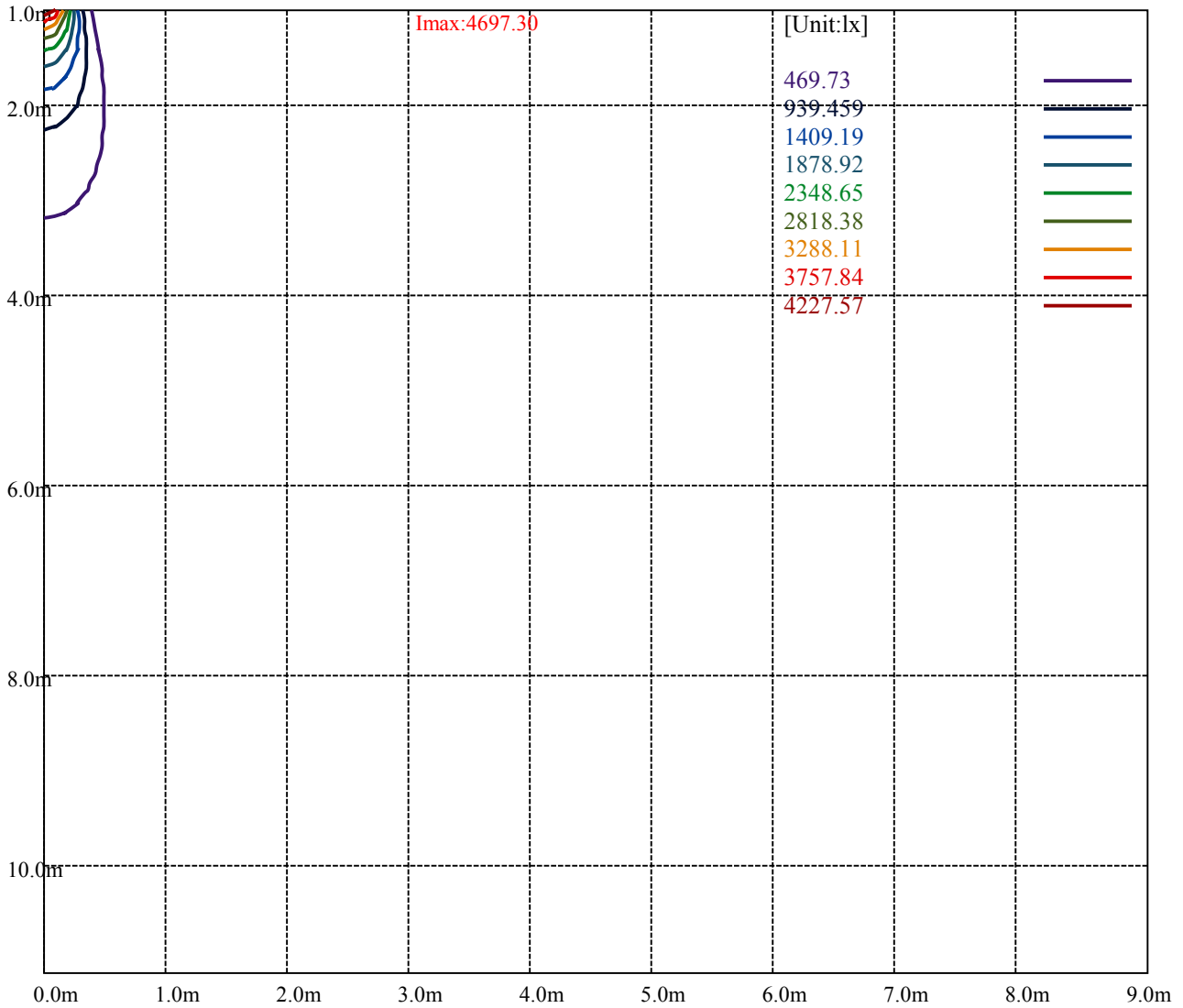
Road

**I<sub>max</sub>:4697.30**

(10%I <sub>max</sub> ) 469.73	—
(20%I <sub>max</sub> ) 939.459	—
(30%I <sub>max</sub> ) 1409.19	—
(40%I <sub>max</sub> ) 1878.92	—
(50%I <sub>max</sub> ) 2348.65	—
(60%I <sub>max</sub> ) 2818.38	—
(70%I <sub>max</sub> ) 3288.11	—
(80%I <sub>max</sub> ) 3757.84	—
(90%I <sub>max</sub> ) 4227.57	—



- (10%Emax) 117.4325
- (20%Emax) 234.8647
- (30%Emax) 352.2975
- (40%Emax) 469.73
- (50%Emax) 587.1625
- (60%Emax) 704.595
- (70%Emax) 822.0275
- (80%Emax) 939.46
- (90%Emax) 1056.892



Luminance Table

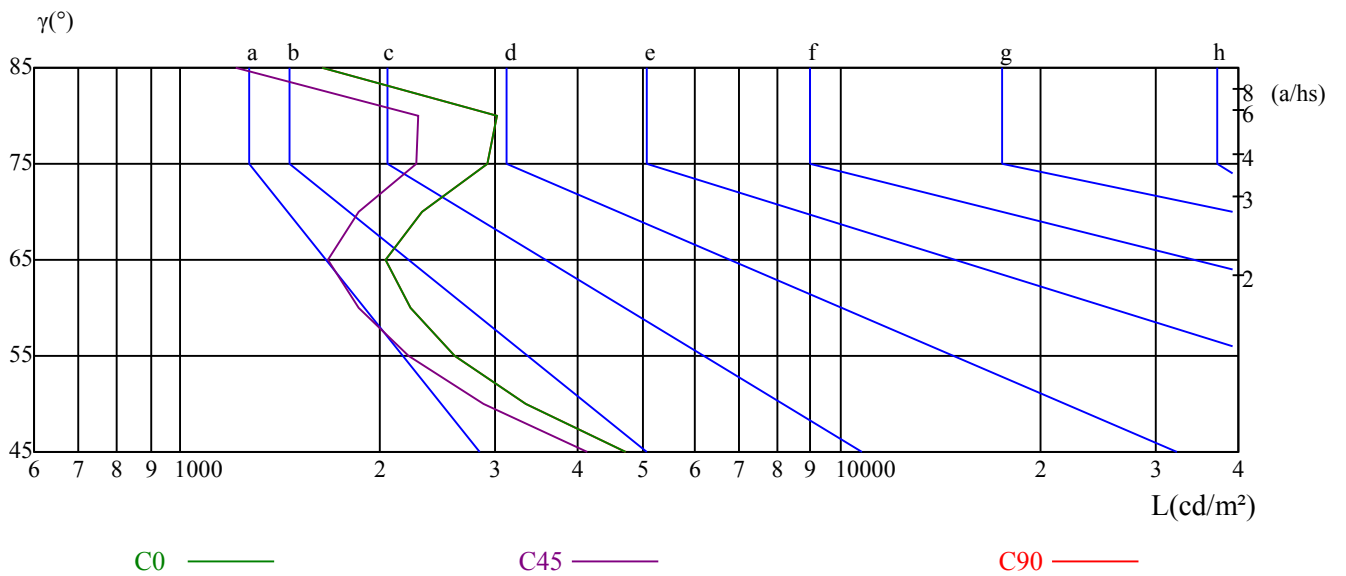
$\gamma$	45	50	55	60	65	70	75	80	85
C0	4733	3334	2609	2236	2049	2319	2908	3007	1640
C45	4130	2867	2209	1862	1675	1858	2277	2291	1209
C90	4733	3334	2609	2236	2049	2319	2908	3007	1640

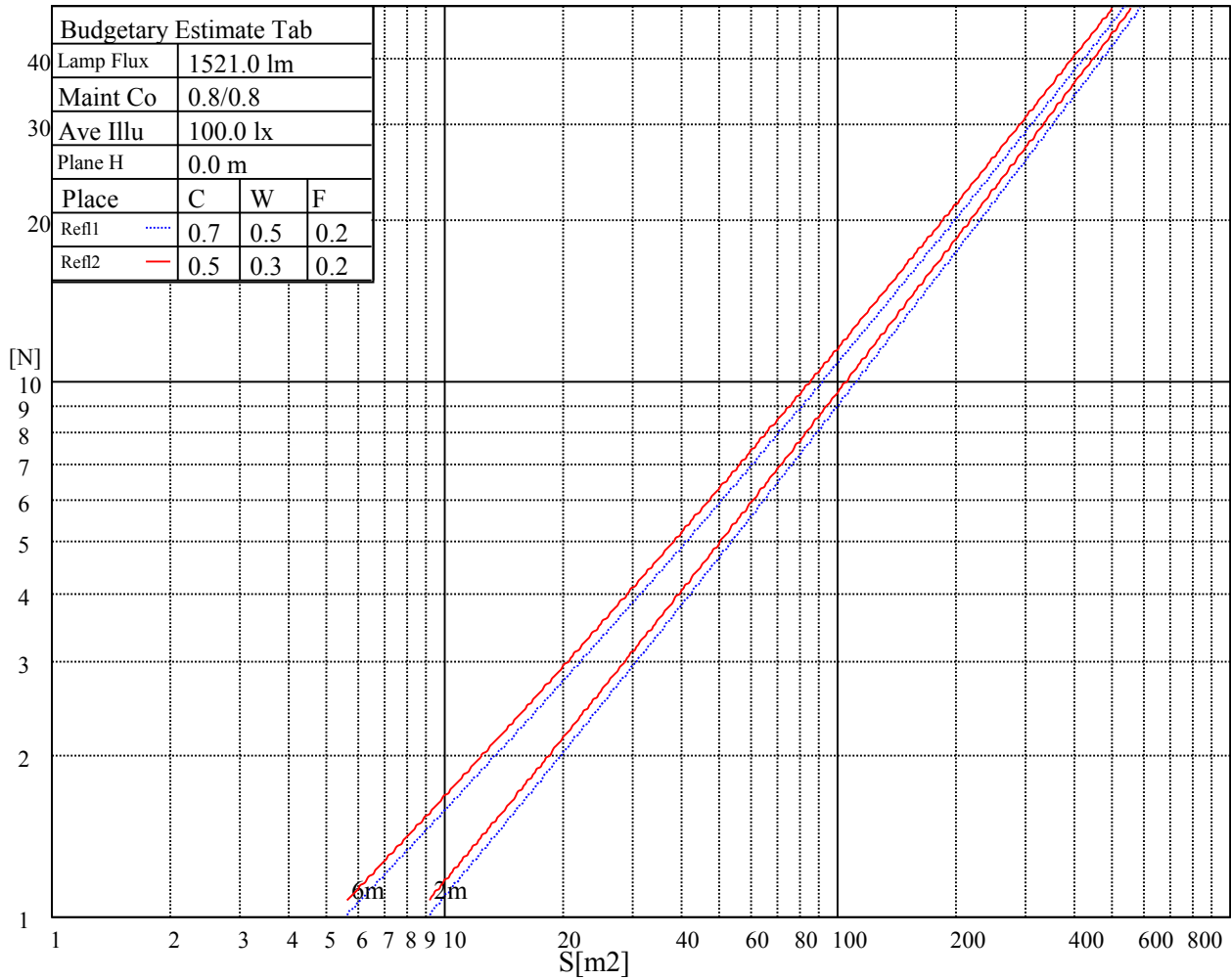
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
4436	4436	4436	8807	8807	8807	11829	11829	11829

Glare Table

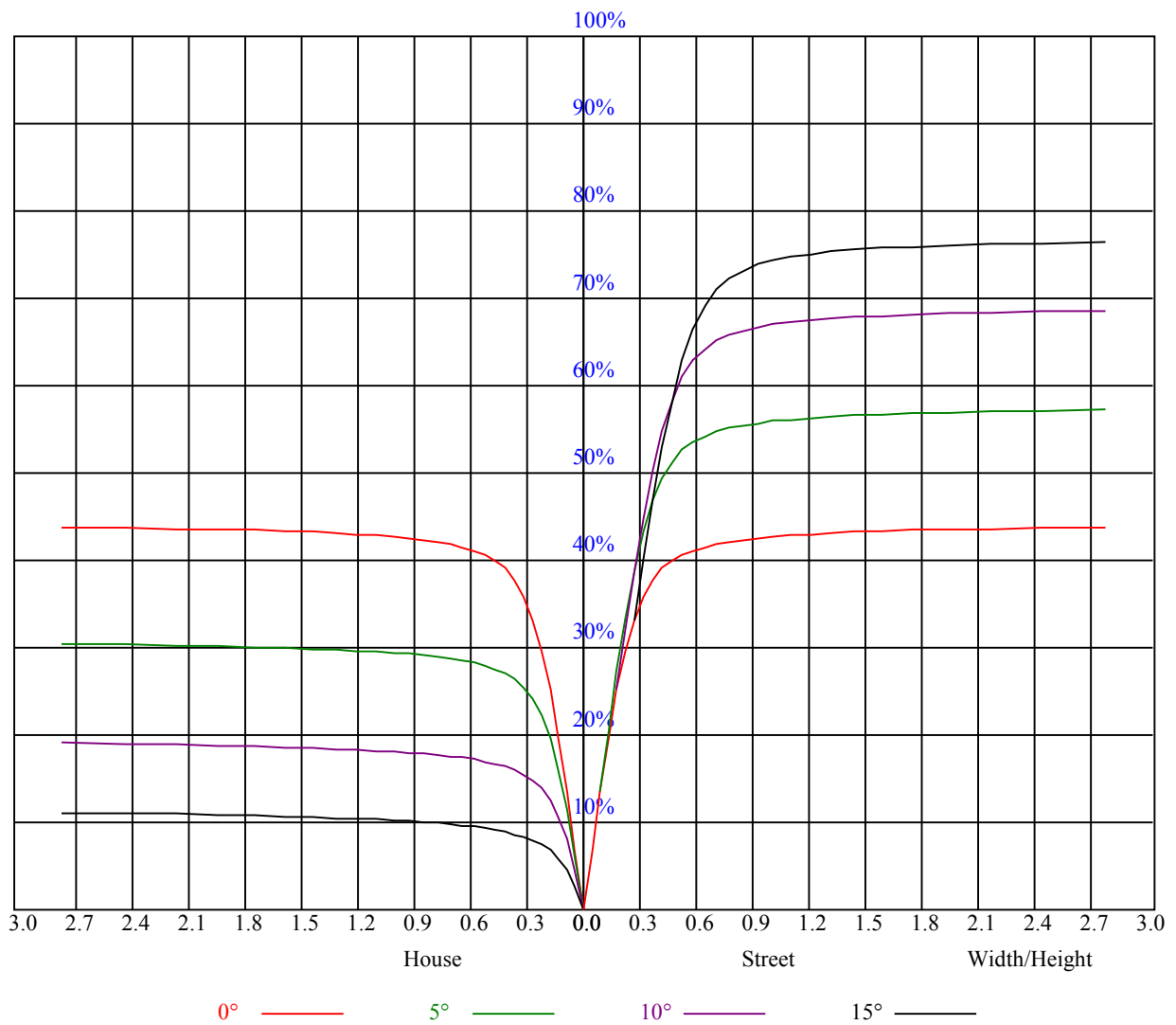
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

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	0.99	0.97	0.95	0.97	0.95	0.94	0.94	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.86	0.84
2	0.93	0.90	0.88	0.92	0.89	0.87	0.89	0.87	0.85	0.87	0.85	0.83	0.84	0.83	0.81	0.80
3	0.89	0.85	0.82	0.88	0.84	0.81	0.85	0.82	0.80	0.83	0.81	0.79	0.81	0.79	0.78	0.76
4	0.85	0.81	0.77	0.84	0.80	0.77	0.82	0.79	0.76	0.80	0.77	0.75	0.79	0.76	0.74	0.73
5	0.81	0.77	0.74	0.80	0.76	0.73	0.79	0.75	0.73	0.77	0.74	0.72	0.76	0.74	0.71	0.70
6	0.78	0.74	0.70	0.77	0.73	0.70	0.76	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.68
7	0.75	0.71	0.68	0.74	0.70	0.67	0.73	0.70	0.67	0.72	0.69	0.67	0.71	0.69	0.67	0.65
8	0.72	0.68	0.65	0.72	0.68	0.65	0.71	0.67	0.65	0.70	0.67	0.65	0.69	0.66	0.64	0.63
9	0.70	0.66	0.63	0.69	0.66	0.63	0.69	0.65	0.63	0.68	0.65	0.62	0.67	0.64	0.62	0.61
10	0.68	0.64	0.61	0.67	0.63	0.61	0.67	0.63	0.61	0.66	0.63	0.61	0.65	0.63	0.60	0.60



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	4692.38	4714.31	4711.50	4686.19	4637.81	4547.81	4451.06	4332.38	4174.31
45.0	4704.75	4692.94	4659.19	4591.69	4518.00	4411.13	4275.00	4130.44	3966.75
90.0	4687.88	4646.81	4578.19	4489.31	4388.63	4249.69	4082.63	3914.44	3702.94
135.0	4704.19	4665.38	4590.56	4510.13	4411.69	4290.19	4105.69	3933.56	3746.81
180.0	4692.38	4649.06	4576.50	4477.50	4365.56	4210.31	4051.69	3850.88	3622.50
225.0	4704.75	4690.69	4660.31	4599.00	4501.13	4411.13	4285.69	4082.06	3931.31
270.0	4687.88	4708.69	4707.56	4678.88	4628.81	4558.50	4443.19	4328.44	4213.13
315.0	4704.19	4721.06	4714.88	4681.69	4630.50	4550.63	4442.06	4323.94	4164.75
360.0	4692.38	4714.31	4711.50	4686.19	4637.81	4547.81	4451.06	4332.38	4174.31
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	3994.31	3814.88	3587.06	3364.31	3088.69	2795.63	2526.75	2223.56	1932.75
45.0	3735.00	3524.63	3295.13	3017.25	2728.13	2469.94	2184.75	1910.25	1679.06
90.0	3494.25	3238.31	2963.81	2710.13	2418.19	2134.13	1892.25	1661.06	1391.63
135.0	3487.50	3255.19	3006.00	2712.38	2415.38	2158.31	1883.25	1650.94	1407.38
180.0	3399.19	3125.25	2836.13	2569.50	2302.31	1983.38	1742.63	1517.06	1111.78
225.0	3741.75	3449.81	3243.38	2991.38	2697.19	2401.88	2147.63	1868.63	1635.75
270.0	3999.38	3819.38	3645.56	3368.81	3093.75	2869.31	2536.88	2270.25	2010.38
315.0	3999.94	3790.69	3556.13	3325.50	3044.25	2751.19	2486.81	2222.44	1904.63
360.0	3994.31	3814.88	3587.06	3364.31	3088.69	2795.63	2526.75	2223.56	1932.75
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	1694.81	1473.19	1222.88	1044.00	884.81	712.13	594.00	494.44	401.63
45.0	1428.19	1238.06	1029.94	852.19	717.19	595.13	484.31	405.56	343.13
90.0	1104.41	1020.60	848.93	702.11	591.24	485.94	407.08	335.31	278.66
135.0	1181.25	1015.88	838.13	689.06	578.25	500.63	392.06	331.31	287.44
180.0	1067.29	902.81	724.95	605.64	505.13	403.26	345.04	284.85	233.89
225.0	1397.81	1091.87	1008.79	840.15	709.71	582.81	487.52	399.71	330.13
270.0	1709.44	1488.94	1287.00	1063.13	906.19	768.94	621.56	523.13	439.31
315.0	1670.63	1451.81	1112.96	1028.53	874.35	721.91	592.14	496.01	407.03
360.0	1694.81	1473.19	1222.88	1044.00	884.81	712.13	594.00	494.44	401.63
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	326.25	285.75	235.07	196.09	169.54	153.00	133.82	119.98	110.81
45.0	286.88	238.61	204.92	175.33	153.84	136.74	121.22	108.51	98.89
90.0	238.61	202.39	173.64	153.56	136.97	120.04	108.84	99.28	88.93
135.0	236.14	199.52	174.77	152.72	135.00	121.73	109.35	100.07	90.96
180.0	206.10	180.11	152.49	138.77	125.55	111.04	103.16	95.18	87.19
225.0	280.41	239.68	200.42	175.78	155.81	135.68	122.68	111.43	100.35
270.0	361.69	299.81	288.00	218.76	189.17	167.34	145.29	127.91	113.06
315.0	341.61	281.59	235.46	203.29	177.64	152.33	136.24	122.68	108.56
360.0	326.25	285.75	235.07	196.09	169.54	153.00	133.82	119.98	110.81
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	99.34	91.41	84.26	76.28	70.59	65.59	59.85	55.74	51.86
45.0	89.49	82.29	75.15	68.74	63.51	58.84	53.66	49.78	46.29
90.0	81.84	75.43	69.02	63.17	58.33	53.49	49.50	45.34	41.68
135.0	82.91	76.67	70.99	64.63	60.02	55.91	51.13	47.64	44.38
180.0	80.10	74.36	68.46	63.73	58.67	54.23	50.46	46.58	42.98
225.0	90.90	83.59	76.44	69.86	64.74	59.63	55.46	51.02	47.03
270.0	101.70	93.04	85.50	77.23	71.55	66.54	60.92	56.87	53.10
315.0	99.00	90.79	81.90	75.43	69.81	63.62	59.63	55.07	50.34
360.0	99.34	91.41	84.26	76.28	70.59	65.59	59.85	55.74	51.86



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	47.48	44.27	41.23	38.08	35.16	32.79	30.38	28.52	26.72
45.0	42.30	39.43	36.73	34.26	31.50	29.48	27.51	25.93	24.36
90.0	38.70	35.61	32.85	30.71	28.69	26.49	25.03	23.68	22.33
135.0	41.12	38.03	35.61	33.13	31.11	29.19	27.34	25.93	24.53
180.0	40.05	37.41	34.37	32.06	30.09	27.90	26.33	25.03	23.85
225.0	43.82	40.73	37.24	34.71	32.46	29.81	28.13	26.61	24.98
270.0	49.05	45.00	41.46	37.58	34.48	31.44	28.97	27.06	25.26
315.0	47.25	43.65	39.94	37.58	35.10	32.01	30.21	28.52	26.78
360.0	47.48	44.27	41.23	38.08	35.16	32.79	30.38	28.52	26.72
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	25.09	23.91	22.73	21.71	20.87	20.14	19.24	18.62	18.06
45.0	23.29	22.16	21.21	20.31	19.58	18.90	18.23	17.61	17.04
90.0	21.38	20.59	19.63	18.96	18.39	17.72	17.21	16.71	16.14
135.0	23.29	22.33	21.43	20.42	19.58	18.96	18.11	17.49	16.99
180.0	22.61	21.71	20.93	20.08	19.35	18.73	18.11	17.55	17.04
225.0	23.74	22.73	21.71	20.93	20.08	19.29	18.68	18.00	17.38
270.0	23.74	22.50	21.49	20.31	19.58	18.90	18.06	17.49	16.99
315.0	25.14	24.02	22.78	21.71	20.87	20.03	19.35	18.62	17.94
360.0	25.09	23.91	22.73	21.71	20.87	20.14	19.24	18.62	18.06
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	17.44	16.93	16.48	15.98	15.53	15.13	14.74	14.46	14.06
45.0	16.59	15.98	15.53	15.13	14.63	14.29	13.89	13.50	13.11
90.0	15.81	15.41	15.92	17.27	19.63	23.96	26.78	29.93	33.19
135.0	16.31	15.81	15.30	14.85	14.46	14.01	13.61	13.22	12.83
180.0	16.54	16.09	15.64	15.24	14.79	14.46	13.95	13.61	13.22
225.0	16.88	16.37	15.81	15.41	14.96	14.51	14.12	13.73	13.33
270.0	16.59	16.26	15.92	15.53	15.30	16.14	18.28	21.21	24.92
315.0	17.38	16.88	16.37	15.86	15.47	14.96	14.57	14.23	13.89
360.0	17.44	16.93	16.48	15.98	15.53	15.13	14.74	14.46	14.06
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	13.61	13.22	12.83	12.43	12.04	11.70	11.19	10.91	10.58
45.0	12.71	12.32	11.98	11.59	11.31	11.08	10.80	10.41	10.01
90.0	36.56	39.26	42.41	45.17	46.80	48.09	47.19	42.47	35.66
135.0	12.38	11.98	11.64	11.19	10.74	10.41	10.07	9.68	9.34
180.0	12.77	12.38	11.98	11.53	11.14	10.74	10.35	10.01	9.62
225.0	12.94	12.54	12.09	11.76	11.48	11.31	11.08	10.69	10.13
270.0	28.63	31.78	34.88	38.48	41.34	44.10	46.46	48.26	48.71
315.0	13.44	13.05	12.66	12.21	11.87	11.42	11.08	10.58	10.29
360.0	13.61	13.22	12.83	12.43	12.04	11.70	11.19	10.91	10.58
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	10.18	9.84	9.51	9.11	8.78	8.49	7.82	7.20	6.86
45.0	9.45	9.06	8.61	8.27	7.82	7.09	6.75	6.36	6.08
90.0	28.18	20.48	12.15	8.49	7.31	6.69	6.30	6.02	5.91
135.0	8.89	8.61	8.27	7.82	7.14	6.64	6.30	6.02	5.96
180.0	9.28	8.94	8.66	8.38	7.54	6.98	6.64	6.41	6.41
225.0	9.62	9.17	8.78	8.33	7.76	7.26	6.81	6.41	6.13
270.0	44.94	39.88	32.01	22.73	15.08	7.88	7.26	6.86	6.53
315.0	9.84	9.51	9.00	8.72	8.38	7.71	7.14	6.81	6.47
360.0	10.18	9.84	9.51	9.11	8.78	8.49	7.82	7.20	6.86

Intensity data(cd)

C/ $\gamma$ (°)	90.0
0.0	6.58
45.0	5.96
90.0	5.85
135.0	5.96
180.0	6.47
225.0	6.08
270.0	6.24
315.0	6.19
360.0	6.58