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NATA

LumCAT: CR01D07538AR
Luminaire: 92.70.074.00
Report No: NATA0100
Test No: GC2018112805
LampCAT: CREE CXA1820
Lamp flux(lm): 2349.0
Number of Lamps: 1
Length(mm): 75
Phm Type: C

Voltage(V): 36.1000
Current(A): 0.5000
Power (W): 18.0500
PF: 0.0000
Ballast type: DC
Width(mm): 75
Height(mm): 0

Photometric Results

Lumens(lm): 2168.39
Efficiency(%): 92.31%
Lumens(lm)/Power(W): 120.19
Central intensity(cd): 4694.906
Maximum intensity(cd): 4694.906
Angle of maximum intensity: C=0.0 γ =0.0
Beam Angle(50%Imax): [C0/180]Total=38.2
 [C90/270]Total=38.2
Field angle(10%Imax): [C0/180]Total=61.8
 [C90/270]Total=61.8
Maximum s/h(1/2): C0_180=0.62 C90_270=0.62
Maximum s/h(1/4): C0_180=0.61 C90_270=0.61
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 92.36%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 95.120%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	4694.906	1.123	1.123	.048%	.052%
1.0	4684.852	8.966	10.089	.382%	.465%
2.0	4654.055	17.812	27.901	.758%	1.287%
3.0	4598.297	26.391	54.291	1.123%	2.504%
4.0	4528.336	34.640	88.931	1.475%	4.101%
5.0	4445.016	42.484	131.415	1.809%	6.060%
6.0	4341.305	49.763	181.178	2.118%	8.355%
7.0	4234.641	56.593	237.771	2.409%	10.965%
8.0	4131.141	63.049	300.82	2.684%	13.873%
9.0	4009.359	68.780	369.599	2.928%	17.045%
10.0	3880.969	73.903	443.502	3.146%	20.453%
11.0	3750.891	78.485	521.987	3.341%	24.073%
12.0	3607.945	82.260	604.247	3.502%	27.866%
13.0	3451.430	85.141	689.388	3.625%	31.793%
14.0	3288.234	87.235	776.623	3.714%	35.816%
15.0	3120.188	88.558	865.181	3.770%	39.900%
16.0	2944.828	89.012	954.193	3.789%	44.005%
17.0	2752.102	88.237	1042.431	3.756%	48.074%
18.0	2551.148	86.451	1128.882	3.680%	52.061%
19.0	2363.836	84.394	1213.275	3.593%	55.953%
20.0	2153.391	80.766	1294.041	3.438%	59.677%
21.0	1941.820	76.311	1370.352	3.249%	63.197%
22.0	1754.086	72.057	1442.41	3.068%	66.520%
23.0	1546.341	66.257	1508.667	2.821%	69.575%
24.0	1359.394	60.633	1569.3	2.581%	72.372%
25.0	1202.217	55.716	1625.017	2.372%	74.941%
26.0	1041.124	50.049	1675.066	2.131%	77.249%
27.0	901.905	44.901	1719.967	1.912%	79.320%
28.0	774.063	39.851	1759.818	1.697%	81.158%
29.0	655.685	34.859	1794.677	1.484%	82.765%
30.0	550.336	30.175	1824.853	1.285%	84.157%
31.0	460.645	26.017	1850.87	1.108%	85.357%
32.0	378.260	21.981	1872.851	.936%	86.370%
33.0	312.286	18.651	1891.502	.794%	87.231%
34.0	255.930	15.694	1907.196	.668%	87.954%
35.0	204.237	12.846	1920.043	.547%	88.547%
36.0	164.777	10.621	1930.664	.452%	89.037%
37.0	139.451	9.203	1939.867	.392%	89.461%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	117.809	7.954	1947.821	.339%	89.828%
39.0	102.248	7.056	1954.877	.300%	90.153%
40.0	92.552	6.524	1961.401	.278%	90.454%
41.0	84.994	6.115	1967.516	.260%	90.736%
42.0	79.256	5.816	1973.331	.248%	91.004%
43.0	75.108	5.617	1978.948	.239%	91.263%
44.0	71.803	5.470	1984.418	.233%	91.516%
45.0	69.188	5.365	1989.783	.228%	91.763%
46.0	66.945	5.281	1995.064	.225%	92.007%
47.0	64.976	5.211	2000.275	.222%	92.247%
48.0	63.401	5.167	2005.442	.220%	92.485%
49.0	62.044	5.135	2010.577	.219%	92.722%
50.0	60.680	5.097	2015.674	.217%	92.957%
51.0	59.548	5.075	2020.749	.216%	93.191%
52.0	58.584	5.063	2025.811	.216%	93.425%
53.0	57.403	5.027	2030.839	.214%	93.656%
54.0	56.138	4.980	2035.819	.212%	93.886%
55.0	54.668	4.911	2040.73	.209%	94.113%
56.0	52.959	4.815	2045.544	.205%	94.335%
57.0	51.040	4.694	2050.239	.200%	94.551%
58.0	49.113	4.567	2054.806	.194%	94.762%
59.0	47.201	4.437	2059.243	.189%	94.966%
60.0	45.450	4.316	2063.559	.184%	95.165%
61.0	43.847	4.205	2067.765	.179%	95.359%
62.0	42.659	4.130	2071.895	.176%	95.550%
63.0	41.948	4.099	2075.994	.174%	95.739%
64.0	41.984	4.138	2080.132	.176%	95.930%
65.0	42.349	4.209	2084.341	.179%	96.124%
66.0	42.356	4.243	2088.584	.181%	96.319%
67.0	42.420	4.282	2092.866	.182%	96.517%
68.0	42.434	4.314	2097.18	.184%	96.716%
69.0	41.175	4.215	2101.396	.179%	96.910%
70.0	39.495	4.070	2105.466	.173%	97.098%
71.0	37.737	3.913	2109.378	.167%	97.278%
72.0	35.902	3.744	2113.123	.159%	97.451%
73.0	34.095	3.575	2116.698	.152%	97.616%
74.0	32.323	3.407	2120.105	.145%	97.773%
75.0	30.741	3.256	2123.361	.139%	97.923%

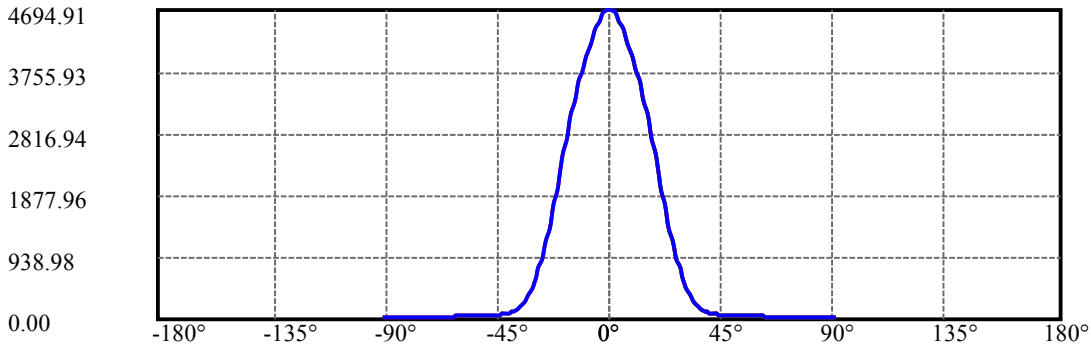
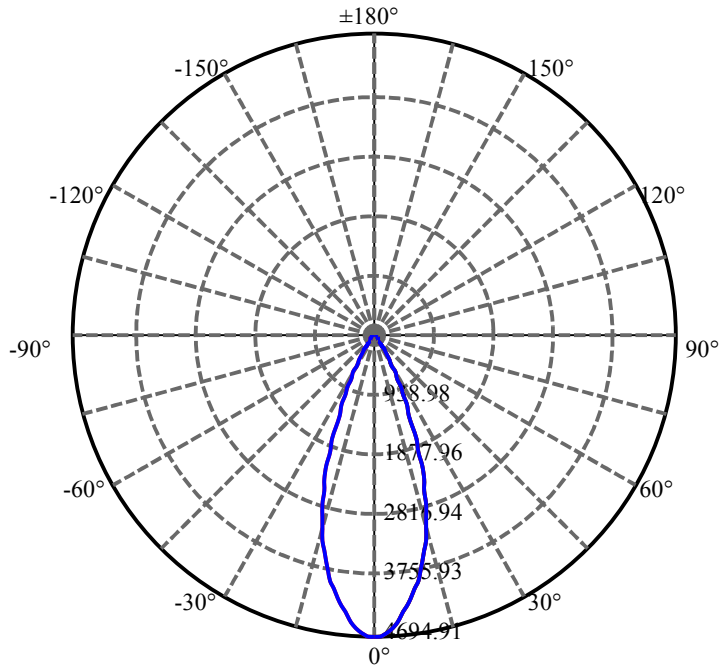
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	29.419	3.130	2126.492	.133%	98.068%
77.0	28.308	3.025	2129.516	.129%	98.207%
78.0	27.394	2.938	2132.455	.125%	98.343%
79.0	26.838	2.889	2135.344	.123%	98.476%
80.0	26.571	2.870	2138.213	.122%	98.608%
81.0	26.775	2.900	2141.113	.123%	98.742%
82.0	27.141	2.947	2144.061	.125%	98.878%
83.0	28.245	3.074	2147.135	.131%	99.020%
84.0	28.350	3.092	2150.227	.132%	99.162%
85.0	28.441	3.107	2153.334	.132%	99.306%
86.0	28.575	3.126	2156.46	.133%	99.450%
87.0	29.236	3.202	2159.661	.136%	99.597%
88.0	30.495	3.342	2163.003	.142%	99.751%
89.0	33.047	3.623	2166.627	.154%	99.919%
90.0	32.203	1.766	2168.393	.075%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	1824.85	77.69%	84.16%
0-40	1961.40	83.50%	90.45%
0-60	2063.56	87.85%	95.17%
0-90	2166.63	92.24%	99.92%
0-120	2166.63	92.24%	99.92%
0-180	2168.39	92.31%	100.00%
60-90	107.38	4.57%	4.95%
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%
0-27.37	1734.71	73.85%	80.00%

ZONAL LUMEN SUMMARY

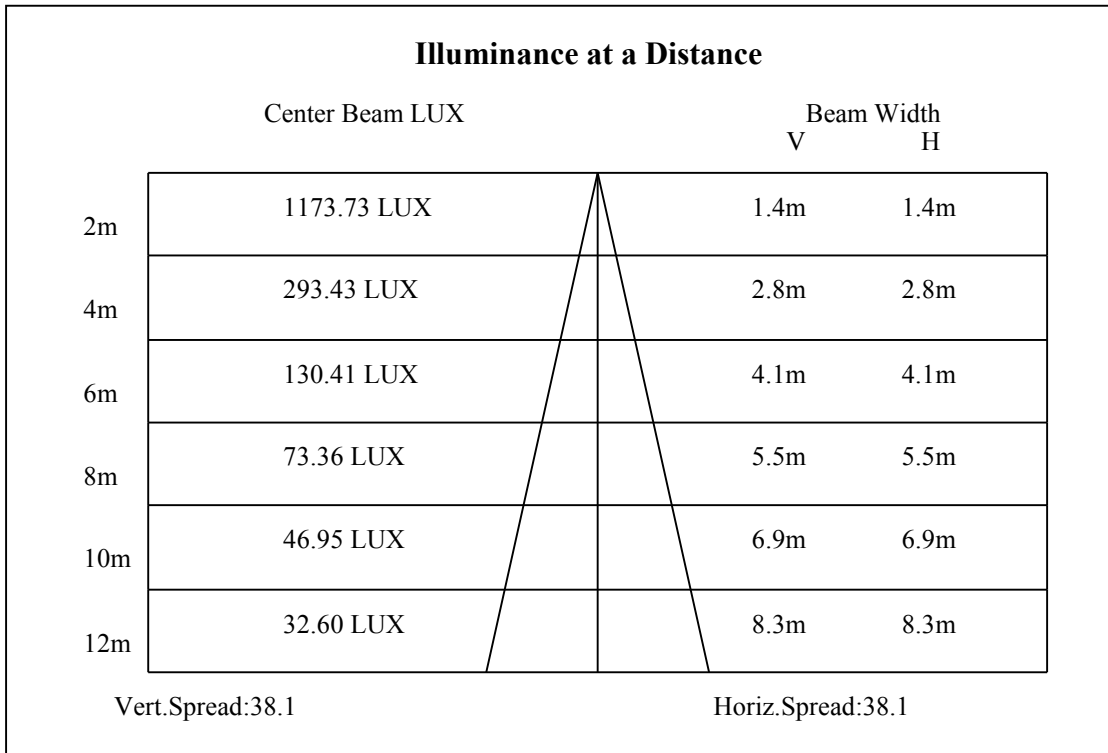
0-10	443.50
10-20	850.54
20-30	530.81
30-40	136.55
40-50	54.27
50-60	47.89
60-70	41.91
70-80	32.75
80-90	28.41
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00

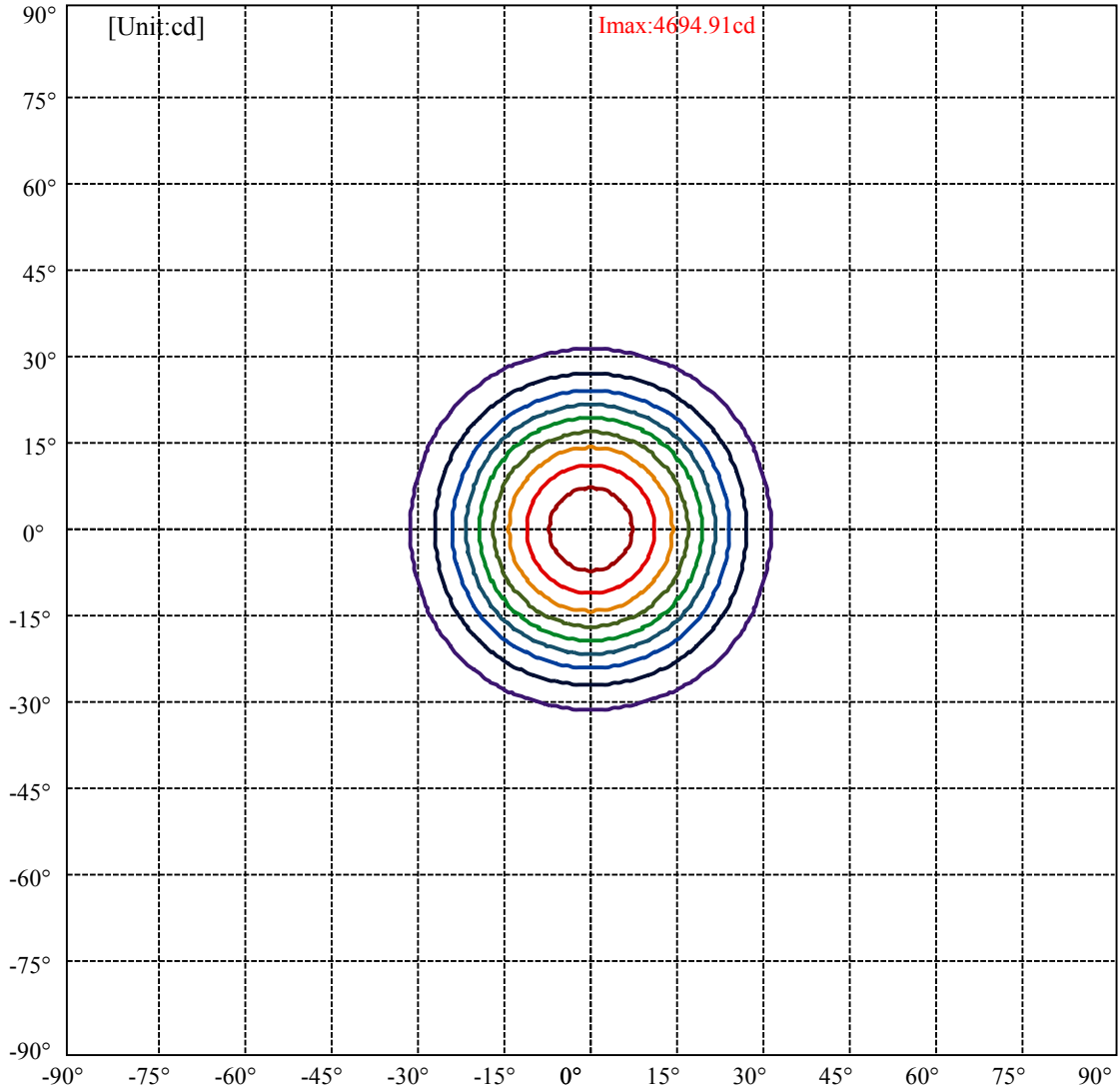


C0(Max): ———
C0/C180: ———
C90/C270: ———

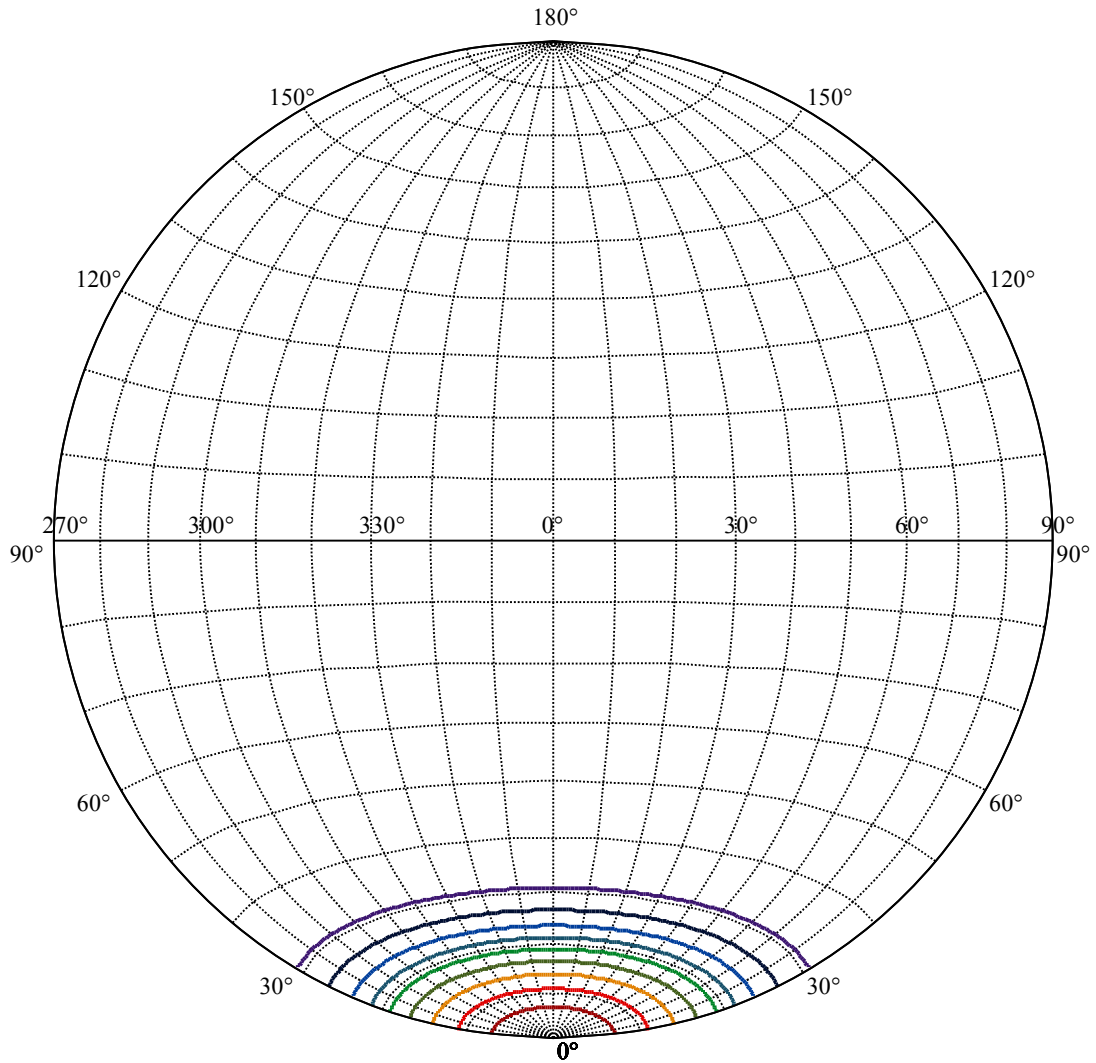
Field angle(10%Imax):C0/180Left:30.9 Right:30.9
:C90/270Left:30.9 Right:30.9

Beam Angle(50%Imax):C0/180Left:19.1 Right:19.1
:C90/270Left:19.1 Right:19.1





(10%Imax) 469.491	—
(20%Imax) 938.981	—
(30%Imax) 1408.47	—
(40%Imax) 1877.96	—
(50%Imax) 2347.45	—
(60%Imax) 2816.94	—
(70%Imax) 3286.43	—
(80%Imax) 3755.93	—
(90%Imax) 4225.42	—



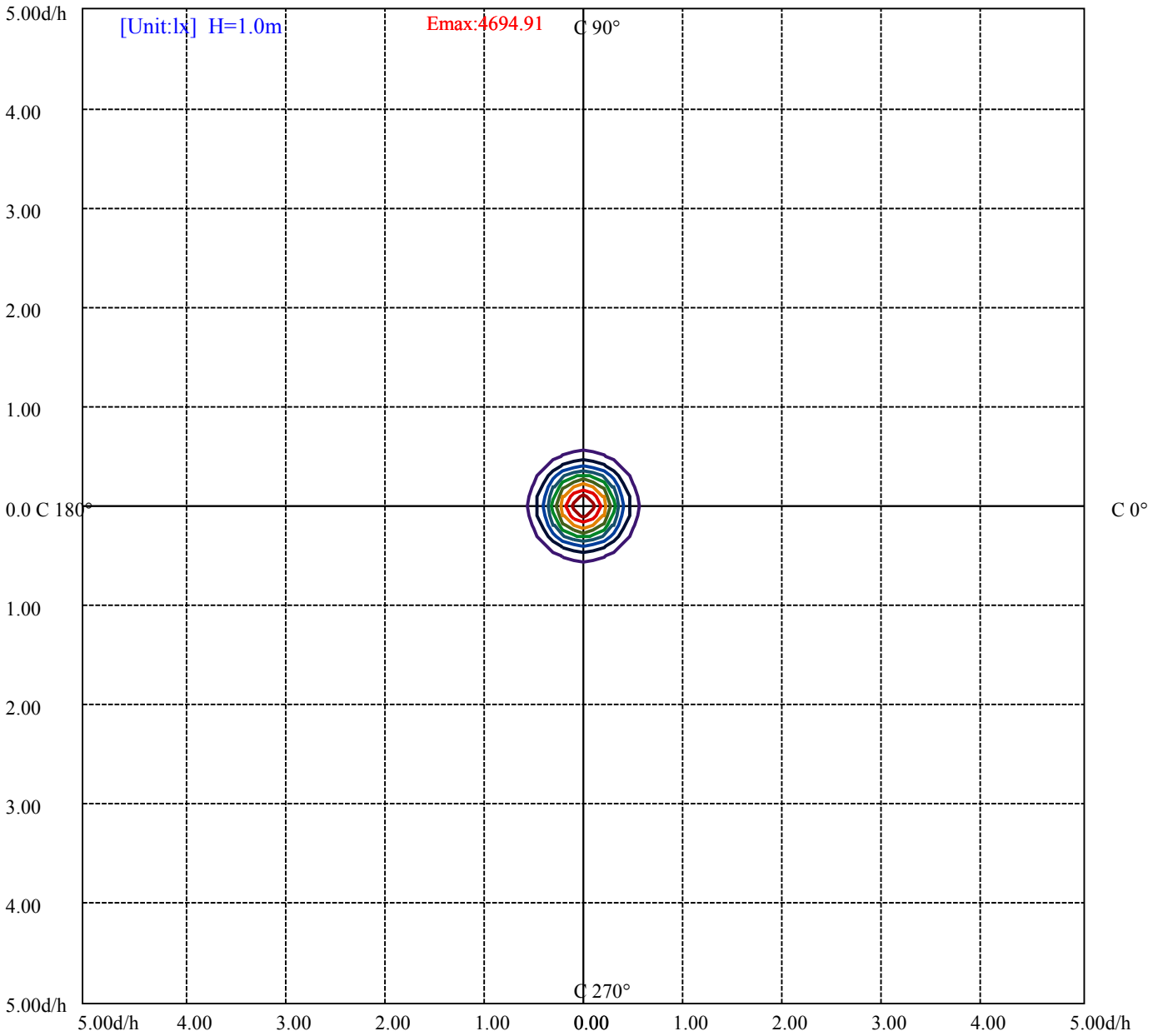
House

[Unit:cd]

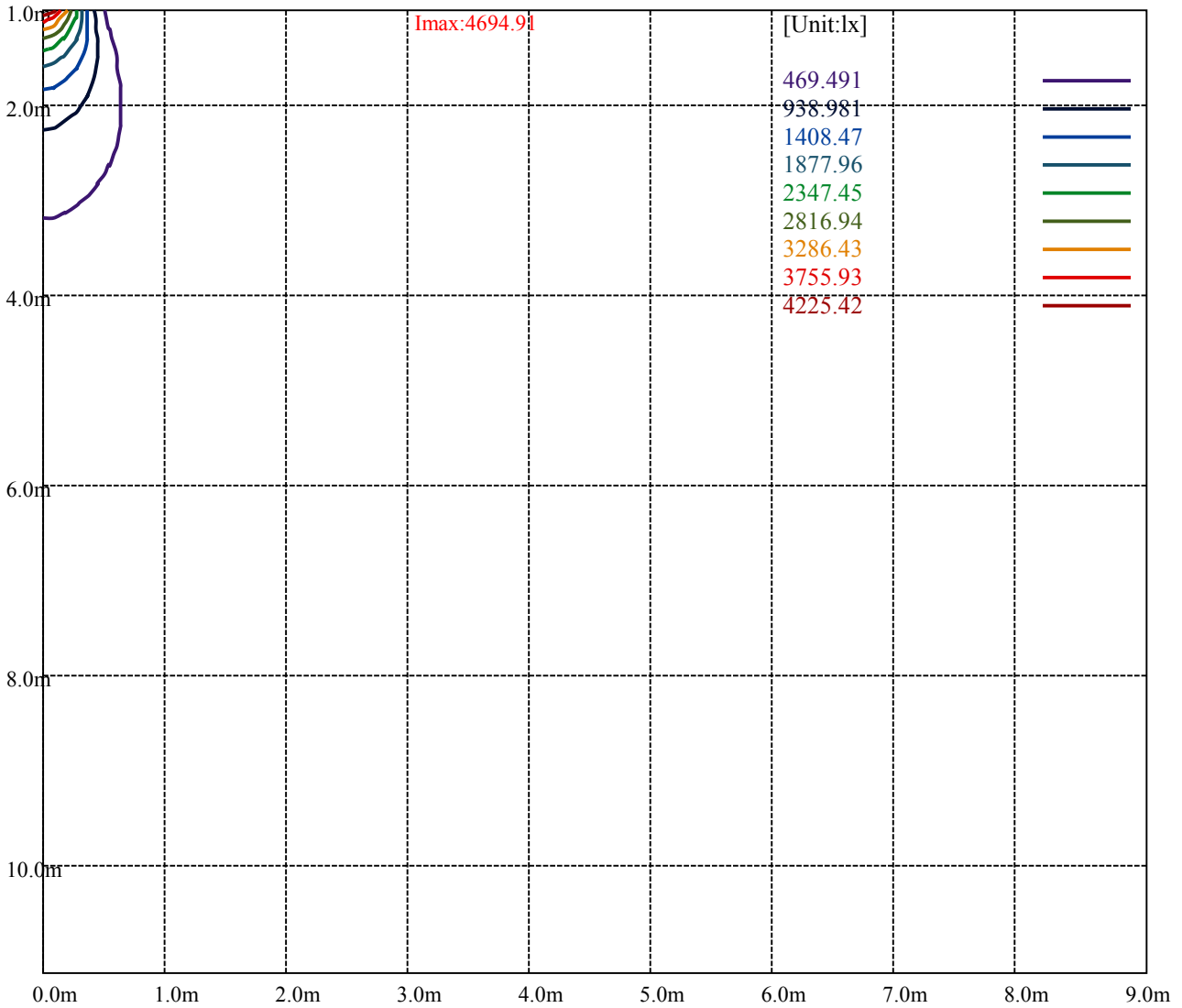
Road

Imax:4694.91

(10%Imax) 469.491	—
(20%Imax) 938.981	—
(30%Imax) 1408.47	—
(40%Imax) 1877.96	—
(50%Imax) 2347.45	—
(60%Imax) 2816.94	—
(70%Imax) 3286.43	—
(80%Imax) 3755.93	—
(90%Imax) 4225.42	—



(10%Emax) 469.49	—
(20%Emax) 938.981	—
(30%Emax) 1408.47	—
(40%Emax) 1877.96	—
(50%Emax) 2347.45	—
(60%Emax) 2816.94	—
(70%Emax) 3286.43	—
(80%Emax) 3755.92	—
(90%Emax) 4225.41	—



Luminance Table

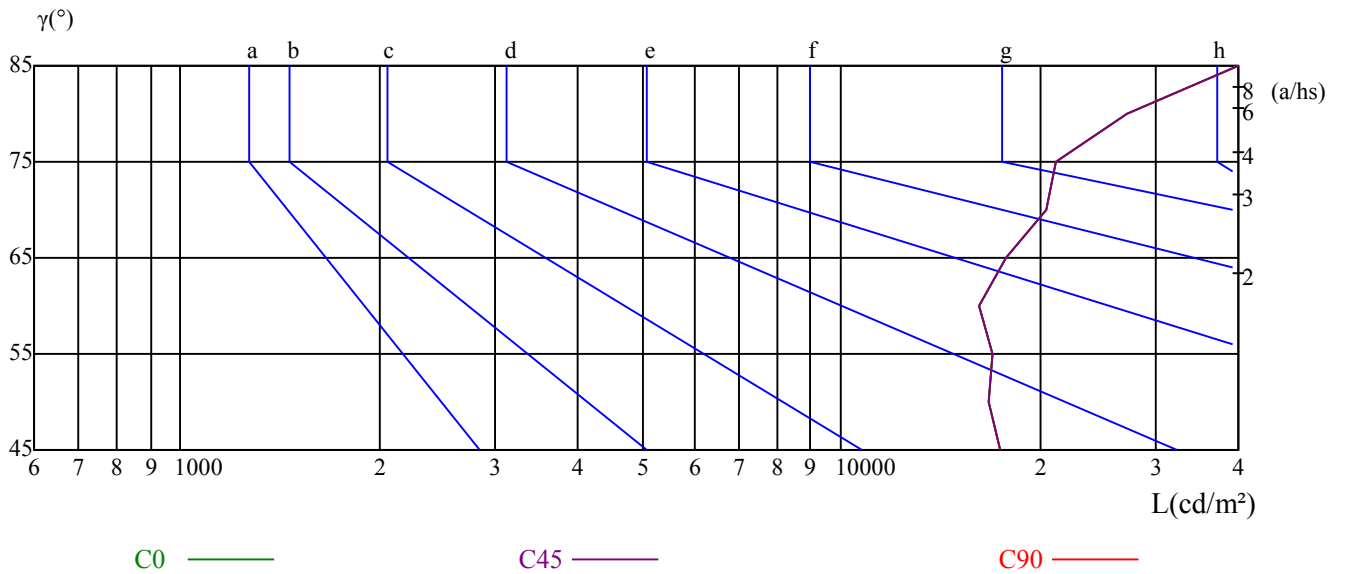
γ	45	50	55	60	65	70	75	80	85
C0	17395	16782	16944	16160	17815	20529	21115	27203	58014
C45	17395	16782	16944	16160	17815	20529	21115	27203	58014
C90	17395	16782	16944	16160	17815	20529	21115	27203	58014

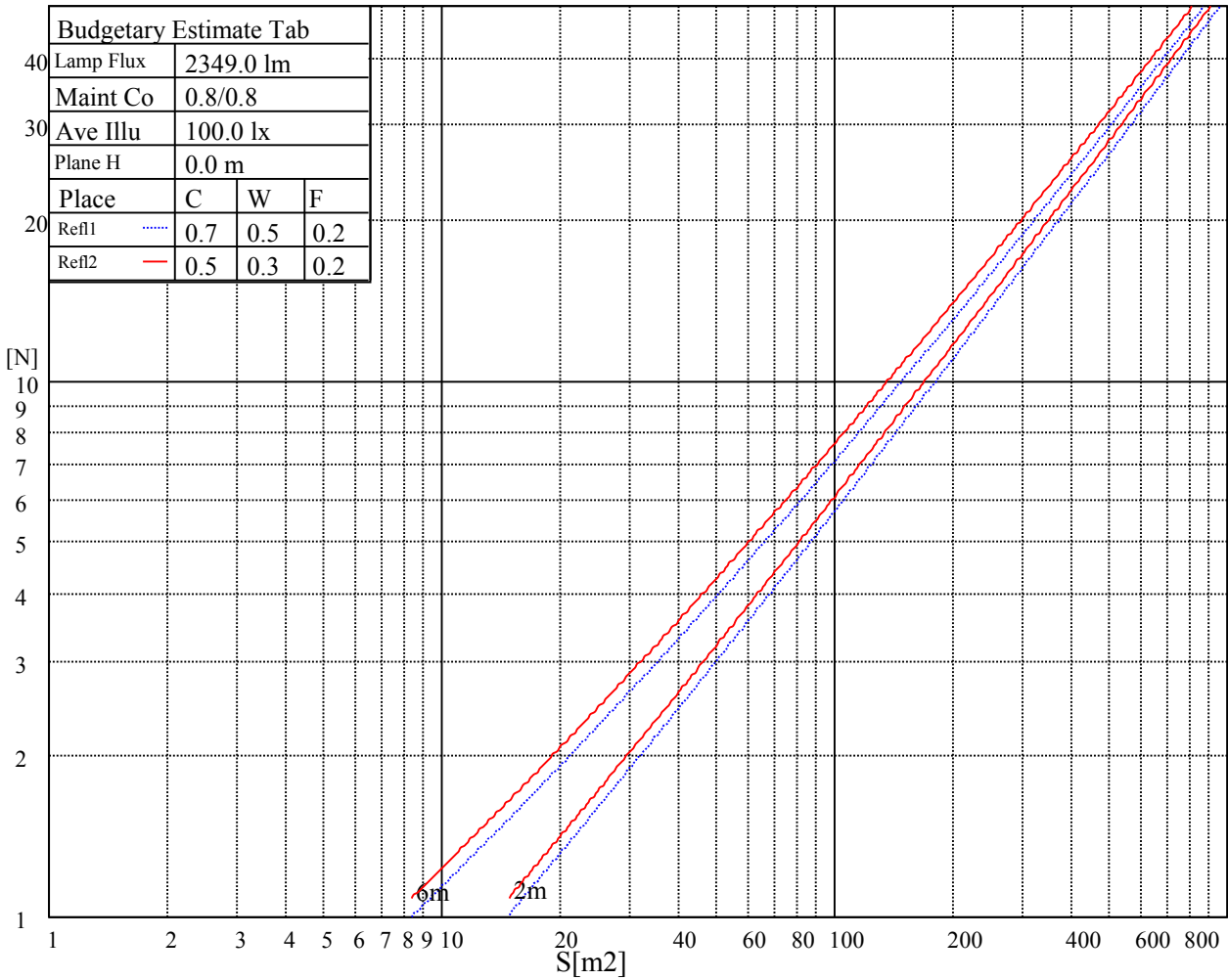
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
17815	17815	17815	21115	21115	21115	58014	58014	58014

Glare Table

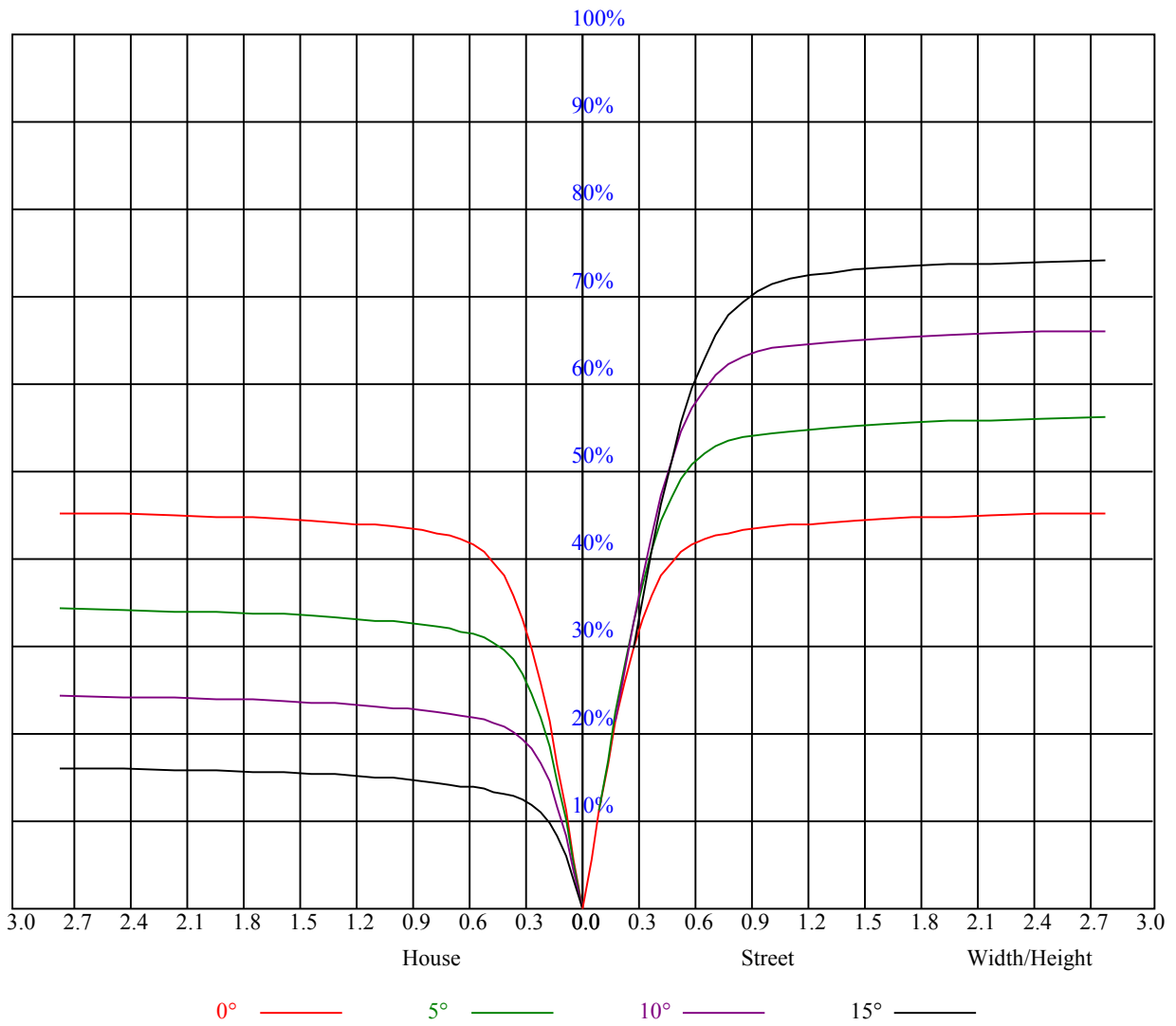
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

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	1.10	1.10	1.10	1.07	1.07	1.07	1.03	1.03	1.03	0.98	0.98	0.98	0.94	0.94	0.94	0.92
1	1.02	1.00	0.97	1.00	0.98	0.96	0.96	0.94	0.93	0.93	0.91	0.90	0.90	0.88	0.87	0.86
2	0.95	0.92	0.89	0.94	0.90	0.88	0.91	0.88	0.86	0.88	0.86	0.84	0.86	0.84	0.82	0.81
3	0.90	0.85	0.82	0.89	0.85	0.81	0.86	0.83	0.80	0.84	0.81	0.79	0.82	0.80	0.78	0.76
4	0.85	0.80	0.77	0.84	0.80	0.76	0.82	0.78	0.75	0.80	0.77	0.74	0.79	0.76	0.74	0.72
5	0.81	0.76	0.72	0.80	0.75	0.72	0.78	0.74	0.71	0.77	0.73	0.71	0.75	0.72	0.70	0.69
6	0.77	0.72	0.68	0.76	0.72	0.68	0.75	0.71	0.68	0.74	0.70	0.67	0.72	0.69	0.67	0.66
7	0.73	0.69	0.65	0.73	0.68	0.65	0.72	0.68	0.65	0.71	0.67	0.64	0.70	0.66	0.64	0.63
8	0.70	0.66	0.62	0.70	0.65	0.62	0.69	0.65	0.62	0.68	0.64	0.62	0.67	0.64	0.61	0.60
9	0.68	0.63	0.60	0.67	0.63	0.59	0.66	0.62	0.59	0.66	0.62	0.59	0.65	0.61	0.59	0.58
10	0.65	0.60	0.57	0.65	0.60	0.57	0.64	0.60	0.57	0.63	0.59	0.57	0.63	0.59	0.57	0.56



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	4685.06	4715.44	4722.19	4713.19	4686.19	4630.50	4568.06	4478.63	4394.25
45.0	4698.00	4697.44	4676.06	4632.19	4564.13	4465.13	4373.44	4273.31	4163.63
90.0	4694.63	4664.81	4614.19	4532.06	4450.50	4356.00	4226.63	4122.56	4011.75
135.0	4701.94	4665.94	4605.19	4541.06	4443.75	4354.31	4242.38	4125.94	4024.13
180.0	4685.06	4632.19	4568.63	4465.13	4368.38	4271.63	4149.56	4029.75	3915.00
225.0	4698.00	4684.50	4649.06	4575.38	4496.63	4404.94	4296.38	4177.13	4067.44
270.0	4694.63	4707.00	4691.81	4656.94	4590.00	4513.50	4410.56	4297.50	4196.25
315.0	4701.94	4711.50	4705.31	4670.44	4627.13	4564.13	4463.44	4372.31	4276.69
360.0	4685.06	4715.44	4722.19	4713.19	4686.19	4630.50	4568.06	4478.63	4394.25
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	4288.50	4176.00	4063.50	3945.94	3785.06	3645.00	3494.25	3298.50	3133.69
45.0	4042.69	3925.13	3781.13	3646.69	3489.19	3322.69	3170.81	3010.50	2797.31
90.0	3885.75	3746.81	3615.75	3456.56	3294.56	3138.19	2954.81	2784.38	2581.31
135.0	3902.06	3768.75	3636.00	3496.50	3333.94	3159.00	2997.00	2805.75	2588.06
180.0	3780.00	3633.19	3494.81	3336.75	3183.75	3000.38	2804.63	2621.25	2430.56
225.0	3939.75	3809.81	3684.38	3529.13	3386.81	3216.94	3041.44	2876.06	2702.25
270.0	4070.81	3942.56	3811.50	3675.38	3515.63	3348.00	3193.31	3011.06	2818.69
315.0	4165.31	4045.50	3920.06	3776.63	3622.50	3475.69	3305.25	3151.13	2984.94
360.0	4288.50	4176.00	4063.50	3945.94	3785.06	3645.00	3494.25	3298.50	3133.69
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	2970.00	2769.19	2565.00	2376.00	2156.06	1934.44	1740.38	1532.81	1355.63
45.0	2613.94	2442.38	2201.06	2010.94	1823.63	1594.69	1420.31	1253.81	1095.75
90.0	2369.25	2177.44	1984.50	1751.06	1572.75	1405.69	1122.19	1070.10	938.08
135.0	2382.75	2189.25	1942.88	1749.94	1572.75	1373.06	1195.88	1050.19	906.75
180.0	2180.81	1985.63	1792.69	1564.88	1392.19	1117.91	1064.03	910.69	787.61
225.0	2476.69	2289.38	2099.25	1865.81	1682.44	1505.81	1317.94	1120.39	996.36
270.0	2640.94	2459.81	2229.75	2043.00	1856.25	1655.44	1462.50	1300.50	1129.50
315.0	2774.81	2597.63	2412.00	2172.94	1976.63	1783.69	1551.94	1379.25	1119.32
360.0	2970.00	2769.19	2565.00	2376.00	2156.06	1934.44	1740.38	1532.81	1355.63
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	1166.63	996.19	860.06	738.56	603.00	508.50	426.94	338.63	284.63
45.0	939.94	816.19	690.19	586.69	482.06	395.44	333.56	286.31	214.65
90.0	790.65	684.17	585.28	476.49	410.34	334.46	266.06	226.13	182.87
135.0	792.56	673.31	559.13	478.13	399.38	326.25	290.25	214.88	173.36
180.0	663.69	561.54	461.76	375.98	311.23	251.78	207.34	168.02	141.86
225.0	848.93	729.39	609.86	505.63	424.52	343.58	274.67	223.76	181.69
270.0	985.50	838.69	710.44	608.06	505.13	414.00	343.13	291.94	218.93
315.0	1027.35	893.03	768.77	633.15	549.51	452.08	356.34	297.79	235.91
360.0	1166.63	996.19	860.06	738.56	603.00	508.50	426.94	338.63	284.63
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	221.96	180.73	141.86	118.63	102.99	90.68	82.24	76.84	72.23
45.0	178.31	150.13	124.59	109.18	98.04	88.14	81.17	76.39	72.17
90.0	147.26	129.43	113.74	98.55	91.18	84.83	79.14	74.59	71.44
135.0	147.66	127.80	111.21	100.35	92.25	85.44	80.33	76.73	73.29
180.0	119.25	106.65	97.03	89.94	83.64	80.27	77.23	74.48	72.68
225.0	142.31	119.64	103.84	91.24	82.91	78.02	73.80	70.59	68.29
270.0	178.48	146.59	120.66	102.88	91.35	82.46	76.61	72.56	69.13
315.0	182.98	154.63	129.54	107.21	98.04	90.11	83.53	78.69	75.21
360.0	221.96	180.73	141.86	118.63	102.99	90.68	82.24	76.84	72.23

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	69.19	66.94	65.08	63.79	62.55	61.37	60.36	59.46	58.28
45.0	68.91	66.71	64.74	63.28	61.93	60.53	59.51	58.67	57.60
90.0	68.57	66.43	64.58	63.00	61.65	60.13	58.73	57.66	56.53
135.0	70.88	68.68	66.88	65.64	64.58	63.68	62.78	61.76	59.96
180.0	71.16	69.19	67.22	65.70	64.24	62.94	61.59	60.30	58.61
225.0	66.26	64.69	63.00	61.65	60.58	59.57	58.78	58.05	57.21
270.0	66.77	64.24	62.10	60.53	59.23	57.54	56.53	55.63	54.56
315.0	71.78	68.68	66.21	63.62	61.59	59.68	58.11	57.15	56.48
360.0	69.19	66.94	65.08	63.79	62.55	61.37	60.36	59.46	58.28
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	57.54	56.87	55.91	54.62	53.10	51.19	49.61	47.53	45.23
45.0	56.76	55.52	53.55	51.92	50.12	48.04	46.18	44.38	43.03
90.0	54.90	53.16	51.19	48.88	46.91	45.11	43.43	41.91	41.18
135.0	58.28	55.97	53.33	50.79	48.60	46.35	44.66	43.37	42.75
180.0	56.42	54.23	52.59	50.51	47.64	45.96	44.66	43.76	43.54
225.0	55.97	54.45	52.76	50.85	49.05	46.80	44.49	42.98	41.96
270.0	53.55	52.43	50.85	49.16	47.53	45.68	43.76	42.24	40.73
315.0	55.69	54.73	53.49	51.58	49.95	48.49	46.80	44.61	42.86
360.0	57.54	56.87	55.91	54.62	53.10	51.19	49.61	47.53	45.23
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	43.59	42.41	41.85	41.96	42.75	46.24	47.03	44.83	43.37
45.0	41.85	41.06	40.61	40.33	39.88	39.38	38.87	38.14	37.01
90.0	40.84	40.84	42.36	41.23	40.22	39.54	38.70	37.01	35.10
135.0	42.53	43.31	45.11	43.31	42.24	41.40	40.39	38.64	36.23
180.0	44.21	47.59	46.91	45.96	43.82	42.64	40.95	38.70	36.51
225.0	41.23	41.18	43.14	45.56	44.16	43.14	40.28	39.21	37.41
270.0	39.77	39.15	38.98	40.11	42.47	41.51	40.73	39.77	38.25
315.0	41.57	40.33	39.83	40.39	43.82	45.62	42.47	39.66	38.03
360.0	43.59	42.41	41.85	41.96	42.75	46.24	47.03	44.83	43.37
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	41.96	39.43	36.11	33.64	31.73	29.87	28.18	26.94	25.88
45.0	36.06	35.16	34.54	33.86	33.13	31.95	30.26	28.80	27.73
90.0	33.08	31.33	30.09	28.91	28.07	27.34	27.00	27.23	27.28
135.0	34.09	32.40	30.83	29.19	28.01	27.17	26.72	26.89	27.34
180.0	34.48	32.79	31.22	29.70	28.07	27.39	27.34	27.39	27.73
225.0	34.54	32.79	31.11	29.53	28.07	26.83	25.76	25.37	25.43
270.0	36.73	34.82	32.63	30.83	29.48	28.18	27.28	26.49	26.10
315.0	36.28	34.03	32.06	30.26	28.80	27.73	26.61	25.59	25.09
360.0	41.96	39.43	36.11	33.64	31.73	29.87	28.18	26.94	25.88
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	25.82	25.20	25.20	25.03	25.65	27.68	25.65	25.82	25.76
45.0	26.83	26.38	26.49	26.94	26.72	26.55	26.89	27.00	29.08
90.0	28.29	28.63	30.21	30.94	29.19	28.91	29.98	32.91	35.66
135.0	28.24	29.70	33.30	32.29	31.50	31.61	33.69	38.19	43.26
180.0	28.18	29.14	30.38	28.29	29.08	31.73	35.21	37.29	41.06
225.0	25.65	26.27	27.06	28.91	27.68	27.45	28.01	29.08	34.59
270.0	26.16	26.49	27.39	27.73	28.63	27.62	27.56	27.17	28.01
315.0	25.03	25.31	25.93	26.66	29.08	27.06	26.89	26.49	26.94
360.0	25.82	25.20	25.20	25.03	25.65	27.68	25.65	25.82	25.76

Intensity data(cd)

C/ γ (°)	90.0
0.0	25.99
45.0	29.98
90.0	34.31
135.0	39.15
180.0	33.24
225.0	36.79
270.0	29.87
315.0	28.29
360.0	25.99