
Nata

Client:

LumCAT: 1653-S

Luminaire: 92.70.064.00

Report No: nata-0100

Test No: GC2018092702

LampCAT: CITIZEN CLU028-1203C4

Lamp flux(lm): 1506.0

Number of Lamps: 1

Length(mm): 32

Phm Type: C

Voltage(V): 36.4000

Current(A): 0.4000

Power (W): 14.5600

PF: 0.0000

Ballast type: DC

Width(mm): 32

Height(mm): 0

Photometric Results

Lumens(lm): 1277.96, Efficiency(%): 84.86% , Luminous Efficacy(lm/W): 87.77

Central intensity(cd): 4377.657, Maximum intensity(cd): 4377.657

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=24.8

[C90/270]Total=24.8

Field angle(10%Imax): [C0/180]Total=59.6

[C90/270]Total=59.6

Maximum s/h(1/2): C0_180=0.42 C90_270=0.42

Maximum s/h(1/4): C0_180=0.43 C90_270=0.43

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 84.92%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 98.022%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	4377.656	1.047	1.047	.070%	.082%
1.0	4362.398	8.349	9.396	.554%	.735%
2.0	4324.359	16.550	25.946	1.099%	2.030%
3.0	4270.078	24.507	50.453	1.627%	3.948%
4.0	4193.719	32.080	82.533	2.130%	6.458%
5.0	4073.133	38.929	121.462	2.585%	9.504%
6.0	3911.484	44.836	166.298	2.977%	13.013%
7.0	3712.008	49.608	215.907	3.294%	16.895%
8.0	3484.266	53.176	269.083	3.531%	21.056%
9.0	3203.719	54.959	324.042	3.649%	25.356%
10.0	2889.914	55.031	379.073	3.654%	29.662%
11.0	2587.219	54.136	433.209	3.595%	33.898%
12.0	2294.297	52.309	485.518	3.473%	37.992%
13.0	2014.102	49.685	535.203	3.299%	41.879%
14.0	1780.453	47.234	582.437	3.136%	45.575%
15.0	1578.023	44.788	627.225	2.974%	49.080%
16.0	1406.531	42.515	669.74	2.823%	52.407%
17.0	1246.859	39.976	709.716	2.654%	55.535%
18.0	1120.999	37.987	747.704	2.522%	58.507%
19.0	1028.229	36.710	784.413	2.438%	61.380%
20.0	931.388	34.933	819.346	2.320%	64.113%
21.0	854.473	33.580	852.926	2.230%	66.741%
22.0	793.280	32.588	885.514	2.164%	69.291%
23.0	734.442	31.469	916.983	2.090%	71.753%
24.0	683.023	30.465	947.448	2.023%	74.137%
25.0	644.147	29.853	977.301	1.982%	76.473%
26.0	605.215	29.094	1006.395	1.932%	78.750%
27.0	563.597	28.059	1034.454	1.863%	80.945%
28.0	520.165	26.779	1061.233	1.778%	83.041%
29.0	473.984	25.199	1086.432	1.673%	85.013%
30.0	427.950	23.465	1109.897	1.558%	86.849%
31.0	382.416	21.599	1131.495	1.434%	88.539%
32.0	331.917	19.288	1150.784	1.281%	90.048%
33.0	291.171	17.390	1168.174	1.155%	91.409%
34.0	255.445	15.664	1183.838	1.040%	92.635%
35.0	202.655	12.747	1196.585	.846%	93.632%
36.0	163.434	10.534	1207.12	.700%	94.456%
37.0	130.170	8.591	1215.71	.570%	95.129%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	96.870	6.540	1222.25	.434%	95.640%
39.0	66.445	4.586	1226.836	.304%	95.999%
40.0	45.457	3.204	1230.04	.213%	96.250%
41.0	31.845	2.291	1232.331	.152%	96.429%
42.0	23.358	1.714	1234.045	.114%	96.563%
43.0	19.997	1.496	1235.54	.099%	96.680%
44.0	17.100	1.303	1236.843	.086%	96.782%
45.0	14.808	1.148	1237.991	.076%	96.872%
46.0	13.809	1.089	1239.081	.072%	96.957%
47.0	13.141	1.054	1240.135	.070%	97.040%
48.0	12.670	1.033	1241.167	.069%	97.121%
49.0	12.277	1.016	1242.183	.067%	97.200%
50.0	11.897	0.999	1243.183	.066%	97.278%
51.0	11.609	0.989	1244.172	.066%	97.356%
52.0	11.447	0.989	1245.161	.066%	97.433%
53.0	11.419	1.000	1246.161	.066%	97.511%
54.0	11.426	1.014	1247.175	.067%	97.591%
55.0	11.510	1.034	1248.209	.069%	97.672%
56.0	11.616	1.056	1249.265	.070%	97.754%
57.0	11.686	1.075	1250.339	.071%	97.838%
58.0	11.791	1.097	1251.436	.073%	97.924%
59.0	11.770	1.106	1252.542	.073%	98.011%
60.0	11.784	1.119	1253.662	.074%	98.098%
61.0	11.742	1.126	1254.788	.075%	98.186%
62.0	11.545	1.118	1255.906	.074%	98.274%
63.0	11.229	1.097	1257.003	.073%	98.360%
64.0	10.793	1.064	1258.067	.071%	98.443%
65.0	10.301	1.024	1259.09	.068%	98.523%
66.0	9.780	0.980	1260.07	.065%	98.600%
67.0	9.204	0.929	1260.999	.062%	98.673%
68.0	8.634	0.878	1261.877	.058%	98.741%
69.0	8.269	0.847	1262.724	.056%	98.807%
70.0	7.931	0.817	1263.541	.054%	98.871%
71.0	7.650	0.793	1264.334	.053%	98.933%
72.0	7.523	0.785	1265.119	.052%	98.995%
73.0	7.418	0.778	1265.897	.052%	99.056%
74.0	7.334	0.773	1266.67	.051%	99.116%
75.0	7.235	0.766	1267.436	.051%	99.176%

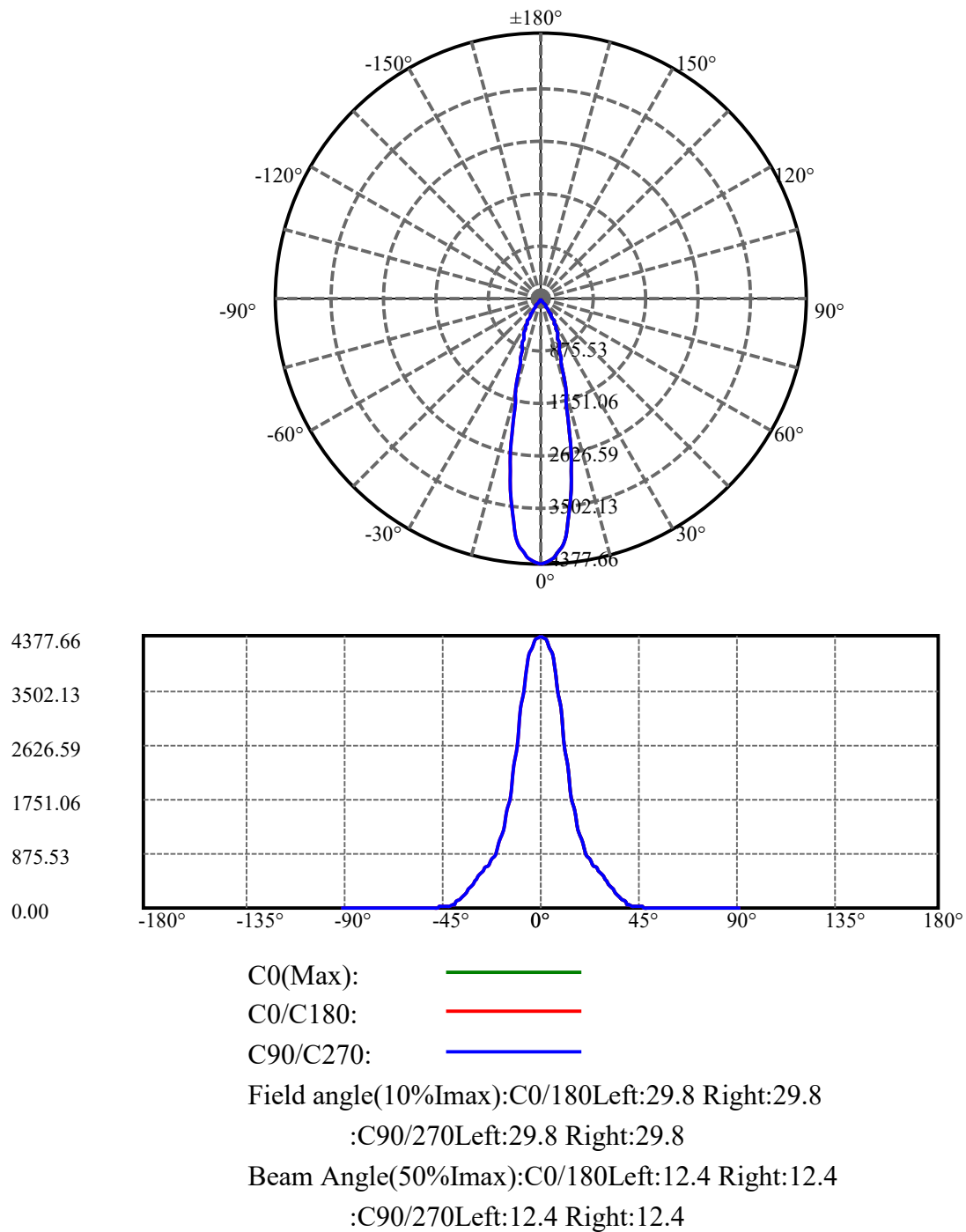
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	7.137	0.759	1268.196	.050%	99.236%
77.0	7.130	0.762	1268.957	.051%	99.295%
78.0	7.137	0.766	1269.723	.051%	99.355%
79.0	7.172	0.772	1270.495	.051%	99.416%
80.0	7.270	0.785	1271.28	.052%	99.477%
81.0	7.193	0.779	1272.059	.052%	99.538%
82.0	7.066	0.767	1272.827	.051%	99.598%
83.0	6.687	0.728	1273.554	.048%	99.655%
84.0	6.581	0.718	1274.272	.048%	99.711%
85.0	6.588	0.720	1274.992	.048%	99.767%
86.0	6.567	0.718	1275.71	.048%	99.824%
87.0	6.082	0.666	1276.376	.044%	99.876%
88.0	5.843	0.640	1277.017	.043%	99.926%
89.0	5.780	0.634	1277.65	.042%	99.975%
90.0	5.716	0.313	1277.964	.021%	100.000%

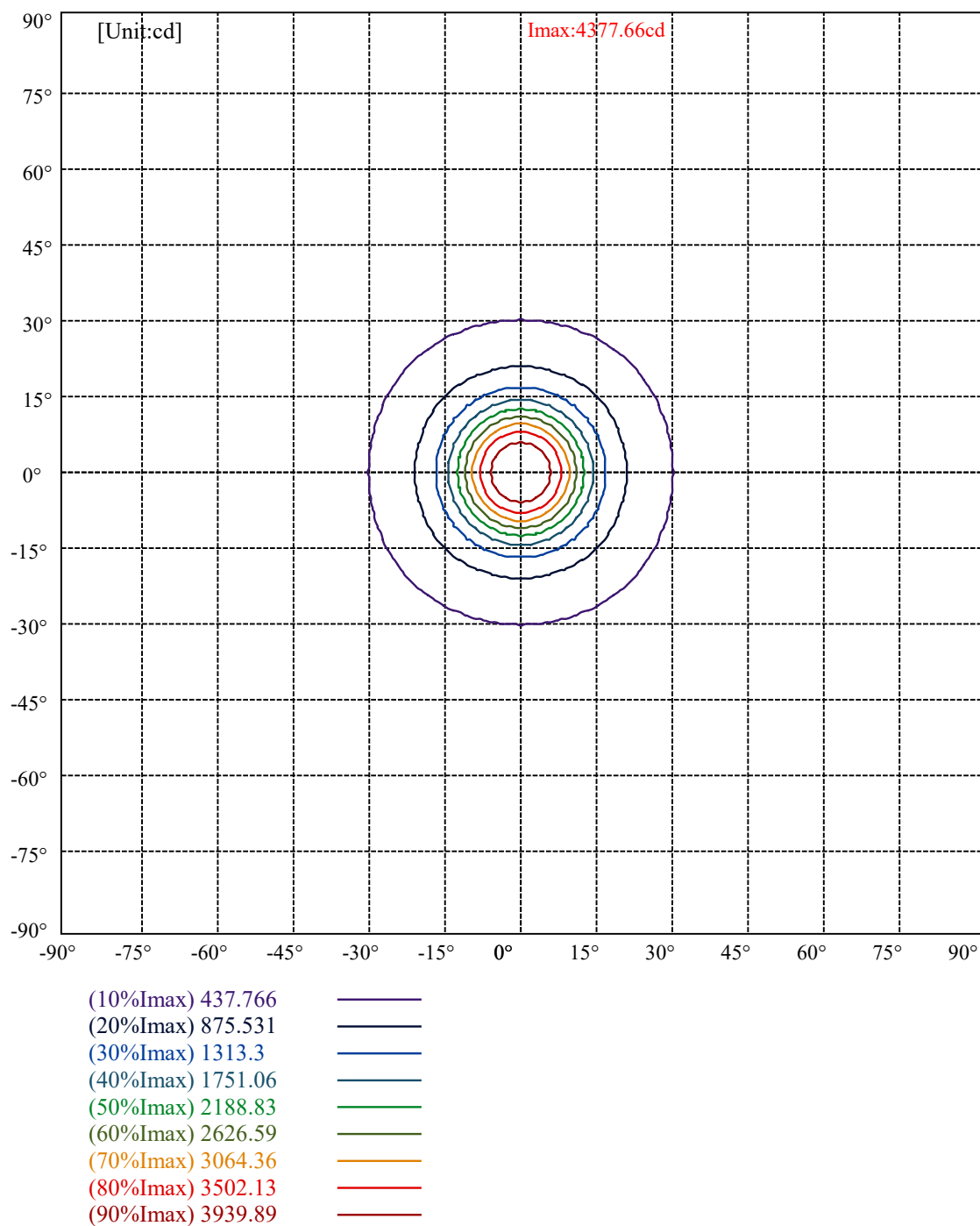
ZONAL LUMEN SUMMARY

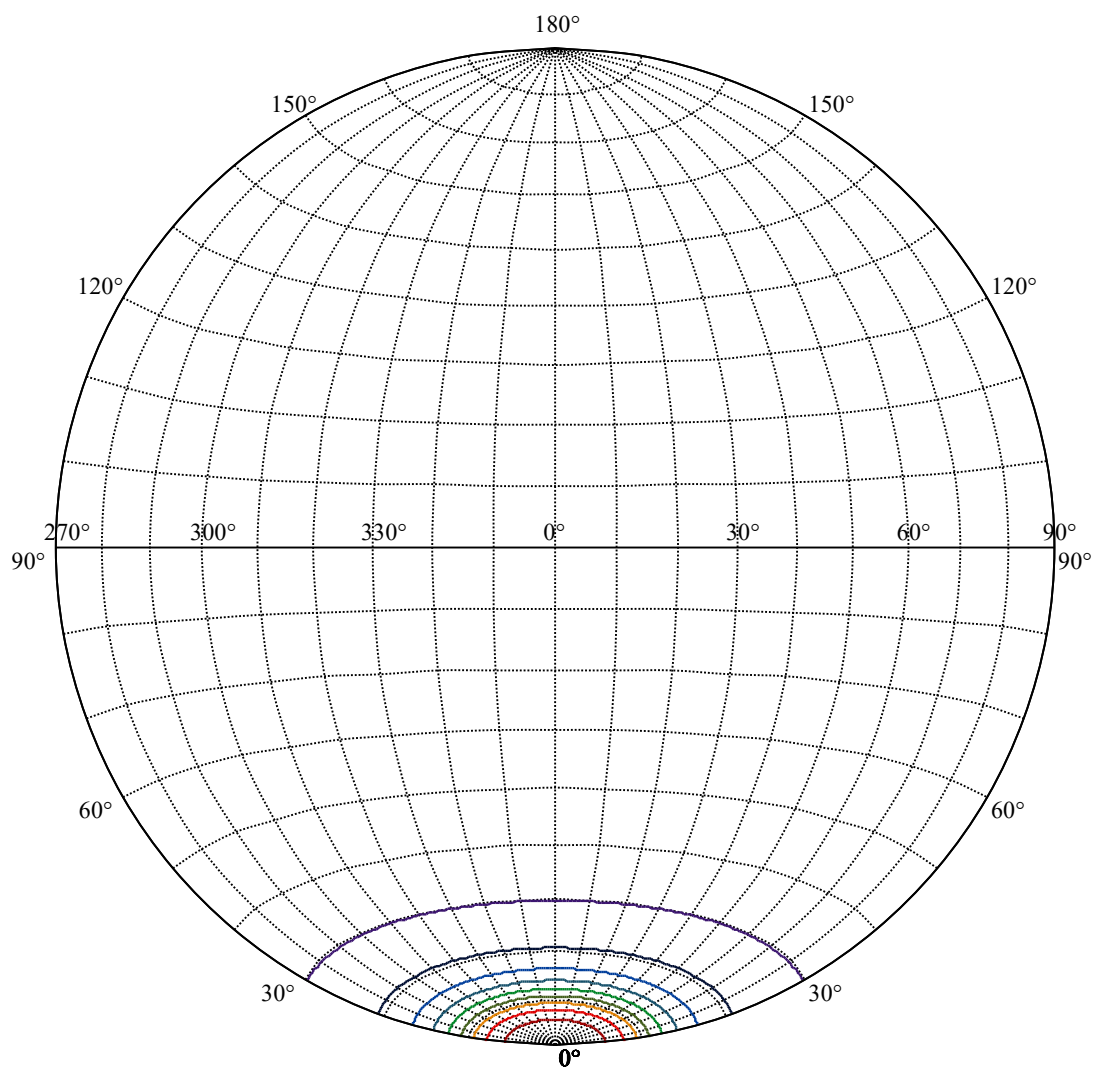
Zone	Lumens	%Lamp	%Fixt
0-30	1109.90	73.70%	86.85%
0-40	1230.04	81.68%	96.25%
0-60	1253.66	83.24%	98.10%
0-90	1277.65	84.84%	99.98%
0-120	1277.65	84.84%	99.98%
0-180	1277.96	84.86%	100.00%
60-90	25.11	1.67%	1.96%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-26.57	1022.37	67.89%	80.00%

ZONAL LUMEN SUMMARY

0-10	379.07
10-20	440.27
20-30	290.55
30-40	120.14
40-50	13.14
50-60	10.48
60-70	9.88
70-80	7.74
80-90	6.37
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







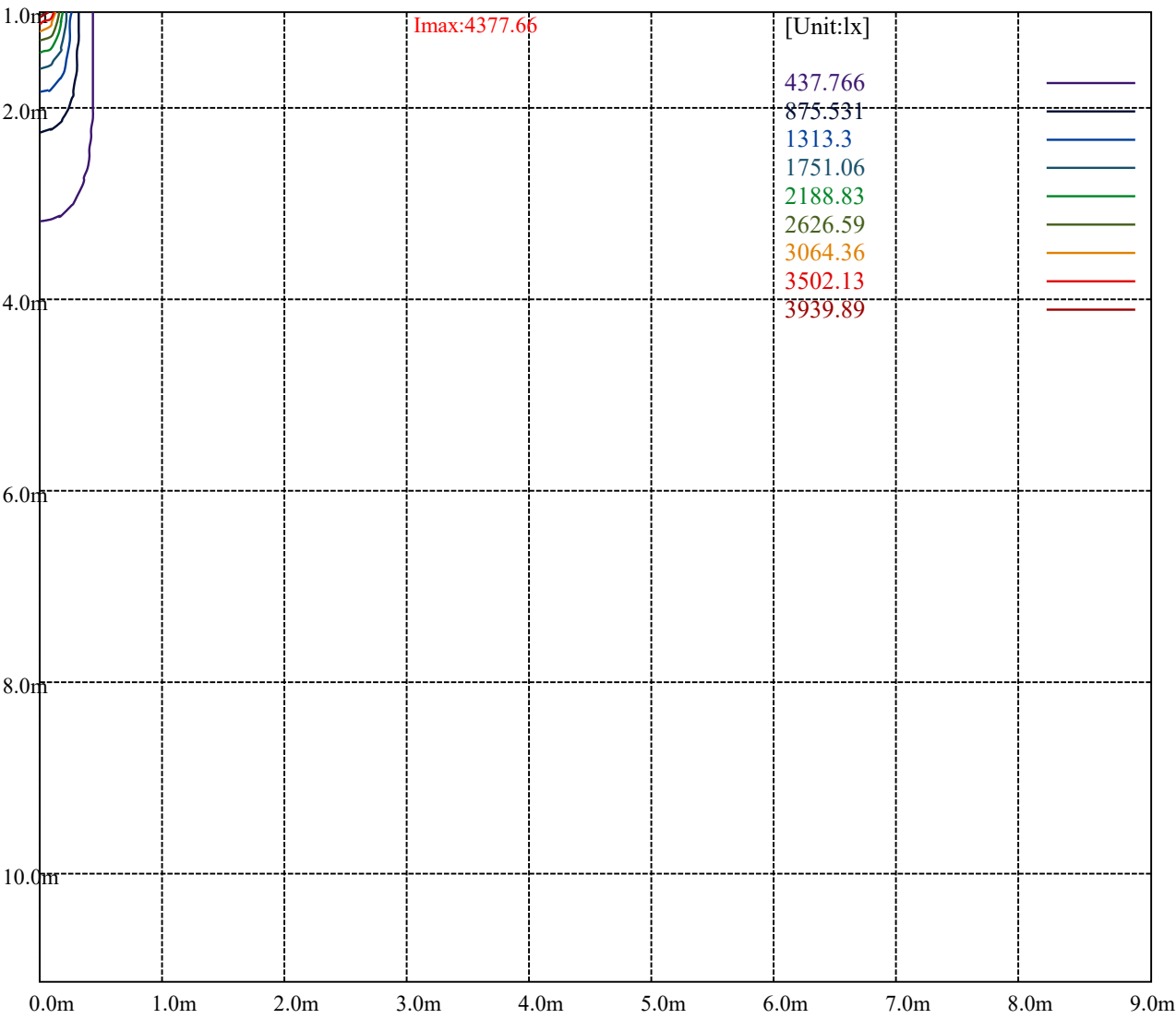
House

[Unit:cd]

Road

Imax:4377.66

(10%Imax)	437.766	—
(20%Imax)	875.531	—
(30%Imax)	1313.3	—
(40%Imax)	1751.06	—
(50%Imax)	2188.83	—
(60%Imax)	2626.59	—
(70%Imax)	3064.36	—
(80%Imax)	3502.13	—
(90%Imax)	3939.89	—



Luminance Table

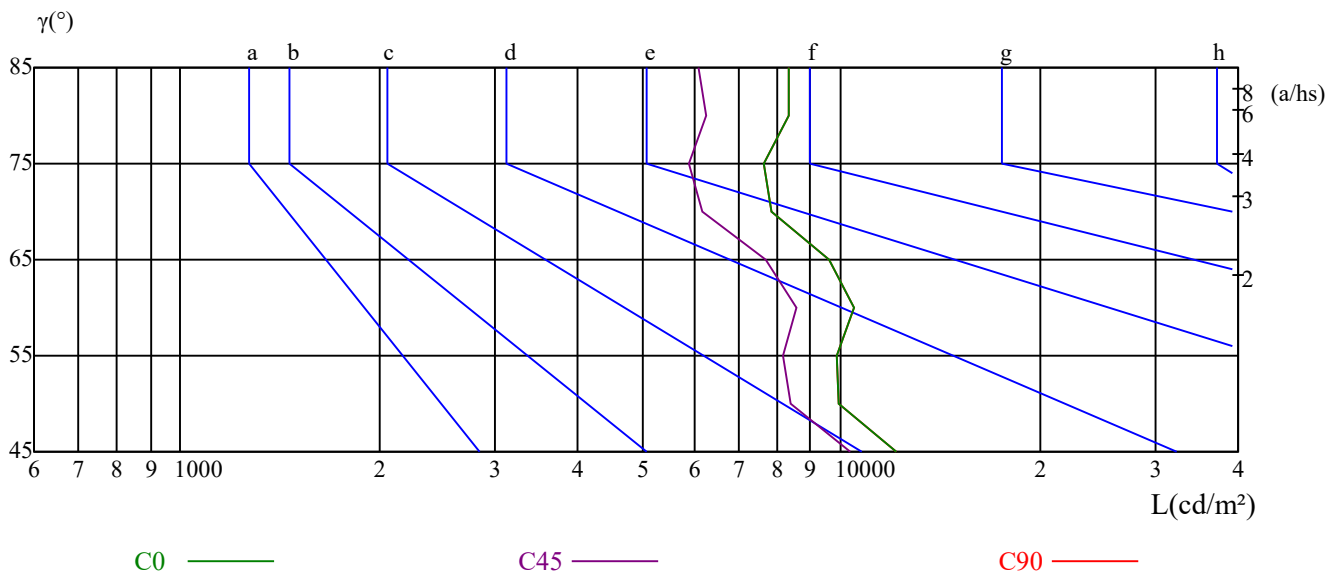
γ	45	50	55	60	65	70	75	80	85
C0	12119	9935	9888	10506	9620	7839	7656	8346	8334
C45	10369	8373	8205	8575	7715	6168	5898	6277	6094
C90	12119	9935	9888	10506	9620	7839	7656	8346	8334

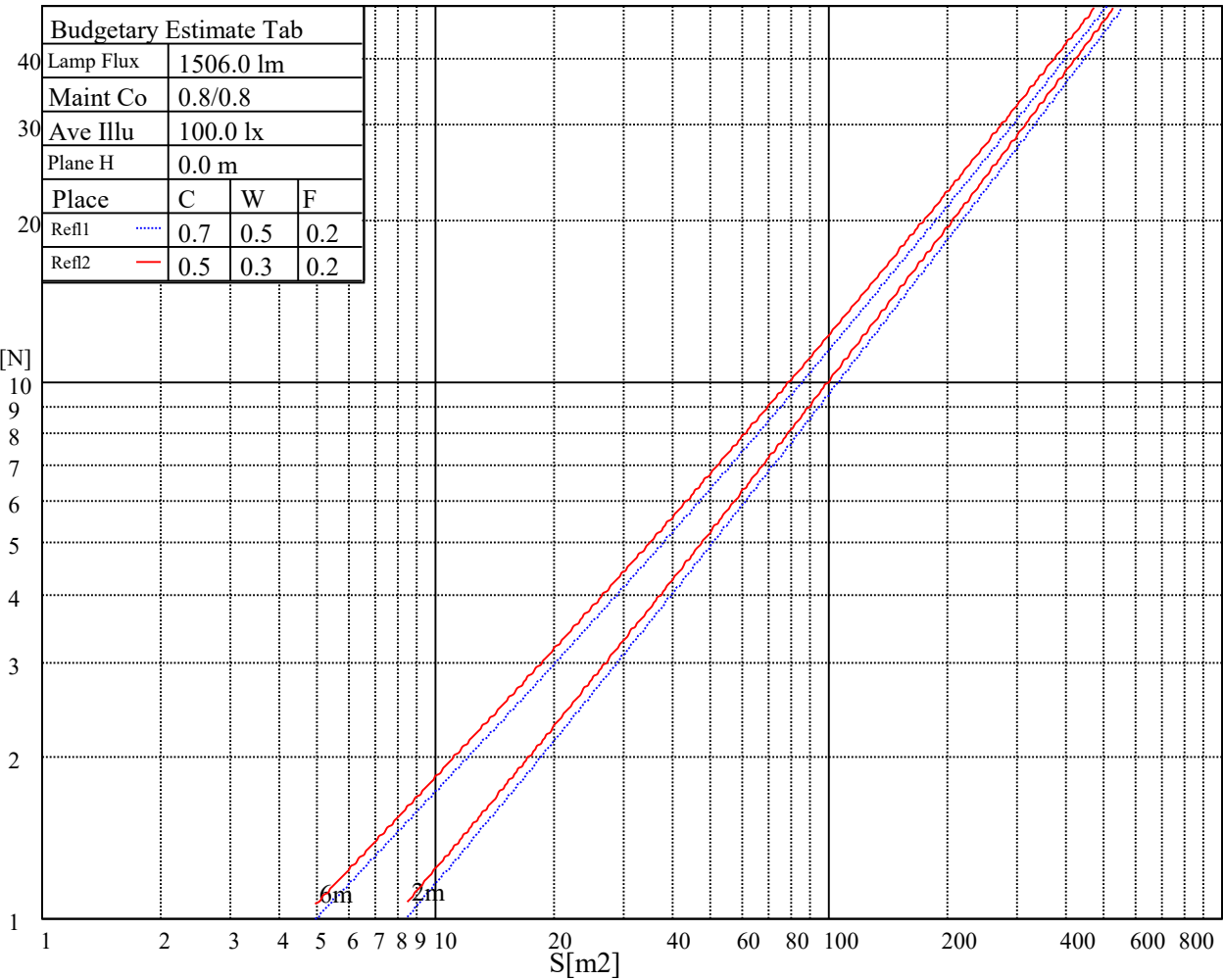
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
23802	23802	23802	27299	27299	27299	73820	73820	73820

Glare Table

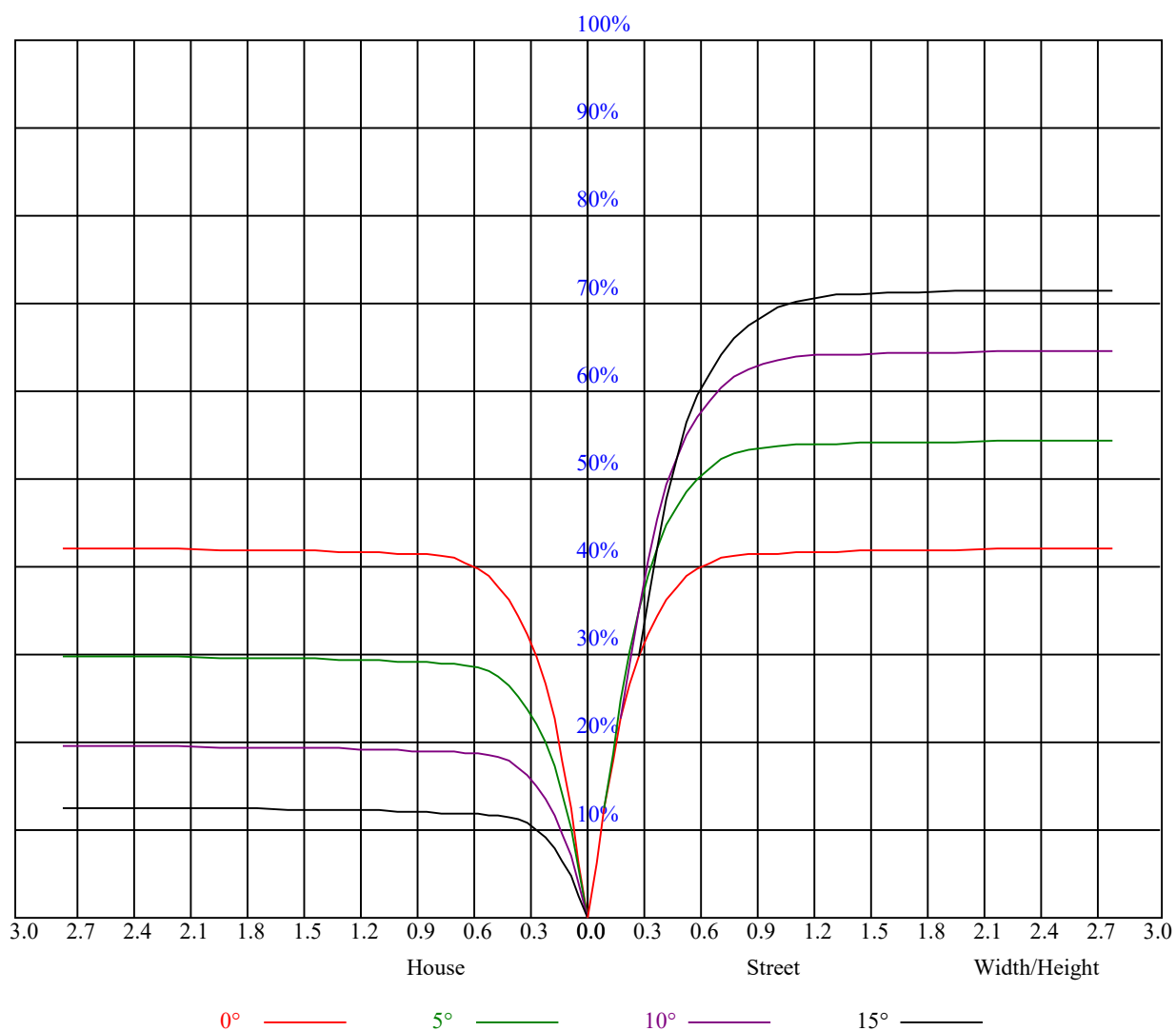
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

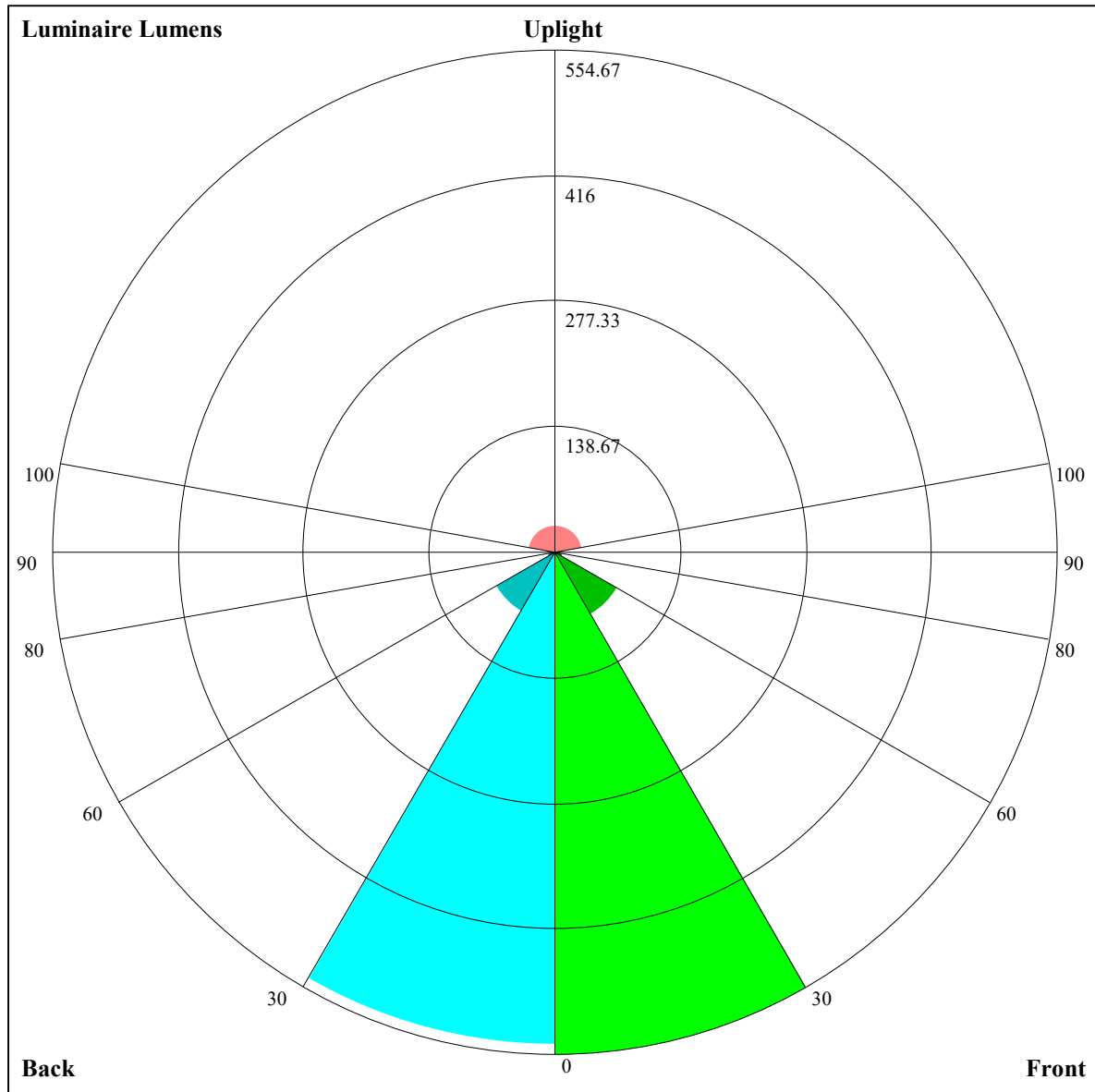
Luminance Limiting Curve





RHOC	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	0.99	0.99	0.99	0.94	0.94	0.94	0.90	0.90	0.90	0.87	0.87	0.87	0.85
1	0.95	0.93	0.91	0.93	0.91	0.90	0.90	0.88	0.87	0.86	0.85	0.84	0.84	0.83	0.82	0.81
2	0.90	0.87	0.84	0.88	0.85	0.83	0.85	0.83	0.81	0.83	0.81	0.80	0.81	0.79	0.78	0.77
3	0.85	0.81	0.79	0.84	0.81	0.78	0.82	0.79	0.77	0.80	0.77	0.76	0.78	0.76	0.74	0.73
4	0.81	0.77	0.74	0.80	0.76	0.74	0.78	0.75	0.73	0.77	0.74	0.72	0.75	0.73	0.71	0.70
5	0.77	0.73	0.70	0.77	0.73	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.73	0.70	0.68	0.67
6	0.74	0.70	0.67	0.74	0.70	0.67	0.72	0.69	0.66	0.71	0.68	0.66	0.70	0.68	0.66	0.65
7	0.71	0.67	0.64	0.71	0.67	0.64	0.70	0.66	0.64	0.69	0.66	0.63	0.68	0.65	0.63	0.62
8	0.69	0.64	0.62	0.68	0.64	0.62	0.67	0.64	0.61	0.66	0.63	0.61	0.66	0.63	0.61	0.60
9	0.66	0.62	0.59	0.66	0.62	0.59	0.65	0.62	0.59	0.64	0.61	0.59	0.64	0.61	0.59	0.58
10	0.64	0.60	0.57	0.63	0.60	0.57	0.63	0.59	0.57	0.62	0.59	0.57	0.62	0.59	0.57	0.56





Luminaire Lumens:

FL=554.67,FM=79.64,FH=9.18,FVH=3.56

BL=543.21,BM=75.43,BH=8.88,BVH=3.59

UL=6.24,UH=29.68

BUG Rating:B2-U2-G0

Nata 1653-S

Intensity data(cd)										Appendix Page: 17 Total:19	
C/γ(°)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0		
0.0	4391.44	4380.19	4355.44	4308.75	4236.19	4097.81	3958.88	3794.06	3561.19		
45.0	4373.44	4359.94	4316.63	4258.13	4185.56	4077.00	3889.13	3700.69	3476.81		
90.0	4376.25	4334.63	4275.56	4192.88	4066.88	3917.25	3732.75	3444.75	3168.56		
135.0	4369.50	4362.75	4312.69	4244.06	4150.13	4011.75	3828.94	3629.25	3393.00		
180.0	4391.44	4383.56	4335.19	4260.94	4172.63	4042.69	3890.25	3674.25	3396.38		
225.0	4373.44	4350.94	4323.94	4283.44	4203.56	4083.75	3914.44	3702.38	3477.38		
270.0	4376.25	4372.88	4341.38	4309.88	4287.94	4219.88	4090.50	3945.38	3792.38		
315.0	4369.50	4354.31	4334.06	4302.56	4246.88	4134.94	3987.00	3805.31	3608.44		
360.0	4391.44	4380.19	4355.44	4308.75	4236.19	4097.81	3958.88	3794.06	3561.19		
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0		
0.0	3286.69	3007.69	2679.75	2392.31	2100.38	1841.63	1640.81	1445.63	1286.44		
45.0	3151.69	2872.69	2584.69	2266.88	1984.50	1770.19	1562.63	1404.00	1252.69		
90.0	2877.75	2516.63	2240.44	1995.19	1778.06	1547.44	1393.88	1261.13	1113.81		
135.0	3083.06	2748.94	2426.06	2154.38	1885.50	1685.25	1485.56	1339.31	1187.44		
180.0	3120.19	2784.94	2457.56	2190.38	1950.75	1694.81	1519.31	1370.25	1194.19		
225.0	3223.13	2871.00	2580.75	2297.25	1983.94	1770.19	1578.94	1392.75	1245.94		
270.0	3504.94	3246.75	2998.13	2628.56	2306.25	2076.75	1787.63	1564.31	1413.56		
315.0	3382.31	3070.69	2730.38	2429.44	2123.44	1857.38	1655.44	1474.88	1280.81		
360.0	3286.69	3007.69	2679.75	2392.31	2100.38	1841.63	1640.81	1445.63	1286.44		
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0		
0.0	1166.06	1064.81	955.13	884.25	820.69	755.44	704.81	666.56	630.56		
45.0	1122.75	1028.81	938.81	861.19	801.00	746.44	691.31	654.19	618.19		
90.0	1017.96	933.58	853.82	784.97	732.60	682.59	644.23	605.08	563.29		
135.0	1080.56	989.44	892.69	826.31	766.69	716.06	663.19	628.31	593.44		
180.0	1105.26	1015.09	918.51	855.73	798.98	740.87	699.75	660.09	620.10		
225.0	1118.59	1033.99	938.98	860.91	801.34	738.39	687.54	651.38	611.66		
270.0	1236.94	1118.81	1014.75	908.44	837.56	774.00	705.94	659.81	619.88		
315.0	1119.88	1041.30	938.42	853.99	787.39	721.74	667.41	627.75	584.61		
360.0	1166.06	1064.81	955.13	884.25	820.69	755.44	704.81	666.56	630.56		
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0		
0.0	585.00	544.50	498.94	456.19	406.69	360.00	314.44	284.06	230.79		
45.0	577.13	532.13	493.31	441.56	392.06	348.75	306.00	288.00	213.86		
90.0	522.56	481.56	427.78	383.46	342.79	285.98	248.74	210.77	169.20		
135.0	550.13	503.44	462.94	410.63	363.38	319.50	284.63	227.64	186.41		
180.0	581.79	539.16	482.96	435.21	388.74	328.61	285.98	247.16	200.93		
225.0	574.65	526.44	479.31	436.50	395.44	338.79	297.39	253.91	199.86		
270.0	571.50	531.56	489.94	444.94	396.00	355.50	309.38	288.00	226.07		
315.0	546.02	502.54	456.69	415.13	374.23	318.21	282.83	244.01	194.12		
360.0	585.00	544.50	498.94	456.19	406.69	360.00	314.44	284.06	230.79		
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0		
0.0	182.08	147.15	110.48	74.19	50.63	35.10	23.91	20.87	18.34		
45.0	172.63	139.28	106.93	71.55	48.38	33.64	22.95	20.36	17.61		
90.0	134.44	101.93	73.58	51.64	34.93	24.81	21.26	18.51	15.86		
135.0	149.57	118.29	90.11	59.34	40.11	29.81	21.83	18.90	15.81		
180.0	160.88	123.92	88.65	59.79	39.66	27.23	20.64	17.72	14.29		
225.0	165.26	130.78	96.53	65.03	43.76	30.49	22.56	19.24	15.86		
270.0	181.74	150.92	113.18	82.24	58.95	40.89	28.52	22.78	20.19		
315.0	160.88	129.09	95.51	67.78	47.25	32.79	25.20	21.60	18.84		
360.0	182.08	147.15	110.48	74.19	50.63	35.10	23.91	20.87	18.34		

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	15.36	14.46	14.23	14.12	14.06	14.06	14.01	14.01	14.18
45.0	15.19	14.40	13.89	13.84	13.56	13.33	13.50	13.44	13.56
90.0	14.79	13.95	13.22	12.66	12.26	11.59	11.14	11.19	11.48
135.0	13.73	12.94	12.21	11.53	11.03	10.58	10.13	9.79	9.68
180.0	12.49	11.81	11.14	10.63	10.35	10.13	9.79	9.62	9.45
225.0	13.61	12.60	11.87	11.42	11.03	10.58	10.18	9.84	9.68
270.0	16.65	14.63	13.56	12.77	12.09	11.64	11.19	10.86	10.46
315.0	16.65	15.69	15.02	14.40	13.84	13.28	12.94	12.83	12.88
360.0	15.36	14.46	14.23	14.12	14.06	14.06	14.01	14.01	14.18
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	14.23	14.23	14.18	13.78	13.44	12.60	11.87	11.19	10.29
45.0	13.50	13.61	13.61	13.33	12.94	12.49	11.87	11.14	10.58
90.0	11.59	11.98	12.49	12.71	12.88	12.94	13.16	12.83	12.38
135.0	9.73	9.51	9.51	9.68	9.96	10.18	10.69	11.36	11.53
180.0	9.28	9.11	9.06	8.94	8.89	8.89	8.89	9.00	9.06
225.0	9.62	9.62	9.56	9.90	10.24	10.35	10.46	10.52	10.46
270.0	10.35	10.58	10.80	11.03	11.53	12.09	12.77	13.44	13.84
315.0	13.11	13.44	13.73	14.12	14.46	14.63	14.57	14.46	14.23
360.0	14.23	14.23	14.18	13.78	13.44	12.60	11.87	11.19	10.29
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	9.68	9.34	9.11	8.83	8.61	8.33	8.10	7.99	7.71
45.0	10.29	9.79	9.51	9.17	8.83	8.44	8.16	7.82	7.59
90.0	11.81	10.97	9.96	9.28	8.72	8.33	7.93	7.82	7.76
135.0	11.25	10.91	10.63	9.90	9.11	8.78	8.33	7.82	7.71
180.0	8.94	8.89	8.89	8.61	8.38	8.16	7.93	7.65	7.54
225.0	10.13	9.90	9.39	9.06	8.61	8.10	7.88	7.65	7.43
270.0	14.01	13.61	12.77	11.93	10.86	9.62	8.94	8.38	7.76
315.0	13.73	12.94	12.15	11.48	10.52	9.34	8.89	8.33	7.71
360.0	9.68	9.34	9.11	8.83	8.61	8.33	8.10	7.99	7.71
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	7.59	7.48	7.31	7.14	7.03	6.98	6.81	6.75	6.69
45.0	7.48	7.37	7.31	7.20	7.09	7.03	6.98	6.86	6.86
90.0	7.76	7.71	7.65	7.59	7.54	7.99	8.61	9.23	10.07
135.0	7.65	7.59	7.54	7.43	7.37	7.26	7.31	7.59	7.88
180.0	7.31	7.26	7.14	7.03	6.92	6.86	6.81	6.69	6.64
225.0	7.26	7.09	6.98	6.92	6.81	6.75	6.69	6.64	6.58
270.0	7.59	7.43	7.37	7.31	7.20	7.14	6.98	6.86	6.81
315.0	7.54	7.43	7.37	7.26	7.14	7.03	6.92	6.75	6.64
360.0	7.59	7.48	7.31	7.14	7.03	6.98	6.81	6.75	6.69
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	6.58	6.47	6.36	6.36	6.36	6.36	6.02	6.02	5.96
45.0	6.92	7.03	6.92	6.69	6.75	6.98	6.08	5.85	5.79
90.0	10.18	9.68	7.76	7.31	7.48	7.65	5.85	5.74	5.68
135.0	7.59	7.43	6.92	6.98	7.09	7.14	7.03	5.74	5.68
180.0	6.58	6.53	6.47	6.41	6.36	6.19	5.91	5.85	5.74
225.0	6.47	6.41	6.30	6.24	6.19	6.02	5.91	5.79	5.79
270.0	6.64	6.53	6.41	6.36	6.24	6.13	5.96	5.91	5.79
315.0	6.58	6.47	6.36	6.30	6.24	6.08	5.91	5.85	5.79
360.0	6.58	6.47	6.36	6.36	6.36	6.36	6.02	6.02	5.96

Intensity data(cd)

Appendix Page: 19 Total:19

C/ γ (°)	90.0
0.0	5.91
45.0	5.79
90.0	5.68
135.0	5.57
180.0	5.63
225.0	5.68
270.0	5.74
315.0	5.74
360.0	5.91