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LumCAT: 1654-S  
Luminaire: 90.70.043.00  
Report No: NATA0100  
Test No: GC2019112710  
LampCAT: CITIZEN CLU028  
Lamp flux(lm): 597.0  
Number of Lamps: 1  
Length(mm): 0  
Phm Type: C

Voltage(V): 34.9400  
Current(A): 0.1470  
Power (W): 5.1300  
PF: 1.0000  
Ballast type: DC  
Width(mm): 0  
Height(mm): 0

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### Photometric Results

Lumens(lm): 521.55  
Efficiency(%): 87.36%  
Lumens(lm)/Power(W): 101.67  
Central intensity(cd): 3812.906  
Maximum intensity(cd): 3812.906  
Angle of maximum intensity: C=0.0  $\gamma$ =0.0  
Beam Angle(50%Imax): [C0/180]Total=16.1  
                                  [C90/270]Total=16.1  
Field angle(10%Imax): [C0/180]Total=31.0  
                                  [C90/270]Total=31.0  
Maximum s/h(1/2): C0\_180=0.28 C90\_270=0.28  
Maximum s/h(1/4): C0\_180=0.28 C90\_270=0.28  
Up flux rate of lamp(%): 0.00%  
Down flux rate of lamp(%): 87.36%  
Up flux rate of LUM(%): - -  
Down flux rate of LUM(%): 100.00%  
CIE Type : Direct lighting  
Output flux ratio in  $\pi$  solid angle : 98.230%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	3812.906	0.000	0	.000%	.000%
1.0	3775.922	3.631	3.631	.608%	.696%
2.0	3654.844	10.665	14.296	1.786%	2.741%
3.0	3453.609	17.001	31.298	2.848%	6.001%
4.0	3207.516	22.297	53.594	3.735%	10.276%
5.0	2915.227	26.340	79.934	4.412%	15.326%
6.0	2565.563	28.803	108.737	4.825%	20.849%
7.0	2242.336	29.843	138.58	4.999%	26.571%
8.0	1918.266	29.777	168.356	4.988%	32.280%
9.0	1577.250	28.329	196.686	4.745%	37.712%
10.0	1249.010	25.577	222.262	4.284%	42.616%
11.0	1047.080	22.943	245.205	3.843%	47.015%
12.0	843.434	20.666	265.871	3.462%	50.977%
13.0	655.179	17.785	283.656	2.979%	54.387%
14.0	522.070	15.069	298.724	2.524%	57.276%
15.0	417.551	12.900	311.624	2.161%	59.750%
16.0	345.994	11.188	322.812	1.874%	61.895%
17.0	295.741	9.994	332.805	1.674%	63.811%
18.0	269.079	9.313	342.118	1.560%	65.596%
19.0	250.418	9.038	351.156	1.514%	67.329%
20.0	236.159	8.906	360.062	1.492%	69.037%
21.0	226.589	8.886	368.948	1.488%	70.741%
22.0	219.087	8.956	377.904	1.500%	72.458%
23.0	212.393	9.054	386.957	1.517%	74.194%
24.0	207.021	9.170	396.127	1.536%	75.952%
25.0	202.760	9.318	405.445	1.561%	77.738%
26.0	198.373	9.469	414.914	1.586%	79.554%
27.0	192.860	9.572	424.485	1.603%	81.389%
28.0	187.432	9.628	434.113	1.613%	83.235%
29.0	182.271	9.672	443.786	1.620%	85.090%
30.0	177.068	9.702	453.488	1.625%	86.950%
31.0	168.820	9.626	463.114	1.612%	88.796%
32.0	149.955	9.133	472.246	1.530%	90.547%
33.0	126.492	8.144	480.39	1.364%	92.108%
34.0	103.163	6.950	487.34	1.164%	93.441%
35.0	74.777	5.526	492.866	.926%	94.500%
36.0	50.963	4.004	496.87	.671%	95.268%
37.0	32.618	2.726	499.596	.457%	95.791%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	18.773	1.715	501.311	.287%	96.119%
39.0	12.572	1.070	502.381	.179%	96.325%
40.0	11.116	0.826	503.207	.138%	96.483%
41.0	10.069	0.754	503.962	.126%	96.628%
42.0	9.021	0.694	504.655	.116%	96.761%
43.0	8.009	0.631	505.286	.106%	96.882%
44.0	7.024	0.567	505.854	.095%	96.990%
45.0	6.441	0.517	506.371	.087%	97.090%
46.0	6.047	0.488	506.859	.082%	97.183%
47.0	5.681	0.466	507.326	.078%	97.273%
48.0	5.393	0.448	507.774	.075%	97.358%
49.0	5.119	0.432	508.205	.072%	97.441%
50.0	4.830	0.415	508.62	.069%	97.521%
51.0	4.620	0.400	509.02	.067%	97.597%
52.0	4.472	0.390	509.41	.065%	97.672%
53.0	4.303	0.382	509.792	.064%	97.745%
54.0	4.191	0.374	510.166	.063%	97.817%
55.0	4.071	0.369	510.535	.062%	97.888%
56.0	3.959	0.363	510.898	.061%	97.957%
57.0	3.881	0.358	511.256	.060%	98.026%
58.0	3.839	0.357	511.613	.060%	98.095%
59.0	3.741	0.354	511.968	.059%	98.163%
60.0	3.691	0.351	512.319	.059%	98.230%
61.0	3.628	0.349	512.668	.059%	98.297%
62.0	3.572	0.347	513.015	.058%	98.363%
63.0	3.502	0.344	513.359	.058%	98.429%
64.0	3.431	0.340	513.699	.057%	98.495%
65.0	3.368	0.336	514.036	.056%	98.559%
66.0	3.319	0.334	514.369	.056%	98.623%
67.0	3.291	0.332	514.702	.056%	98.687%
68.0	3.220	0.330	515.031	.055%	98.750%
69.0	3.185	0.327	515.358	.055%	98.813%
70.0	3.150	0.325	515.684	.054%	98.875%
71.0	3.087	0.322	516.006	.054%	98.937%
72.0	3.045	0.319	516.325	.053%	98.998%
73.0	2.995	0.316	516.64	.053%	99.059%
74.0	2.967	0.313	516.954	.053%	99.119%
75.0	2.925	0.311	517.265	.052%	99.178%

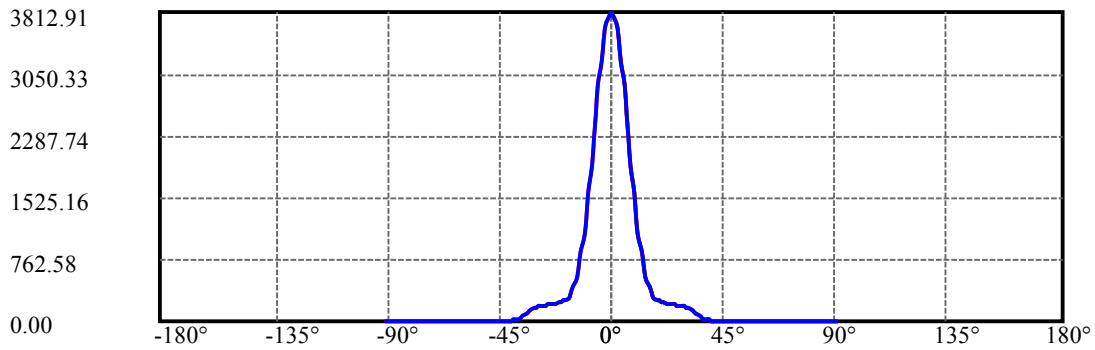
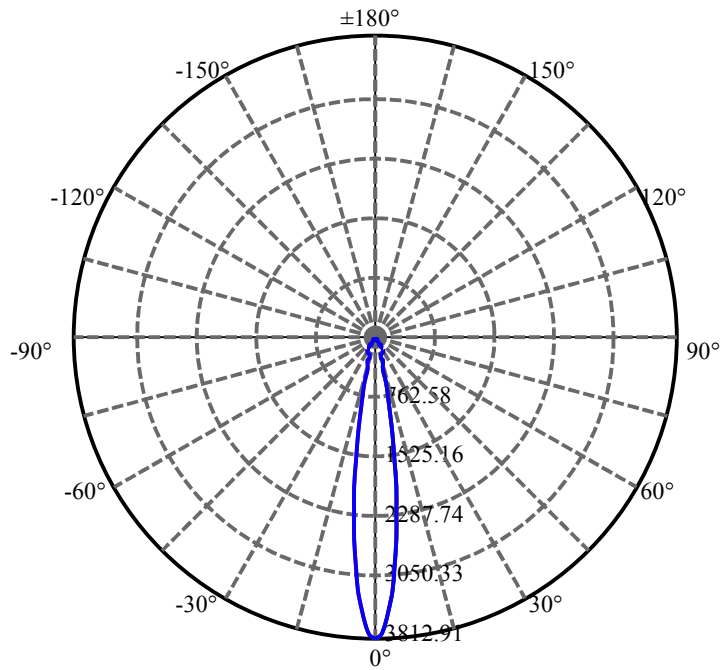
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	2.890	0.309	517.574	.052%	99.238%
77.0	2.848	0.306	517.88	.051%	99.296%
78.0	2.805	0.303	518.182	.051%	99.354%
79.0	2.756	0.299	518.481	.050%	99.412%
80.0	2.728	0.296	518.777	.050%	99.468%
81.0	2.693	0.293	519.07	.049%	99.524%
82.0	2.679	0.291	519.361	.049%	99.580%
83.0	2.616	0.288	519.649	.048%	99.635%
84.0	2.566	0.282	519.932	.047%	99.690%
85.0	2.538	0.279	520.21	.047%	99.743%
86.0	2.524	0.277	520.487	.046%	99.796%
87.0	2.468	0.273	520.76	.046%	99.848%
88.0	2.433	0.268	521.029	.045%	99.900%
89.0	2.370	0.263	521.292	.044%	99.950%
90.0	2.348	0.259	521.55	.043%	100.000%

## ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	453.49	75.96%	86.95%
0-40	503.21	84.29%	96.48%
0-60	512.32	85.82%	98.23%
0-90	521.29	87.32%	99.95%
0-120	521.29	87.32%	99.95%
0-180	521.55	87.36%	100.00%
60-90	9.32	1.56%	1.79%
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%
0-26.24	417.24	69.89%	80.00%

## ZONAL LUMEN SUMMARY

0-10	222.26
10-20	137.80
20-30	93.43
30-40	49.72
40-50	5.41
50-60	3.70
60-70	3.36
70-80	3.09
80-90	2.51
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



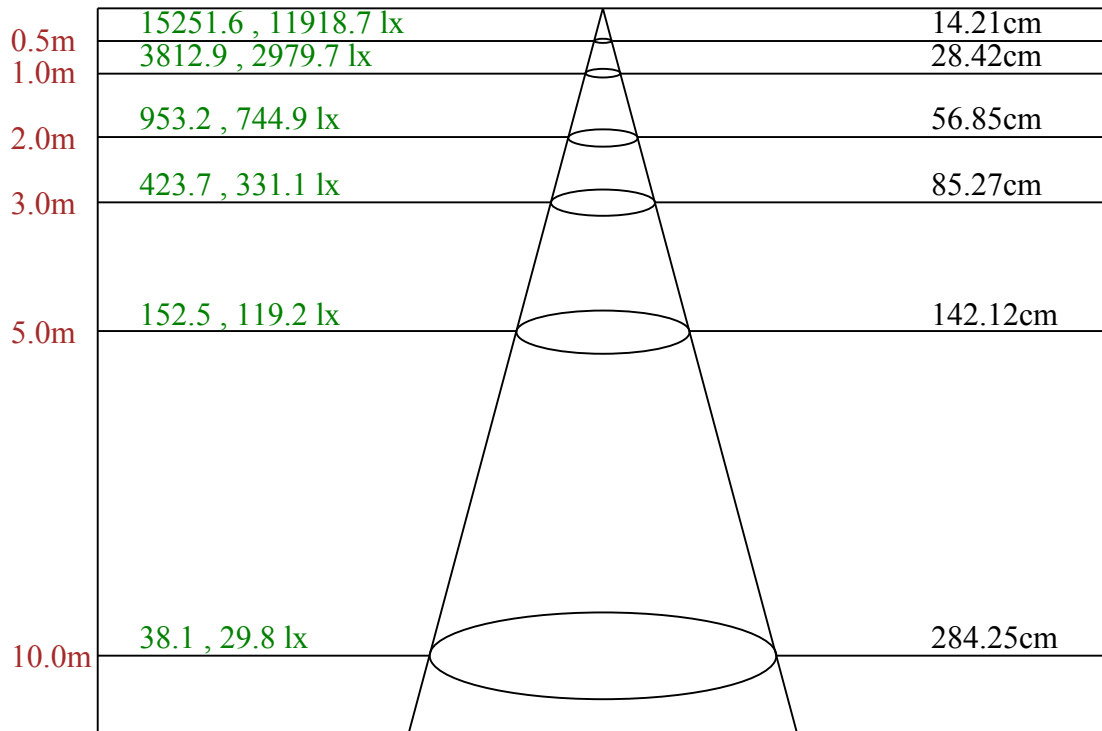
C0(Max): —————

C0/C180: —————

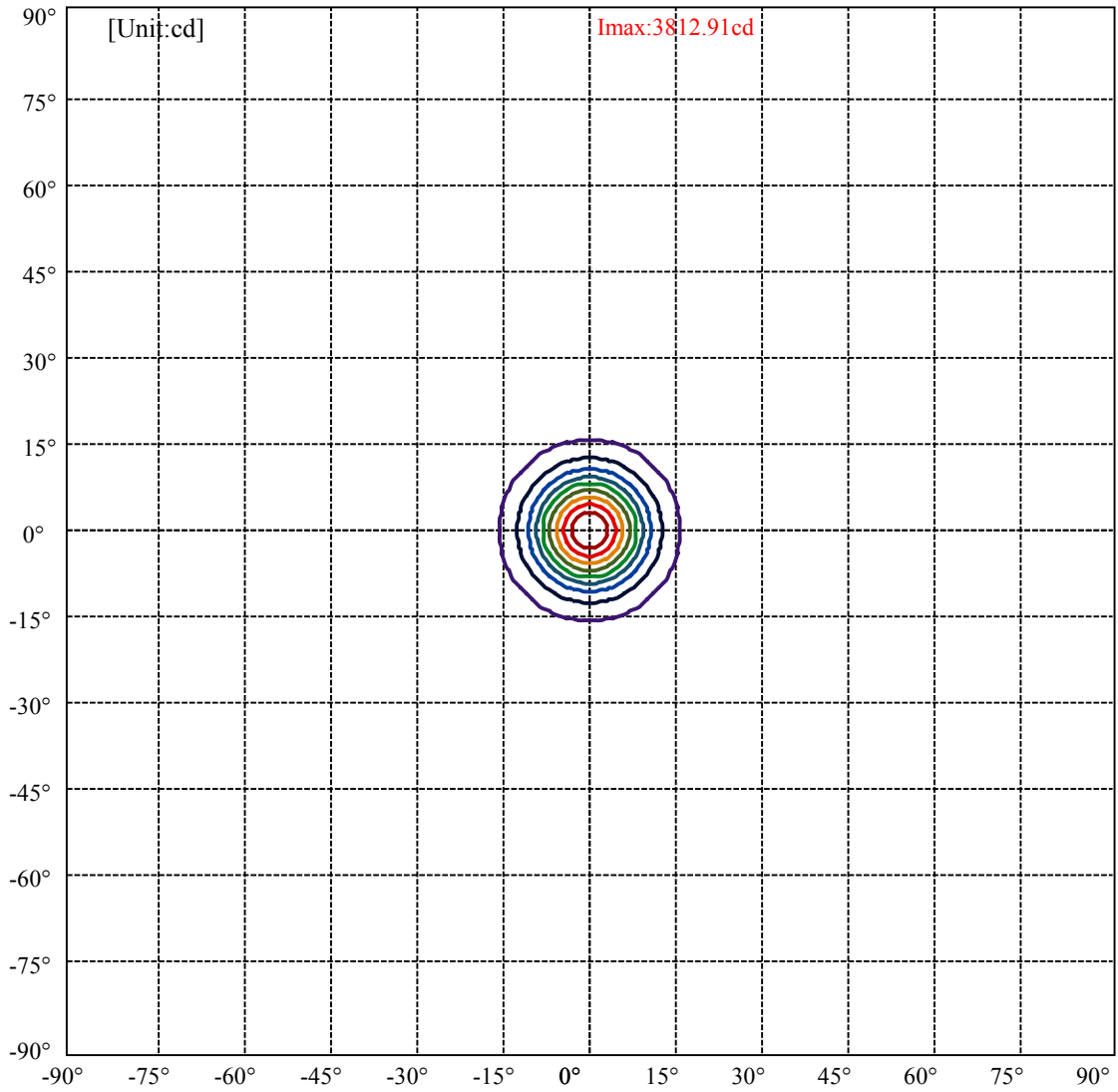
C90/C270: —————

Field angle(10%Imax):C0/180Left:15.5 Right:15.5  
:C90/270Left:15.5 Right:15.5

Beam Angle(50%Imax):C0/180Left:8.0 Right:8.0  
:C90/270Left:8.0 Right:8.0

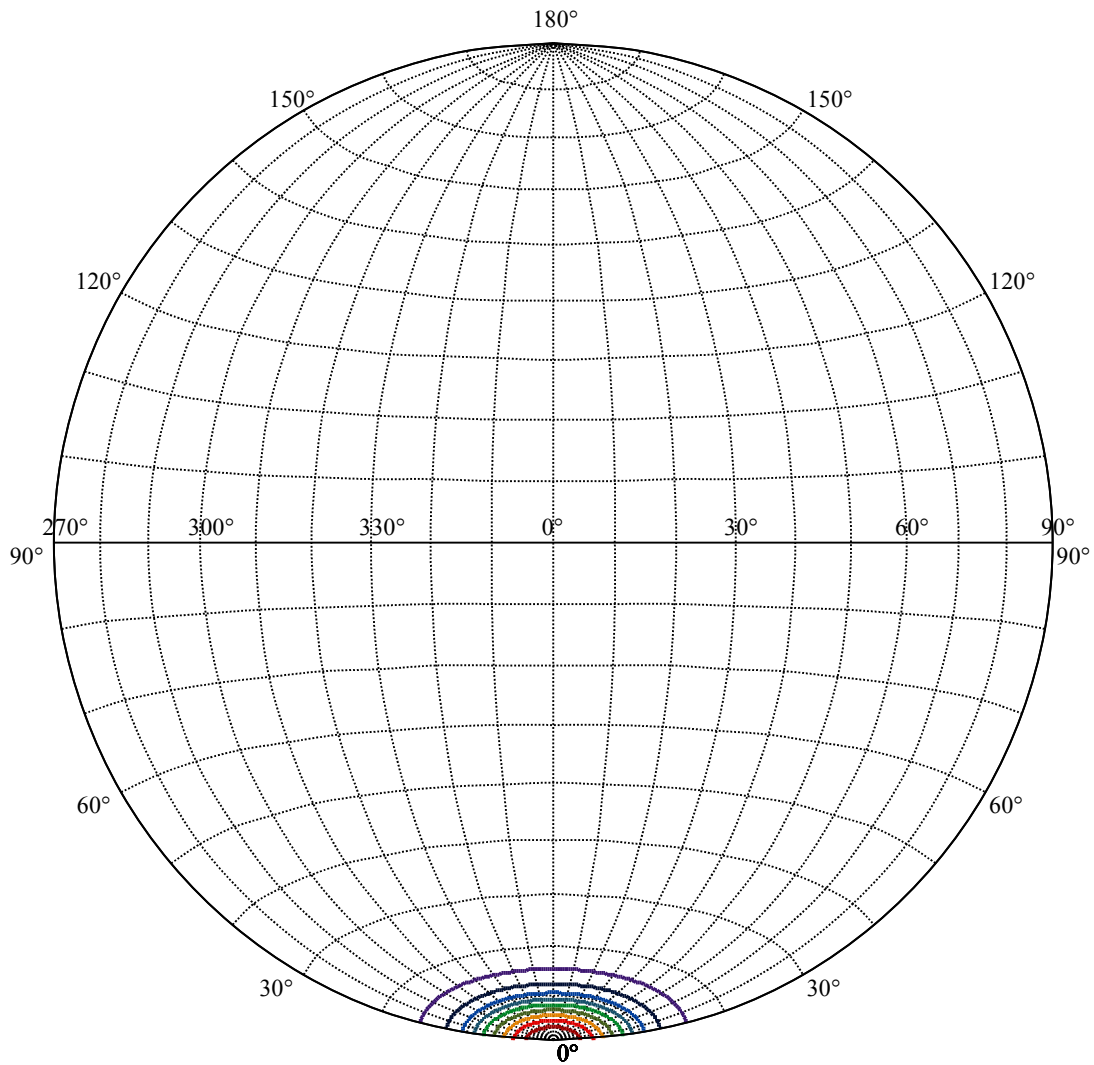


Max , Ave      Beam angle of C0 plane 16.18



(10%Imax) 381.291	—
(20%Imax) 762.581	—
(30%Imax) 1143.87	—
(40%Imax) 1525.16	—
(50%Imax) 1906.45	—
(60%Imax) 2287.74	—
(70%Imax) 2669.03	—
(80%Imax) 3050.33	—
(90%Imax) 3431.62	—





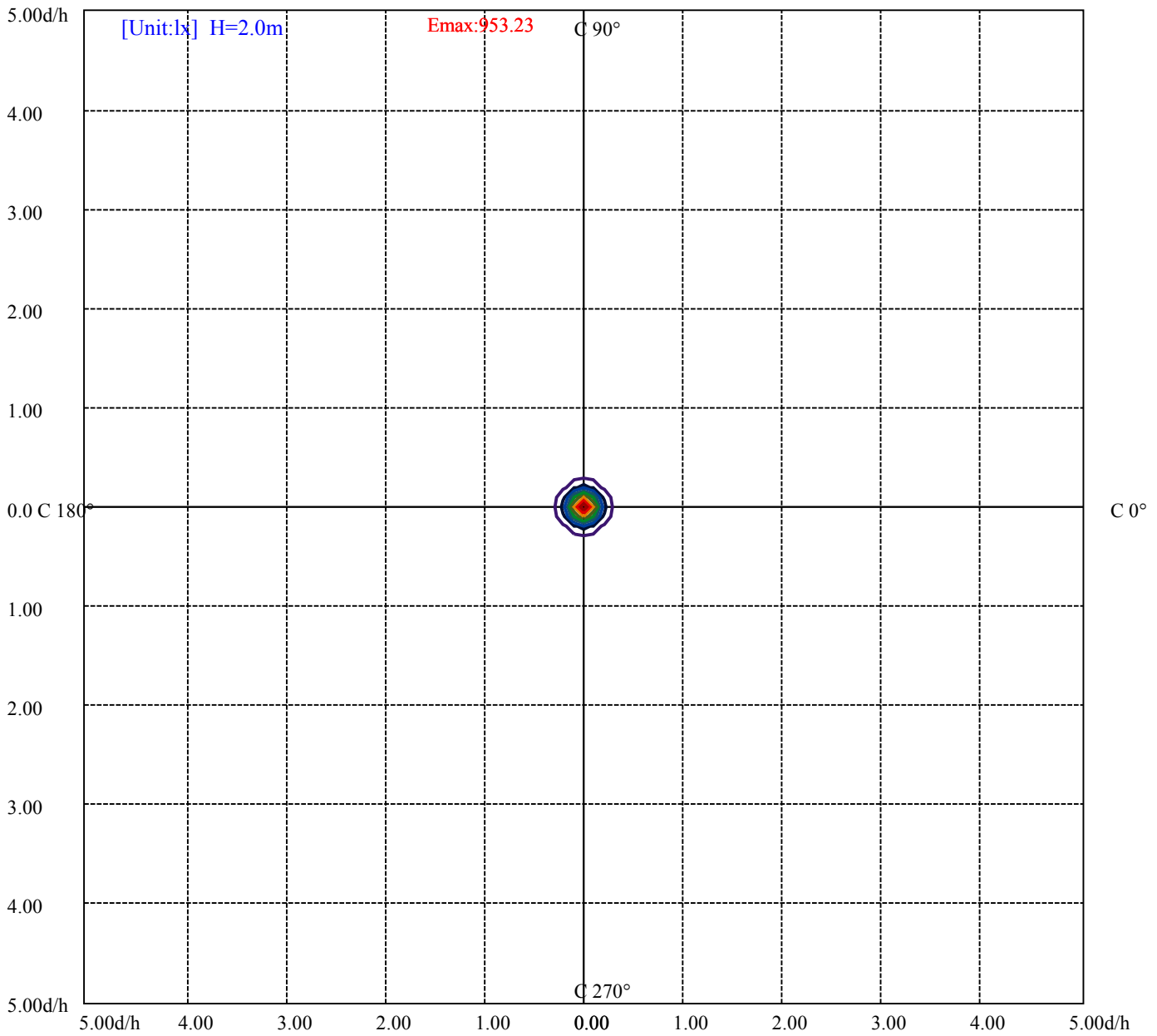
House

[Unit:cd]

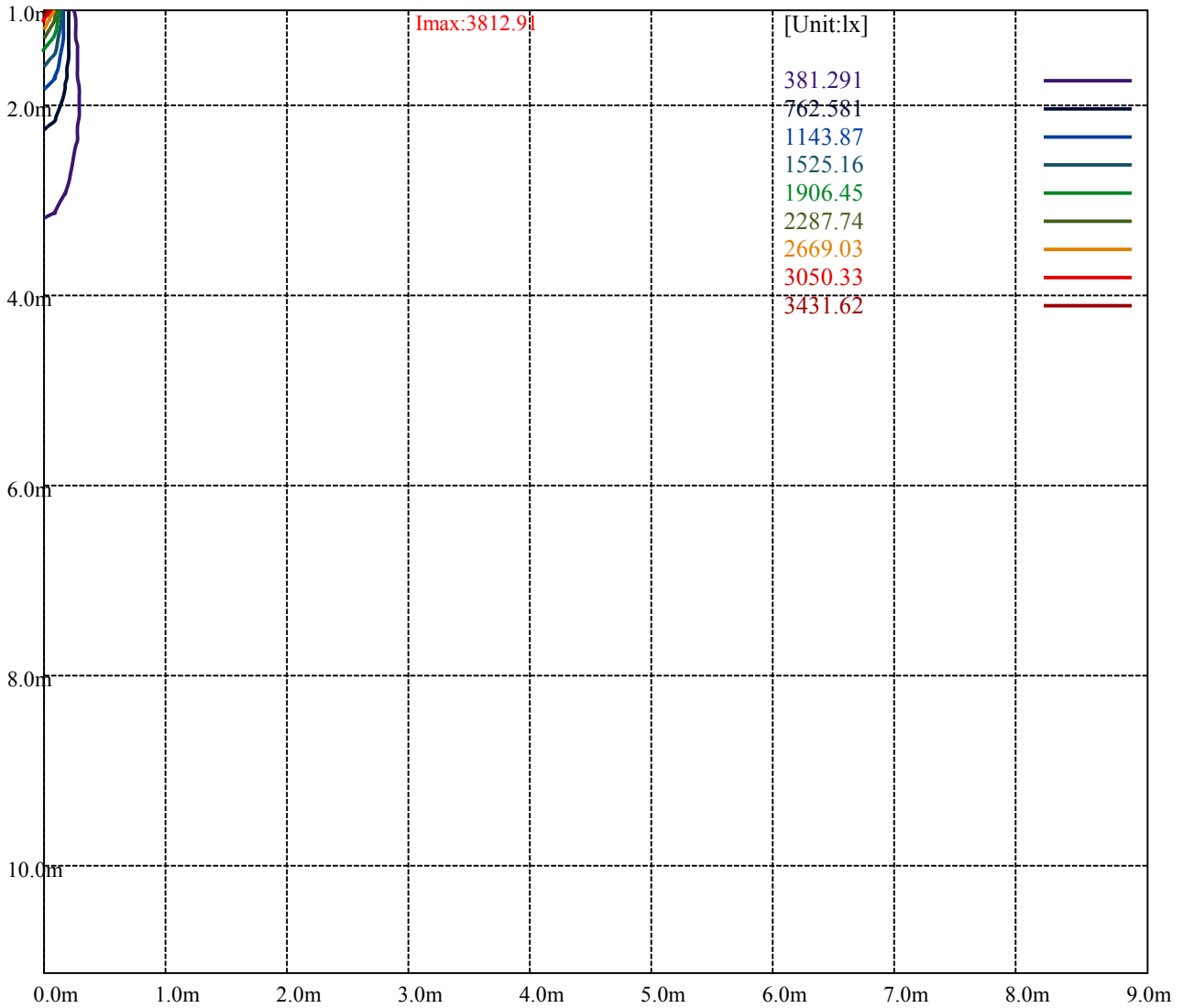
Road

**Imax:3812.91**

(10%Imax) 381.291	—
(20%Imax) 762.581	—
(30%Imax) 1143.87	—
(40%Imax) 1525.16	—
(50%Imax) 1906.45	—
(60%Imax) 2287.74	—
(70%Imax) 2669.03	—
(80%Imax) 3050.33	—
(90%Imax) 3431.62	—



(10%Emax) 95.3225	—
(20%Emax) 190.645	—
(30%Emax) 285.9675	—
(40%Emax) 381.29	—
(50%Emax) 476.6125	—
(60%Emax) 571.935	—
(70%Emax) 667.2575	—
(80%Emax) 762.58	—
(90%Emax) 857.9025	—



Luminance Table

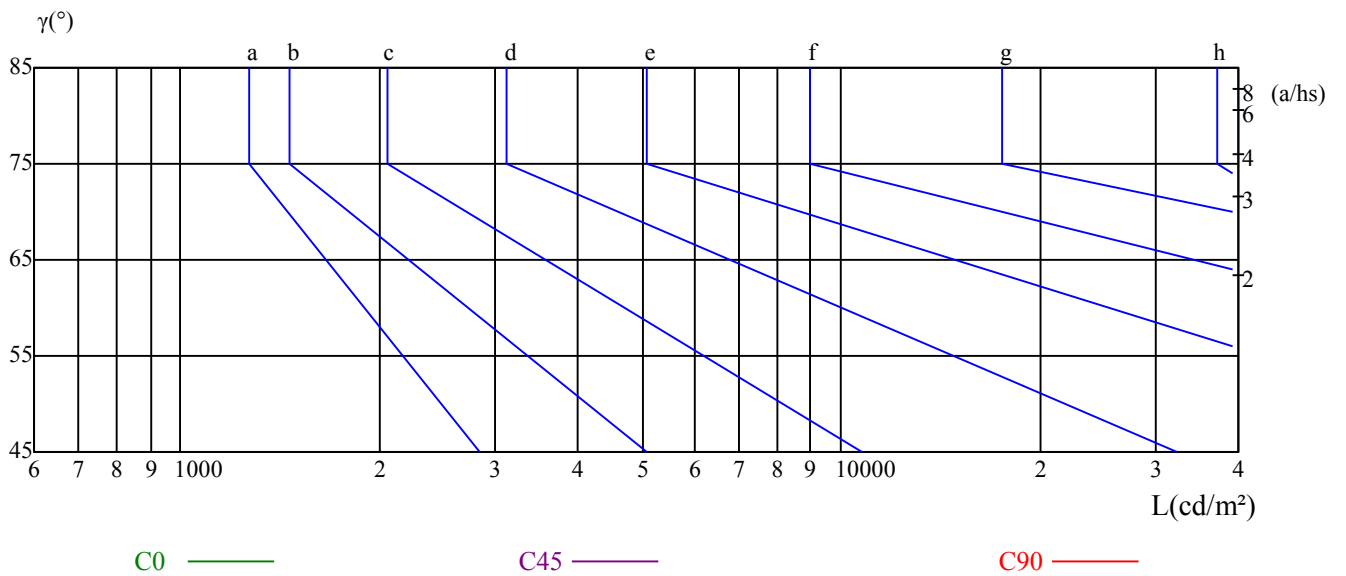
$\gamma$	45	50	55	60	65	70	75	80	85
C0	0	0	0	0	0	0	0	0	0
C45	0	0	0	0	0	0	0	0	0
C90	0	0	0	0	0	0	0	0	0

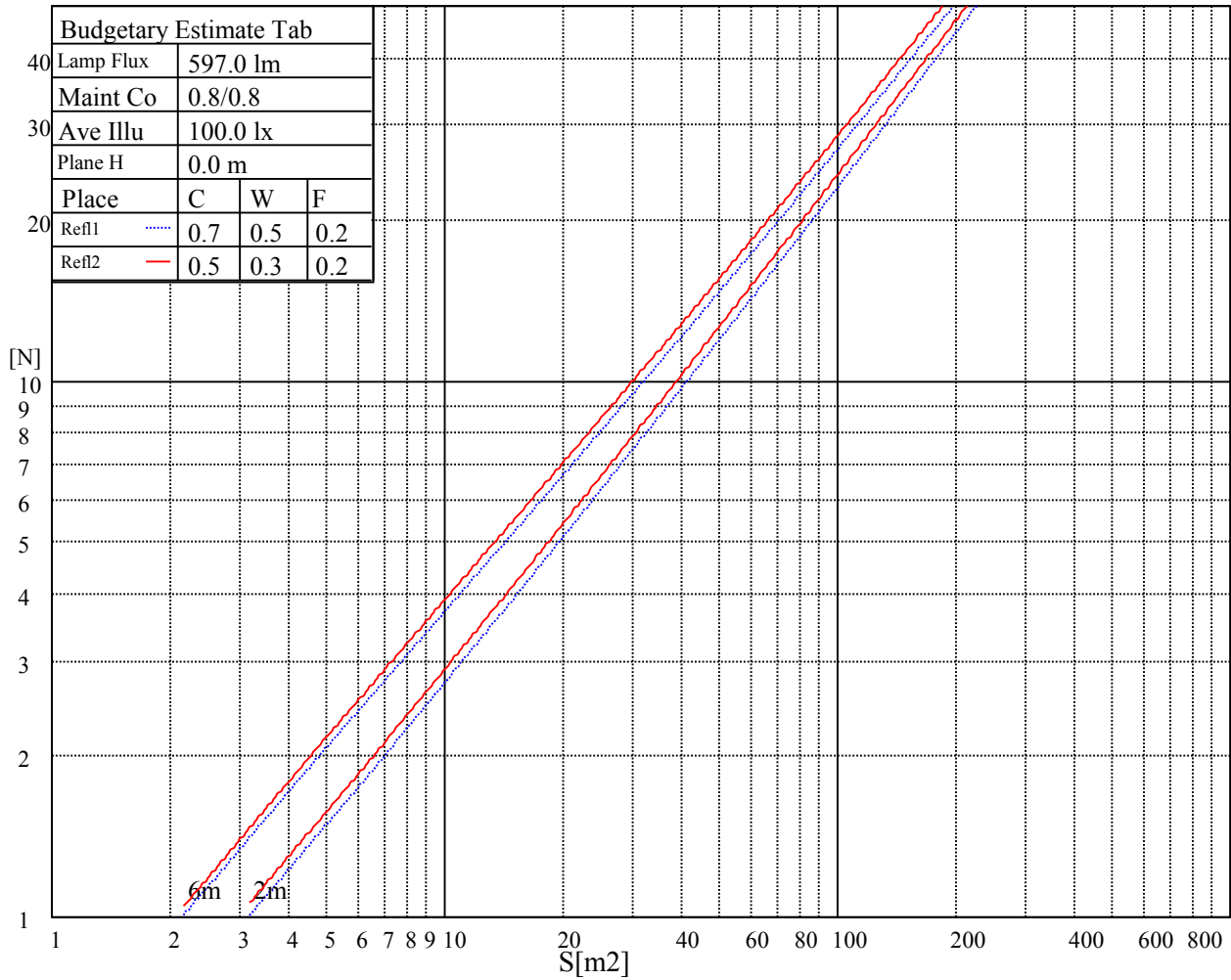
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
0	0	0	0	0	0	0	0	0

Glare Table

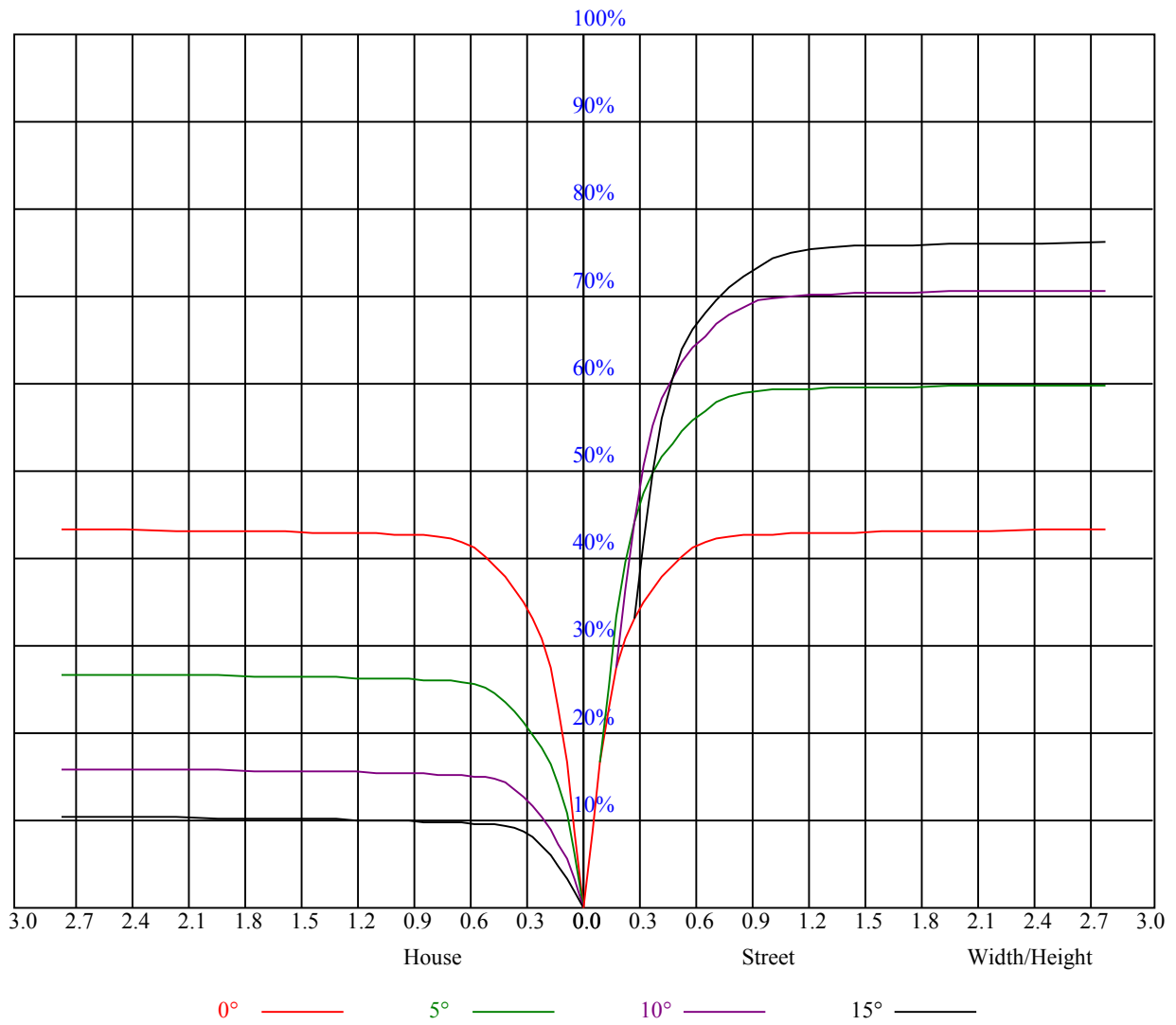
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

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	1.04	1.04	1.04	1.02	1.02	1.02	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.87
1	0.98	0.96	0.95	0.96	0.95	0.93	0.93	0.91	0.90	0.89	0.88	0.88	0.87	0.86	0.85	0.84
2	0.93	0.90	0.88	0.92	0.89	0.87	0.89	0.87	0.85	0.86	0.85	0.83	0.84	0.83	0.82	0.80
3	0.89	0.85	0.83	0.88	0.85	0.82	0.85	0.83	0.81	0.83	0.81	0.80	0.82	0.80	0.78	0.77
4	0.85	0.81	0.79	0.84	0.81	0.78	0.82	0.80	0.77	0.81	0.78	0.76	0.79	0.77	0.76	0.74
5	0.82	0.78	0.75	0.81	0.78	0.75	0.80	0.77	0.74	0.78	0.76	0.74	0.77	0.75	0.73	0.72
6	0.79	0.75	0.72	0.78	0.75	0.72	0.77	0.74	0.72	0.76	0.73	0.71	0.75	0.73	0.71	0.70
7	0.76	0.72	0.70	0.76	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.73	0.70	0.69	0.68
8	0.74	0.70	0.67	0.73	0.70	0.67	0.73	0.69	0.67	0.72	0.69	0.67	0.71	0.69	0.67	0.66
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	0.67	0.65	0.64
10	0.70	0.66	0.64	0.69	0.66	0.64	0.69	0.66	0.63	0.68	0.65	0.63	0.68	0.65	0.63	0.62



## Intensity data(cd)

C/ $\gamma$ ( $^{\circ}$ )	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
0.0	3832.88	3751.31	3590.44	3373.31	3076.31	2781.00	2437.88	2095.88	1800.00
45.0	3810.38	3749.06	3584.25	3386.81	3142.13	2838.94	2513.25	2210.06	1870.88
90.0	3807.56	3752.44	3642.19	3406.50	3152.25	2876.63	2507.63	2202.75	1894.50
135.0	3800.81	3830.63	3762.56	3624.19	3406.50	3143.81	2809.13	2448.56	2138.06
180.0	3832.88	3830.06	3754.69	3546.56	3319.88	3044.81	2663.44	2336.63	2004.19
225.0	3810.38	3801.94	3710.81	3533.06	3312.00	3006.00	2677.50	2365.88	2019.38
270.0	3807.56	3786.19	3679.31	3506.63	3281.63	2965.50	2624.06	2311.88	1952.44
315.0	3800.81	3705.75	3514.50	3251.81	2969.44	2665.13	2291.63	1967.06	1666.69
360.0	3832.88	3751.31	3590.44	3373.31	3076.31	2781.00	2437.88	2095.88	1800.00
C/ $\gamma$ ( $^{\circ}$ )	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	1484.44	1197.00	975.94	790.31	608.06	492.19	403.88	334.13	294.75
45.0	1553.63	1294.31	1033.88	837.00	654.75	513.00	420.75	352.13	303.19
90.0	1558.69	1110.15	1027.91	812.87	636.19	511.54	406.46	342.28	295.93
135.0	1791.00	1458.00	1200.94	978.19	741.94	594.56	475.88	383.06	321.19
180.0	1652.63	1118.59	1089.56	862.59	678.21	541.35	420.02	343.13	285.24
225.0	1724.06	1411.31	1103.96	919.58	721.86	582.64	457.59	374.96	313.54
270.0	1606.50	1334.25	1074.94	868.50	672.19	514.69	408.94	339.75	287.44
315.0	1247.06	1068.47	869.51	678.43	528.24	426.60	346.89	298.52	264.66
360.0	1484.44	1197.00	975.94	790.31	608.06	492.19	403.88	334.13	294.75
C/ $\gamma$ ( $^{\circ}$ )	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	285.75	255.38	240.64	231.58	222.81	216.68	211.22	206.55	202.67
45.0	286.31	258.47	242.61	232.71	224.04	215.55	209.76	205.48	201.09
90.0	270.73	256.22	243.84	232.37	224.55	217.80	211.50	207.39	203.79
135.0	284.06	268.09	242.21	232.65	225.68	217.63	211.50	205.54	200.53
180.0	253.86	239.74	231.92	222.24	215.33	209.19	203.51	198.45	194.85
225.0	277.43	258.19	244.35	231.58	220.95	210.21	201.83	199.18	198.34
270.0	248.57	235.01	221.46	216.84	213.36	209.48	205.03	202.16	196.88
315.0	245.93	232.26	222.24	212.74	205.99	202.61	201.83	197.33	188.83
360.0	285.75	255.38	240.64	231.58	222.81	216.68	211.22	206.55	202.67
C/ $\gamma$ ( $^{\circ}$ )	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	198.96	194.63	191.53	187.99	173.48	152.94	128.25	102.15	69.19
45.0	197.55	193.89	190.52	187.43	174.32	150.36	125.16	98.66	67.50
90.0	199.80	196.20	192.94	189.28	179.78	157.22	128.87	102.26	71.83
135.0	196.76	193.50	189.00	186.53	183.43	170.55	150.69	129.60	95.46
180.0	187.59	178.71	173.76	170.38	166.05	150.02	130.73	106.93	83.59
225.0	197.83	197.38	197.38	197.21	194.01	177.86	149.91	122.34	90.84
270.0	191.08	184.22	177.08	173.53	169.99	155.08	135.73	111.83	81.51
315.0	173.31	160.93	145.97	124.20	109.52	85.61	62.61	51.53	38.31
360.0	198.96	194.63	191.53	187.99	173.48	152.94	128.25	102.15	69.19
C/ $\gamma$ ( $^{\circ}$ )	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	44.44	24.30	11.93	9.28	8.55	7.76	6.86	5.79	5.01
45.0	43.20	23.63	11.76	8.83	8.10	7.31	6.41	5.46	4.67
90.0	44.38	24.92	13.89	8.72	7.93	7.26	6.41	5.51	4.73
135.0	69.02	48.26	24.36	13.16	10.24	9.23	8.38	7.71	6.58
180.0	59.68	39.21	23.18	14.57	12.21	10.86	9.90	8.78	7.37
225.0	61.26	38.87	22.84	14.68	13.56	12.49	11.19	9.96	8.83
270.0	58.11	39.04	23.63	16.99	15.98	15.02	13.89	12.94	11.81
315.0	27.62	22.73	18.62	14.34	12.38	10.63	9.11	7.93	7.20
360.0	44.44	24.30	11.93	9.28	8.55	7.76	6.86	5.79	5.01



## Intensity data(cd)

C/ $\gamma$ (°)	45.0	46.0	47.0	48.0	49.0	50.0	51.0	52.0	53.0
0.0	4.67	4.50	4.28	4.11	3.99	3.83	3.71	3.60	3.54
45.0	4.44	4.22	4.05	3.88	3.77	3.66	3.54	3.49	3.38
90.0	4.33	4.11	3.94	3.77	3.71	3.60	3.43	3.43	3.38
135.0	5.85	5.51	5.29	5.06	4.84	4.56	4.50	4.39	4.16
180.0	6.64	6.13	5.85	5.51	5.18	4.89	4.73	4.50	4.39
225.0	8.04	7.54	7.03	6.69	6.24	5.85	5.57	5.34	5.12
270.0	10.97	10.29	9.39	8.83	8.10	7.37	6.86	6.47	6.02
315.0	6.58	6.08	5.63	5.29	5.12	4.89	4.61	4.56	4.44
360.0	4.67	4.50	4.28	4.11	3.99	3.83	3.71	3.60	3.54
C/ $\gamma$ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	3.43	3.38	3.38	3.32	3.26	3.21	3.21	3.21	3.21
45.0	3.32	3.26	3.21	3.15	3.15	3.15	3.09	3.04	3.04
90.0	3.26	3.21	3.15	3.15	3.15	3.09	3.09	3.09	3.04
135.0	4.22	4.16	3.94	3.88	3.94	3.77	3.66	3.54	3.54
180.0	4.28	4.22	4.11	4.05	4.05	3.99	3.94	3.83	3.71
225.0	4.95	4.78	4.67	4.61	4.50	4.39	4.33	4.33	4.28
270.0	5.79	5.46	5.12	4.95	4.78	4.50	4.44	4.33	4.16
315.0	4.28	4.11	4.11	3.94	3.88	3.83	3.77	3.66	3.60
360.0	3.43	3.38	3.38	3.32	3.26	3.21	3.21	3.21	3.21
C/ $\gamma$ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	3.15	3.15	3.15	3.09	3.09	3.15	3.15	3.15	3.21
45.0	3.04	3.04	3.04	3.04	3.09	3.04	2.98	3.04	2.98
90.0	3.04	3.04	3.04	3.04	3.04	2.98	2.98	3.04	2.93
135.0	3.43	3.32	3.26	3.26	3.21	3.15	3.09	3.04	3.04
180.0	3.66	3.54	3.43	3.38	3.32	3.21	3.21	3.09	3.04
225.0	4.11	3.99	3.88	3.77	3.71	3.54	3.49	3.38	3.21
270.0	4.05	3.88	3.77	3.66	3.60	3.49	3.43	3.38	3.26
315.0	3.54	3.49	3.38	3.32	3.26	3.21	3.15	3.09	3.04
360.0	3.15	3.15	3.15	3.09	3.09	3.15	3.15	3.15	3.21
C/ $\gamma$ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	3.21	3.21	3.21	3.21	3.21	3.15	3.04	2.93	2.87
45.0	3.04	2.93	2.93	2.87	2.87	2.87	2.81	2.81	2.81
90.0	2.93	2.93	2.93	2.87	2.87	2.87	2.87	2.81	2.76
135.0	3.04	2.98	2.93	2.93	2.81	2.81	2.81	2.76	2.76
180.0	2.93	2.93	2.87	2.81	2.76	2.70	2.64	2.64	2.59
225.0	3.09	3.04	3.04	2.93	2.87	2.81	2.76	2.76	2.76
270.0	3.15	3.04	2.98	2.93	2.87	2.81	2.76	2.70	2.70
315.0	2.98	2.93	2.87	2.87	2.87	2.76	2.76	2.64	2.59
360.0	3.21	3.21	3.21	3.21	3.21	3.15	3.04	2.93	2.87
C/ $\gamma$ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	2.81	2.76	2.64	2.59	2.59	2.64	2.59	2.48	2.31
45.0	2.76	2.76	2.70	2.64	2.59	2.53	2.48	2.42	2.42
90.0	2.76	2.70	2.64	2.64	2.59	2.53	2.42	2.42	2.36
135.0	2.70	2.70	2.64	2.53	2.53	2.53	2.48	2.42	2.42
180.0	2.59	2.53	2.53	2.53	2.48	2.48	2.42	2.42	2.36
225.0	2.70	2.70	2.64	2.59	2.53	2.53	2.48	2.48	2.36
270.0	2.64	2.64	2.59	2.53	2.53	2.48	2.48	2.42	2.36
315.0	2.59	2.64	2.53	2.48	2.48	2.48	2.42	2.42	2.36
360.0	2.81	2.76	2.64	2.59	2.59	2.64	2.59	2.48	2.31

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**Intensity data(cd)**

<b>C/<math>\gamma</math>(<math>^{\circ}</math>)</b>	<b>90.0</b>
<b>0.0</b>	<b>2.31</b>
<b>45.0</b>	<b>2.31</b>
<b>90.0</b>	<b>2.36</b>
<b>135.0</b>	<b>2.36</b>
<b>180.0</b>	<b>2.31</b>
<b>225.0</b>	<b>2.42</b>
<b>270.0</b>	<b>2.36</b>
<b>315.0</b>	<b>2.36</b>
<b>360.0</b>	<b>2.31</b>