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NATA

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Client:

LumCAT: 3-2115-N

Luminaire: 92.70.131.00

Report No: nata-0100

Test No: GC2018111307

LampCAT: OSRAM S15

Lamp flux(lm): 2619.0

Number of Lamps: 1

Length(mm): 81

Phm Type: C

Voltage(V): 36.2000

Current(A): 0.5500

Power (W): 19.9100

PF: 0.0000

Ballast type: DC

Width(mm): 81

Height(mm): 0

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Photometric Results

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Lumens(lm): 2208.45, Efficiency(%): 84.32% , Luminous Efficacy(lm/W): 110.92

Central intensity(cd): 13965.470, Maximum intensity(cd): 13965.470

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

Beam Angle(50%Imax): [C0/180]Total=15.4

[C90/270]Total=15.4

Field angle(10%Imax): [C0/180]Total=42.2

[C90/270]Total=42.2

Maximum s/h(1/2): C0\_180=0.26 C90\_270=0.26

Maximum s/h(1/4): C0\_180=0.31 C90\_270=0.31

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 84.45%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in  $\pi$  solid angle : 97.836%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	13965.469	3.341	3.341	.128%	.151%
1.0	13847.344	26.502	29.843	1.012%	1.351%
2.0	13406.484	51.308	81.151	1.959%	3.675%
3.0	12501.633	71.749	152.9	2.740%	6.923%
4.0	11361.234	86.908	239.809	3.318%	10.859%
5.0	10353.445	98.954	338.763	3.778%	15.339%
6.0	8877.094	101.755	440.518	3.885%	19.947%
7.0	7669.195	102.493	543.011	3.913%	24.588%
8.0	6684.188	102.013	645.024	3.895%	29.207%
9.0	5774.063	99.053	744.077	3.782%	33.692%
10.0	4971.656	94.672	838.749	3.615%	37.979%
11.0	4380.188	91.652	930.402	3.500%	42.129%
12.0	3854.320	87.878	1018.279	3.355%	46.108%
13.0	3332.039	82.196	1100.475	3.138%	49.830%
14.0	2961.211	78.559	1179.034	3.000%	53.387%
15.0	2697.680	76.566	1255.601	2.923%	56.854%
16.0	2361.867	71.391	1326.992	2.726%	60.087%
17.0	2087.016	66.913	1393.905	2.555%	63.117%
18.0	1879.242	63.682	1457.587	2.432%	66.000%
19.0	1698.961	60.656	1518.244	2.316%	68.747%
20.0	1541.250	57.806	1576.05	2.207%	71.365%
21.0	1404.984	55.214	1631.265	2.108%	73.865%
22.0	1273.247	52.305	1683.569	1.997%	76.233%
23.0	1162.842	49.825	1733.394	1.902%	78.489%
24.0	1080.991	48.216	1781.61	1.841%	80.672%
25.0	992.531	45.999	1827.609	1.756%	82.755%
26.0	924.588	44.447	1872.056	1.697%	84.768%
27.0	855.949	42.613	1914.669	1.627%	86.697%
28.0	755.086	38.874	1953.543	1.484%	88.458%
29.0	653.773	34.758	1988.3	1.327%	90.031%
30.0	552.326	30.284	2018.585	1.156%	91.403%
31.0	435.220	24.581	2043.166	.939%	92.516%
32.0	331.720	19.277	2062.442	.736%	93.389%
33.0	256.823	15.339	2077.781	.586%	94.083%
34.0	181.005	11.100	2088.881	.424%	94.586%
35.0	112.479	7.075	2095.956	.270%	94.906%
36.0	88.938	5.733	2101.688	.219%	95.166%
37.0	74.461	4.914	2106.603	.188%	95.388%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	64.554	4.358	2110.961	.166%	95.586%
39.0	56.201	3.879	2114.839	.148%	95.761%
40.0	49.880	3.516	2118.355	.134%	95.920%
41.0	44.761	3.220	2121.576	.123%	96.066%
42.0	40.542	2.975	2124.55	.114%	96.201%
43.0	37.027	2.769	2127.32	.106%	96.326%
44.0	34.327	2.615	2129.934	.100%	96.445%
45.0	32.217	2.498	2132.433	.095%	96.558%
46.0	30.101	2.374	2134.807	.091%	96.665%
47.0	28.596	2.293	2137.101	.088%	96.769%
48.0	27.373	2.231	2139.331	.085%	96.870%
49.0	26.255	2.173	2141.504	.083%	96.969%
50.0	25.270	2.123	2143.627	.081%	97.065%
51.0	24.553	2.092	2145.719	.080%	97.159%
52.0	23.892	2.065	2147.784	.079%	97.253%
53.0	23.309	2.041	2149.825	.078%	97.345%
54.0	22.852	2.027	2151.853	.077%	97.437%
55.0	22.451	2.017	2153.869	.077%	97.529%
56.0	22.106	2.010	2155.879	.077%	97.620%
57.0	21.755	2.001	2157.88	.076%	97.710%
58.0	21.452	1.995	2159.875	.076%	97.800%
59.0	21.164	1.989	2161.864	.076%	97.891%
60.0	20.904	1.985	2163.85	.076%	97.980%
61.0	20.630	1.979	2165.828	.076%	98.070%
62.0	20.370	1.972	2167.801	.075%	98.159%
63.0	20.109	1.965	2169.765	.075%	98.248%
64.0	19.758	1.947	2171.713	.074%	98.336%
65.0	19.223	1.911	2173.623	.073%	98.423%
66.0	18.647	1.868	2175.491	.071%	98.508%
67.0	18.042	1.821	2177.313	.070%	98.590%
68.0	17.332	1.762	2179.075	.067%	98.670%
69.0	16.826	1.723	2180.797	.066%	98.748%
70.0	16.320	1.682	2182.479	.064%	98.824%
71.0	15.806	1.639	2184.118	.063%	98.898%
72.0	15.398	1.606	2185.724	.061%	98.971%
73.0	15.012	1.574	2187.298	.060%	99.042%
74.0	14.618	1.541	2188.839	.059%	99.112%
75.0	14.259	1.510	2190.35	.058%	99.180%

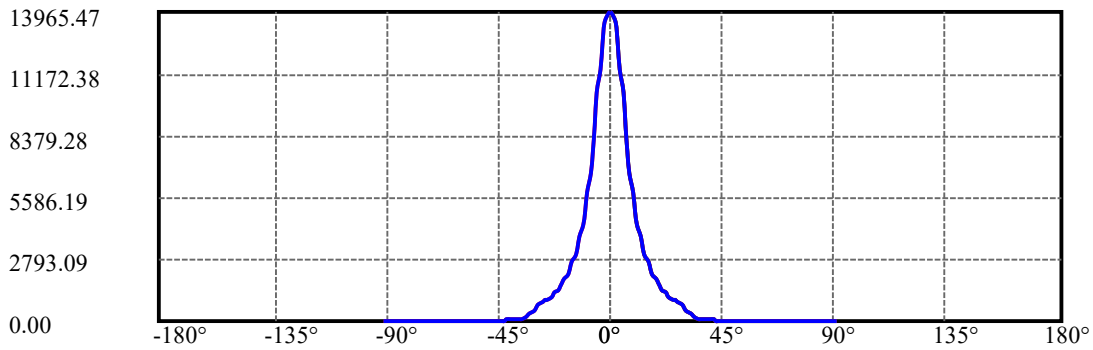
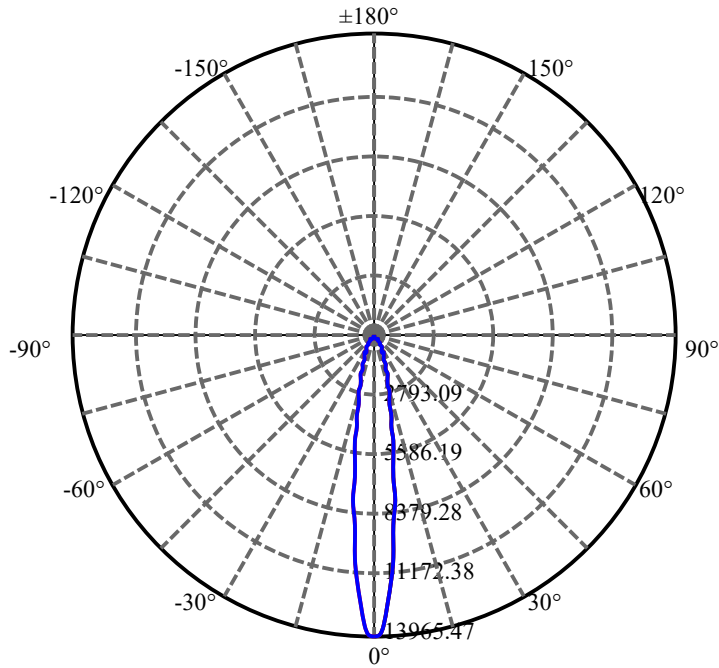
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	13.880	1.477	2191.826	.056%	99.247%
77.0	13.493	1.442	2193.268	.055%	99.313%
78.0	13.141	1.410	2194.678	.054%	99.376%
79.0	12.741	1.371	2196.049	.052%	99.438%
80.0	12.382	1.337	2197.386	.051%	99.499%
81.0	12.052	1.305	2198.692	.050%	99.558%
82.0	11.686	1.269	2199.961	.048%	99.616%
83.0	11.363	1.237	2201.197	.047%	99.672%
84.0	11.011	1.201	2202.398	.046%	99.726%
85.0	10.680	1.167	2203.565	.045%	99.779%
86.0	10.392	1.137	2204.702	.043%	99.830%
87.0	10.090	1.105	2205.807	.042%	99.880%
88.0	9.809	1.075	2206.882	.041%	99.929%
89.0	9.577	1.050	2207.932	.040%	99.977%
90.0	9.464	0.519	2208.451	.020%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	2018.58	77.07%	91.40%
0-40	2118.36	80.88%	95.92%
0-60	2163.85	82.62%	97.98%
0-90	2207.93	84.30%	99.98%
0-120	2207.93	84.30%	99.98%
0-180	2208.45	84.32%	100.00%
60-90	46.07	1.76%	2.09%
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%
0-23.69	1766.76	67.46%	80.00%

ZONAL LUMEN SUMMARY

0-10	838.75
10-20	737.30
20-30	442.53
30-40	99.77
40-50	25.27
50-60	20.22
60-70	18.63
70-80	14.91
80-90	10.55
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

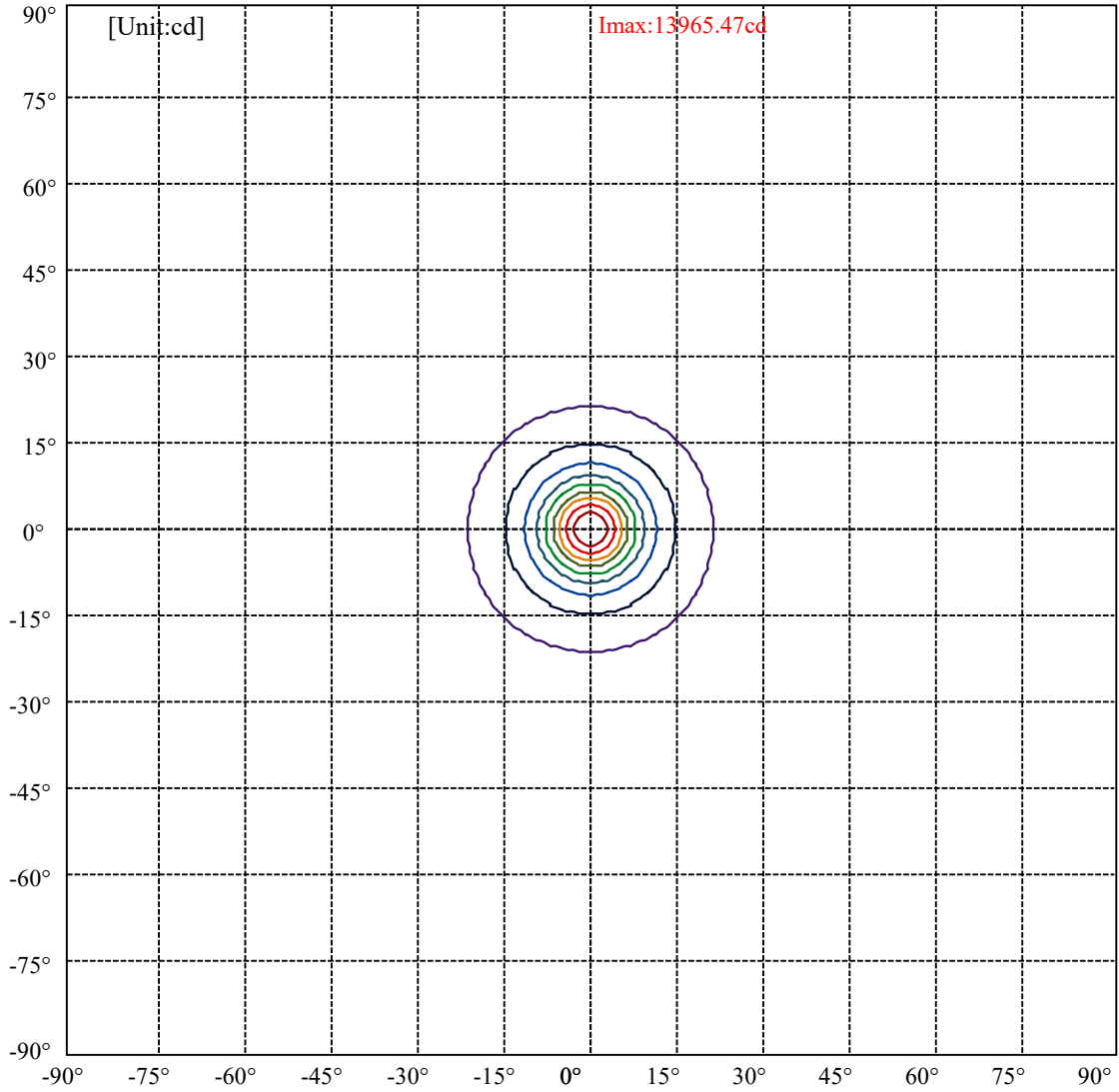


C0(Max): —————  
C0/C180: —————  
C90/C270: —————

Field angle(10%Imax):C0/180Left:21.1 Right:21.1  
:C90/270Left:21.1 Right:21.1

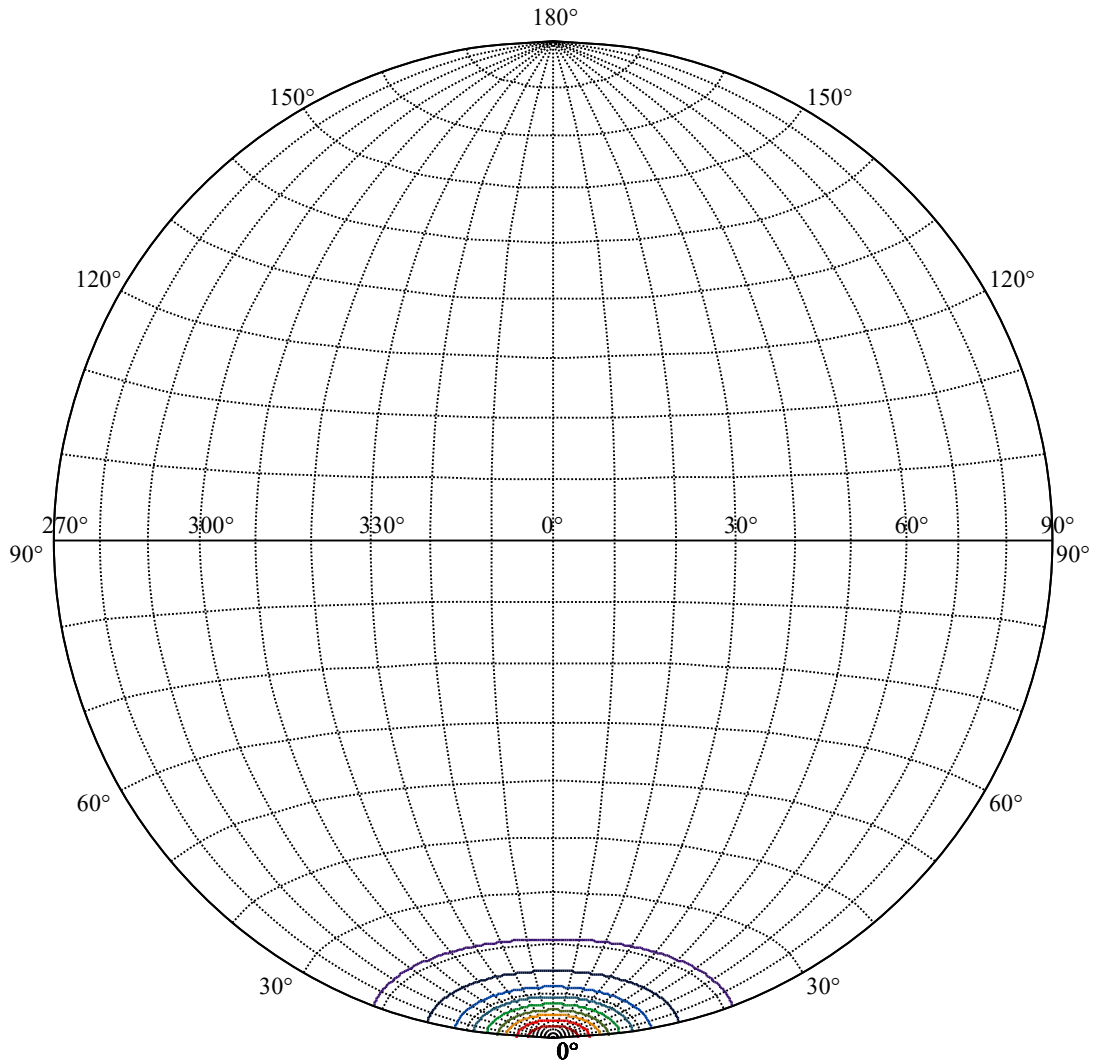
Beam Angle(50%Imax):C0/180Left:7.7 Right:7.7  
:C90/270Left:7.7 Right:7.7





(10%Imax) 1396.55	—
(20%Imax) 2793.09	—
(30%Imax) 4189.64	—
(40%Imax) 5586.19	—
(50%Imax) 6982.73	—
(60%Imax) 8379.28	—
(70%Imax) 9775.83	—
(80%Imax) 11172.4	—
(90%Imax) 12568.9	—





House

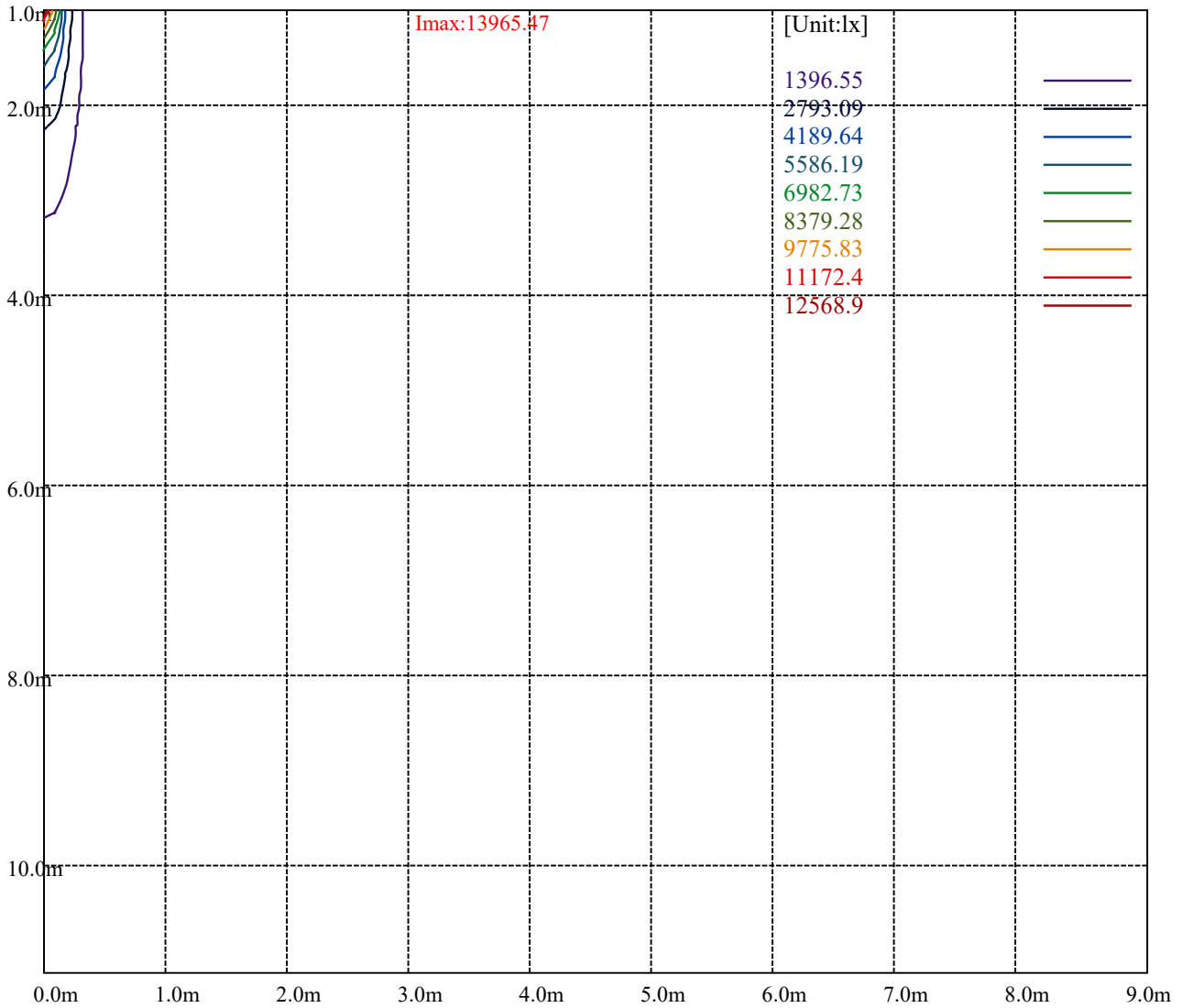
[Unit:cd]

Road

Imax:13965.47

(10%Imax) 1396.55	—
(20%Imax) 2793.09	—
(30%Imax) 4189.64	—
(40%Imax) 5586.19	—
(50%Imax) 6982.73	—
(60%Imax) 8379.28	—
(70%Imax) 9775.83	—
(80%Imax) 11172.4	—
(90%Imax) 12568.9	—





Luminance Table

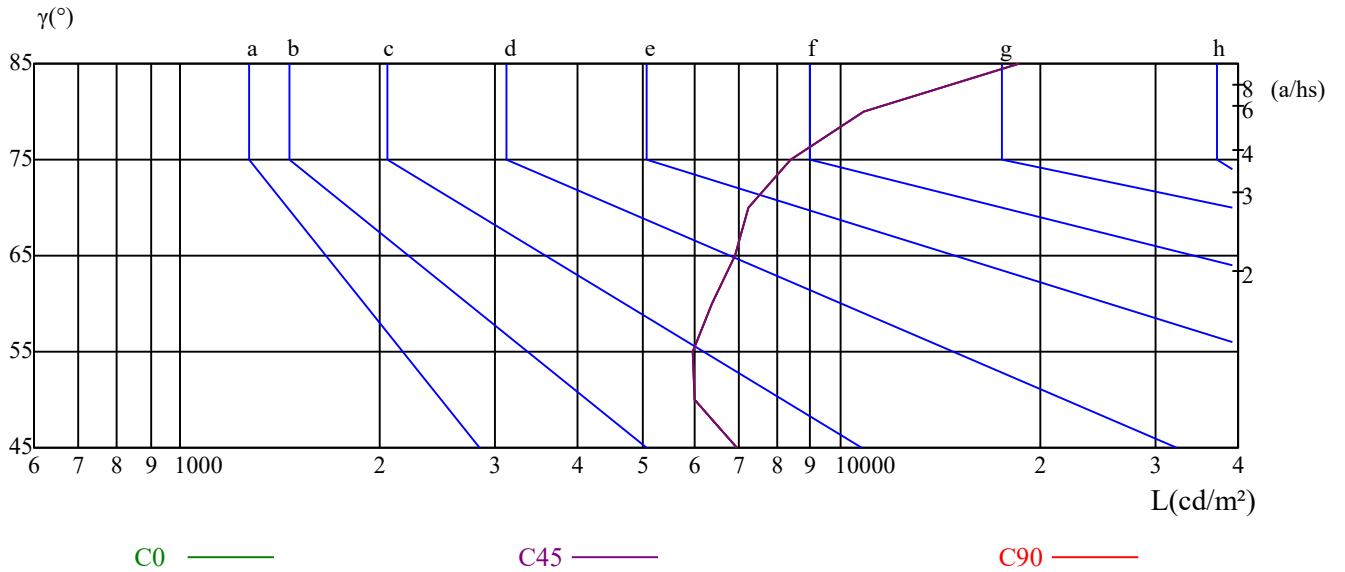
$\gamma$	45	50	55	60	65	70	75	80	85
C0	6944	5992	5966	6372	6933	7273	8397	10868	18678
C45	6944	5992	5966	6372	6933	7273	8397	10868	18678
C90	6944	5992	5966	6372	6933	7273	8397	10868	18678

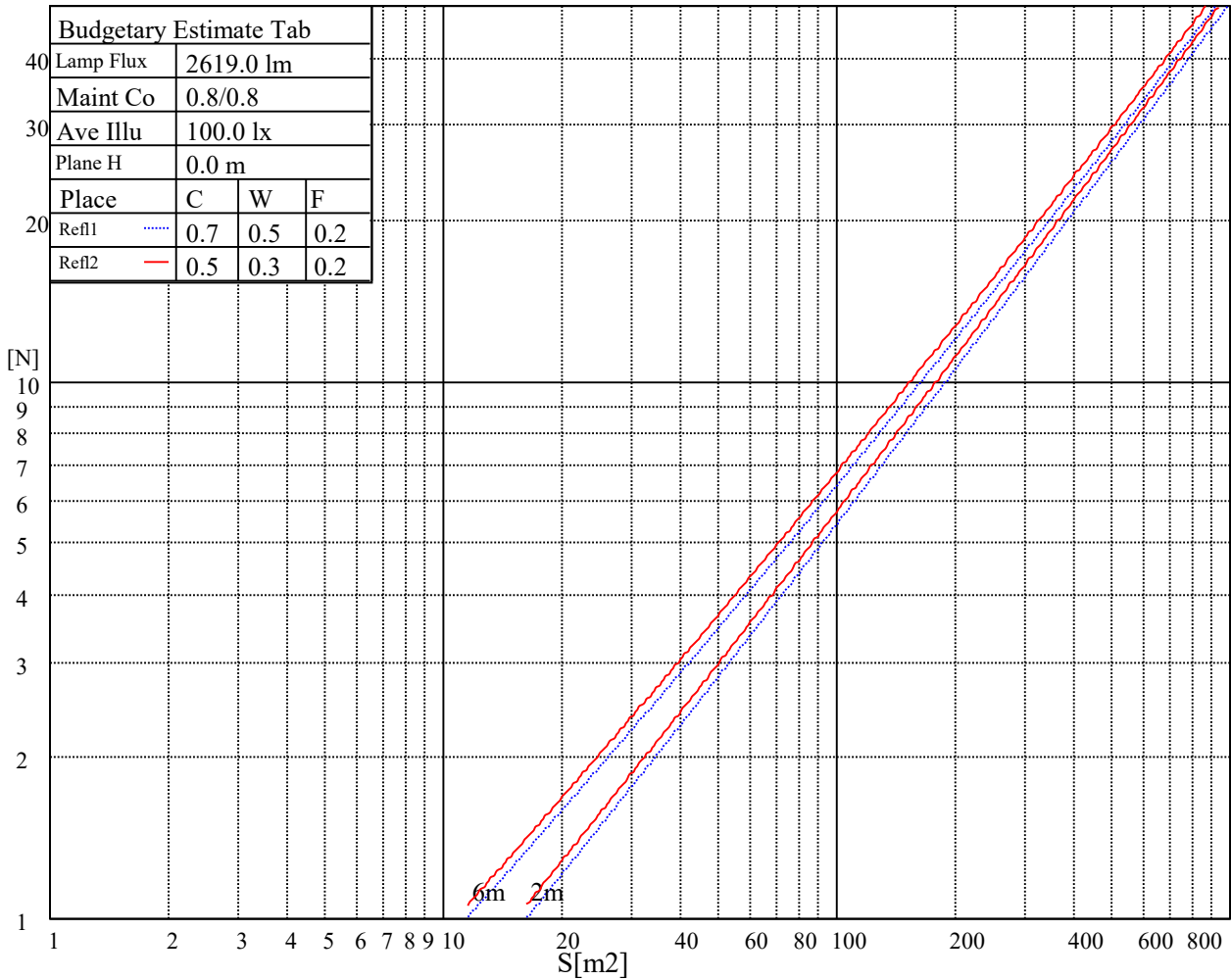
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
6933	6933	6933	8397	8397	8397	18678	18678	18678

Glare Table

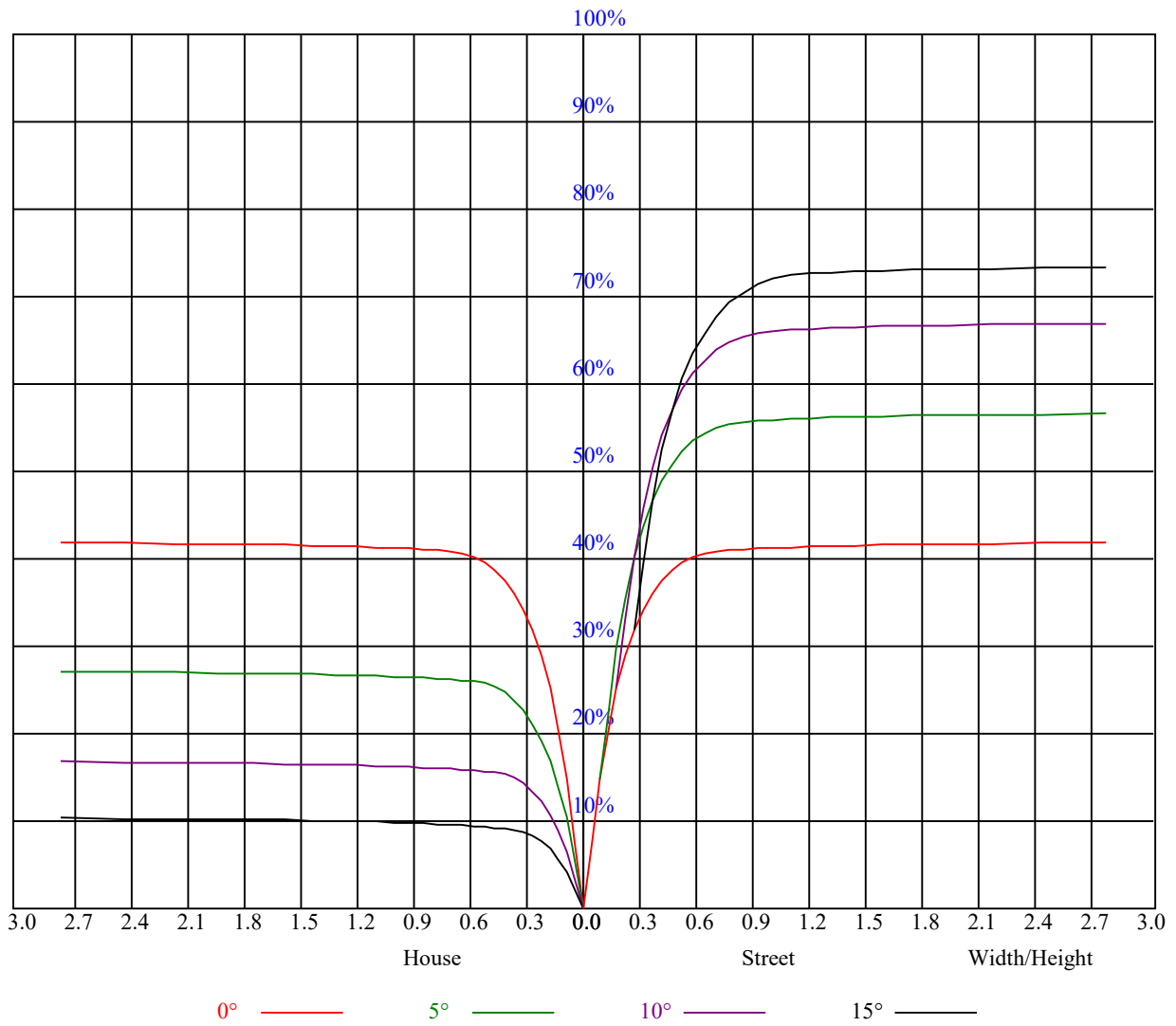
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

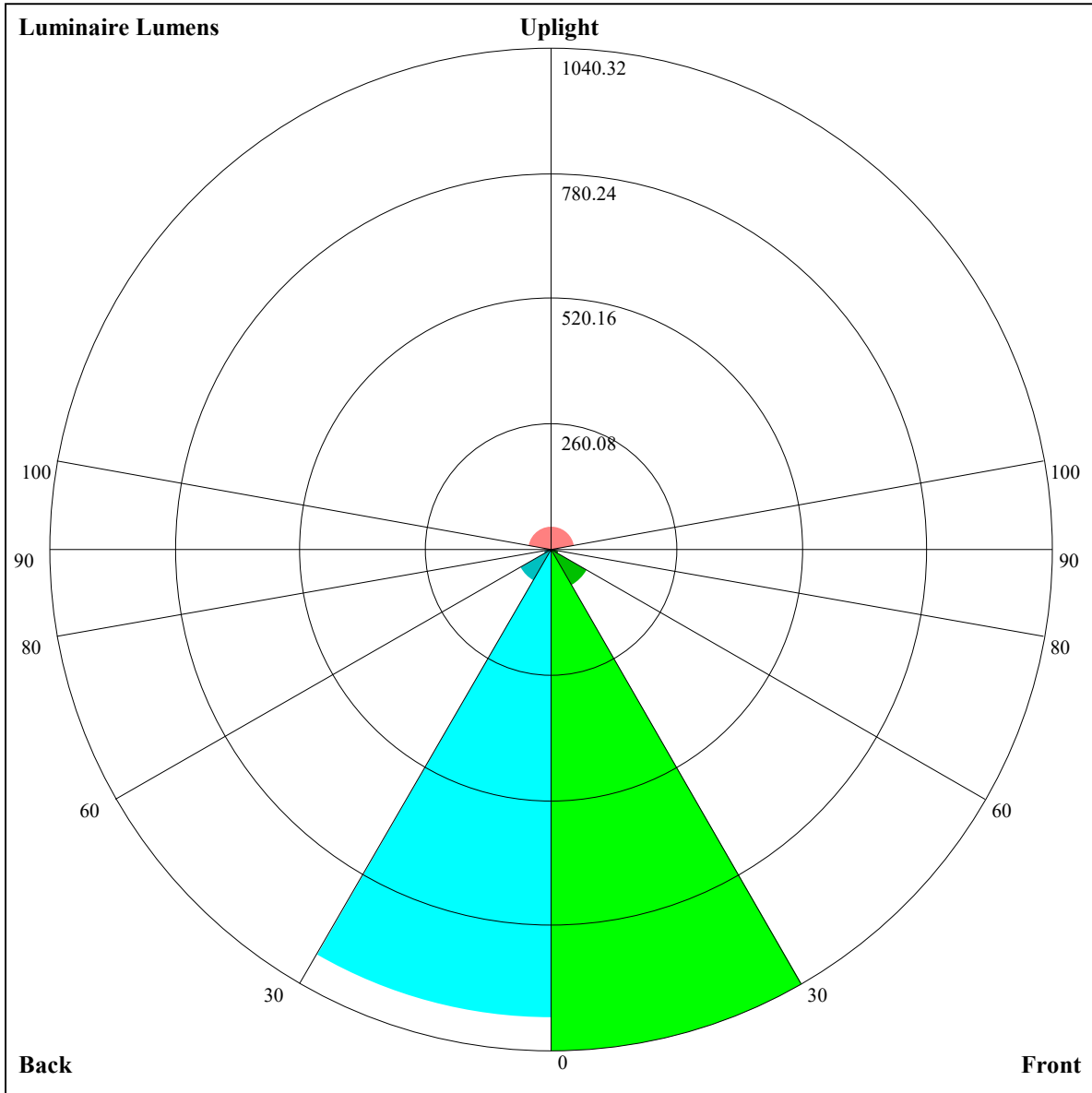
Luminance Limiting Curve





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	1.01	1.01	1.01	0.98	0.98	0.98	0.94	0.94	0.94	0.90	0.90	0.90	0.86	0.86	0.86	0.84
1	0.95	0.93	0.91	0.93	0.91	0.90	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.83	0.82	0.80
2	0.90	0.87	0.85	0.88	0.86	0.84	0.86	0.84	0.82	0.83	0.82	0.80	0.81	0.80	0.78	0.77
3	0.86	0.82	0.80	0.84	0.81	0.79	0.82	0.80	0.78	0.80	0.78	0.77	0.79	0.77	0.75	0.74
4	0.82	0.78	0.76	0.81	0.78	0.75	0.79	0.77	0.74	0.78	0.75	0.74	0.76	0.74	0.73	0.72
5	0.79	0.75	0.72	0.78	0.75	0.72	0.77	0.74	0.71	0.75	0.73	0.71	0.74	0.72	0.70	0.69
6	0.76	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.73	0.71	0.68	0.72	0.70	0.68	0.67
7	0.73	0.70	0.67	0.73	0.69	0.67	0.72	0.69	0.67	0.71	0.68	0.66	0.70	0.68	0.66	0.65
8	0.71	0.67	0.65	0.71	0.67	0.65	0.70	0.67	0.65	0.69	0.66	0.64	0.68	0.66	0.64	0.63
9	0.69	0.65	0.63	0.69	0.65	0.63	0.68	0.65	0.63	0.67	0.64	0.62	0.67	0.64	0.62	0.61
10	0.67	0.63	0.61	0.67	0.63	0.61	0.66	0.63	0.61	0.66	0.63	0.61	0.65	0.62	0.61	0.60





Luminaire Lumens:  
FL=1040.32,FM=85.99,FH=17.14,FVH=5.94  
BL=971.47,BM=76.09,BH=16.89,BVH=5.83  
UL=10.33,UH=49.14

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	13798.13	14011.88	13927.50	13601.25	12841.88	11790.00	10378.13	8949.38	7807.50
45.0	14028.75	13860.00	13348.13	12532.50	11283.75	10023.75	8617.50	7408.13	6485.63
90.0	14011.88	13798.13	13173.75	11130.75	10974.94	9718.31	8242.31	7198.31	6292.69
135.0	14023.13	13809.38	13342.50	12436.88	11221.88	9961.88	8578.13	7363.13	6429.38
180.0	13798.13	13331.25	12431.25	11167.31	9885.38	8589.94	7186.50	6261.75	5483.25
225.0	14028.75	13950.00	13595.63	12870.00	11156.06	10676.25	8845.31	7782.19	6715.13
270.0	14011.88	14040.00	13786.88	13308.75	12352.50	11205.00	9742.50	8313.75	7205.63
315.0	14023.13	13978.13	13646.25	12965.63	11173.50	10862.44	9426.38	8076.94	7054.31
360.0	13798.13	14011.88	13927.50	13601.25	12841.88	11790.00	10378.13	8949.38	7807.50
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	6710.63	5793.75	5096.25	4505.63	3875.63	3459.38	3093.75	2846.25	2435.63
45.0	5591.25	4826.25	4252.50	3757.50	3234.38	2880.00	2840.63	2298.38	2039.63
90.0	5416.88	4677.75	4124.25	3585.94	3134.25	2792.25	2468.81	2216.81	1964.25
135.0	5715.00	4792.50	4224.38	3785.63	3251.25	2851.88	2689.31	2286.00	2032.88
180.0	4766.06	4154.06	3706.88	3264.19	2890.69	2602.69	2348.44	2088.56	1854.00
225.0	5733.00	4933.13	4321.13	3727.69	3237.75	2869.31	2517.19	2257.88	2010.94
270.0	6165.00	5304.38	4646.25	4083.75	3493.13	3105.00	2846.25	2493.00	2202.19
315.0	6094.69	5291.44	4669.88	4124.25	3539.25	3129.19	2777.06	2408.06	2156.63
360.0	6710.63	5793.75	5096.25	4505.63	3875.63	3459.38	3093.75	2846.25	2435.63
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	2199.94	1971.00	1775.81	1627.88	1475.44	1361.25	1236.94	1118.81	1031.06
45.0	1842.19	1654.88	1494.56	1369.13	1247.06	1150.31	1053.56	973.13	913.50
90.0	1750.50	1587.38	1445.63	1298.25	1111.11	1101.32	1008.34	945.23	884.59
135.0	1841.06	1654.88	1509.75	1369.13	1245.38	1139.06	1053.00	965.25	909.56
180.0	1653.19	1499.06	1366.88	1238.63	1112.68	1034.78	947.42	874.63	812.14
225.0	1806.19	1663.31	1537.88	1396.69	1293.75	1122.41	1088.72	1001.87	936.00
270.0	2002.50	1830.38	1644.75	1516.50	1402.31	1279.13	1166.63	1067.63	979.31
315.0	1938.38	1730.81	1554.75	1423.69	1298.25	1114.48	1093.33	993.71	930.54
360.0	2199.94	1971.00	1775.81	1627.88	1475.44	1361.25	1236.94	1118.81	1031.06
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	951.75	860.63	774.56	677.81	550.13	447.75	350.44	303.75	168.13
45.0	842.06	734.63	629.44	529.31	403.88	307.69	284.06	153.96	100.46
90.0	812.87	697.16	590.96	482.96	367.09	263.25	184.73	119.93	88.37
135.0	844.31	725.06	615.38	511.88	397.69	286.88	231.24	120.43	87.92
180.0	731.70	617.23	516.43	411.30	298.52	201.66	137.87	96.08	78.75
225.0	879.75	780.86	677.76	579.09	474.13	367.31	272.14	177.13	113.96
270.0	910.13	819.56	712.13	613.13	501.75	389.81	298.69	288.00	136.35
315.0	875.03	805.56	713.53	613.13	488.59	389.42	295.43	188.78	125.89
360.0	951.75	860.63	774.56	677.81	550.13	447.75	350.44	303.75	168.13
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	117.00	92.42	77.74	65.98	58.39	51.02	45.28	41.12	37.35
45.0	85.05	72.28	61.71	53.38	47.19	41.79	37.63	34.54	31.95
90.0	76.78	65.76	58.39	51.47	45.79	41.57	37.91	34.82	32.57
135.0	75.15	64.01	56.53	49.67	44.55	40.05	36.90	33.86	31.50
180.0	67.61	57.94	51.86	45.68	40.95	37.46	34.65	32.01	30.04
225.0	90.90	77.40	67.22	57.99	51.86	46.80	42.64	38.48	35.72
270.0	102.09	86.06	73.24	63.39	56.53	50.23	45.17	41.63	38.25
315.0	96.92	79.82	69.75	62.04	53.78	49.16	44.16	39.77	37.24
360.0	117.00	92.42	77.74	65.98	58.39	51.02	45.28	41.12	37.35

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	34.65	32.06	29.93	28.29	26.94	25.48	24.58	23.79	23.01
45.0	29.87	28.18	26.49	25.37	24.41	23.46	22.84	22.28	21.71
90.0	30.66	28.69	27.51	26.33	25.26	24.36	23.68	23.06	22.67
135.0	29.64	28.01	26.66	25.65	24.69	23.74	23.12	22.56	21.99
180.0	28.46	26.78	25.71	24.69	23.85	23.06	22.50	21.94	21.54
225.0	33.64	31.39	29.93	28.74	27.56	26.66	25.93	25.26	24.64
270.0	35.94	33.75	32.01	30.77	29.76	28.63	27.84	27.11	26.38
315.0	34.88	31.95	30.54	29.14	27.56	26.78	25.93	25.14	24.53
360.0	34.65	32.06	29.93	28.29	26.94	25.48	24.58	23.79	23.01
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	22.56	22.16	21.77	21.49	21.26	21.04	20.81	20.64	20.36
45.0	21.43	21.15	20.93	20.70	20.59	20.36	20.25	20.14	19.86
90.0	22.22	21.83	21.60	21.32	21.15	20.93	20.87	20.59	20.48
135.0	21.54	21.21	20.98	20.76	20.59	20.31	20.19	20.03	19.91
180.0	21.26	20.98	20.81	20.59	20.36	20.25	20.08	19.74	19.63
225.0	24.02	23.51	23.06	22.50	21.99	21.66	21.21	20.87	20.48
270.0	25.76	25.26	24.58	24.02	23.51	22.95	22.44	21.99	21.54
315.0	24.02	23.51	23.12	22.67	22.16	21.83	21.38	21.04	20.70
360.0	22.56	22.16	21.77	21.49	21.26	21.04	20.81	20.64	20.36
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	20.08	19.86	19.58	18.96	18.51	17.66	17.21	16.59	16.09
45.0	19.69	19.29	18.79	18.23	17.66	17.04	16.54	16.20	15.64
90.0	20.36	19.80	19.24	18.51	17.94	17.21	16.82	16.26	15.86
135.0	19.74	19.46	18.79	18.17	17.61	16.88	16.48	15.98	15.58
180.0	19.24	18.73	18.23	17.49	16.93	16.26	15.86	15.36	15.02
225.0	20.25	19.97	19.46	19.13	18.28	17.78	17.10	16.54	15.92
270.0	21.15	20.93	20.31	19.80	19.13	18.23	17.66	17.16	16.48
315.0	20.36	20.03	19.41	18.90	18.28	17.61	16.93	16.48	15.86
360.0	20.08	19.86	19.58	18.96	18.51	17.66	17.21	16.59	16.09
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	15.58	15.24	14.85	14.51	14.18	13.78	13.44	13.11	12.71
45.0	15.30	15.02	14.57	14.23	13.89	13.50	13.11	12.71	12.32
90.0	15.47	15.08	14.74	14.40	14.01	13.61	13.22	12.71	12.32
135.0	15.24	14.85	14.46	14.12	13.73	13.28	12.94	12.54	12.15
180.0	14.63	14.18	13.84	13.44	13.05	12.71	12.38	11.98	11.70
225.0	15.47	15.08	14.68	14.29	13.89	13.56	13.22	12.77	12.49
270.0	16.03	15.58	15.13	14.74	14.34	13.95	13.61	13.22	12.88
315.0	15.47	15.08	14.68	14.34	13.95	13.56	13.22	12.88	12.49
360.0	15.58	15.24	14.85	14.51	14.18	13.78	13.44	13.11	12.71
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	12.38	12.04	11.70	11.36	11.03	10.74	10.46	10.24	9.96
45.0	11.93	11.59	11.19	10.91	10.58	10.29	10.01	9.73	9.45
90.0	12.04	11.64	11.36	10.80	10.41	10.13	9.79	9.56	9.39
135.0	11.76	11.48	11.08	10.74	10.41	10.18	9.90	9.62	9.39
180.0	11.42	11.03	10.74	10.52	10.24	9.96	9.73	9.39	9.34
225.0	12.15	11.76	11.48	11.14	10.80	10.58	10.18	9.96	9.68
270.0	12.54	12.21	11.87	11.53	11.14	10.69	10.35	9.96	9.73
315.0	12.21	11.76	11.48	11.08	10.86	10.58	10.29	10.01	9.68
360.0	12.38	12.04	11.70	11.36	11.03	10.74	10.46	10.24	9.96

Intensity data(cd)

C/ $\gamma$ (°)	90.0
0.0	9.68
45.0	9.45
90.0	9.45
135.0	9.39
180.0	9.39
225.0	9.51
270.0	9.45
315.0	9.39
360.0	9.68