
NATA

Client:

LumCAT: 3-2042-M

Luminaire: 92.70.131.000

Report No: nata-0100

Test No: GC2018120707

LampCAT: OSRAM SOLERIQ S13

Lamp flux(lm): 1777.0

Number of Lamps: 1

Length(mm): 84

Phm Type: C

Voltage(V): 36.8000

Current(A): 0.5000

Power (W): 18.4000

PF: 0.0000

Ballast type: DC

Width(mm): 84

Height(mm): 0

Photometric Results

Lumens(lm): 1564.65, Efficiency(%): 88.05% , Luminous Efficacy(lm/W): 85.04

Central intensity(cd): 18050.630, Maximum intensity(cd): 18050.630

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=11.8

[C90/270]Total=11.8

Field angle(10%Imax): [C0/180]Total=22.6

[C90/270]Total=22.6

Maximum s/h(1/2): C0_180=0.21 C90_270=0.21

Maximum s/h(1/4): C0_180=0.20 C90_270=0.20

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 88.29%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 98.444%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	18050.625	4.319	4.319	.243%	.276%
1.0	17803.125	34.072	38.391	1.917%	2.454%
2.0	16987.500	65.013	103.404	3.659%	6.609%
3.0	15284.250	87.719	191.123	4.936%	12.215%
4.0	13630.359	104.266	295.39	5.868%	18.879%
5.0	11257.383	107.593	402.983	6.055%	25.755%
6.0	8818.945	101.089	504.072	5.689%	32.216%
7.0	6664.641	89.068	593.14	5.012%	37.909%
8.0	4918.781	75.070	668.21	4.225%	42.707%
9.0	3516.680	60.328	728.537	3.395%	46.562%
10.0	2552.414	48.604	777.141	2.735%	49.669%
11.0	1943.367	40.664	817.805	2.288%	52.267%
12.0	1503.408	34.277	852.082	1.929%	54.458%
13.0	1207.069	29.776	881.859	1.676%	56.361%
14.0	1044.914	27.721	909.58	1.560%	58.133%
15.0	932.034	26.453	936.033	1.489%	59.824%
16.0	849.635	25.682	961.715	1.445%	61.465%
17.0	789.244	25.305	987.019	1.424%	63.082%
18.0	748.322	25.358	1012.378	1.427%	64.703%
19.0	719.276	25.680	1038.057	1.445%	66.344%
20.0	692.634	25.978	1064.035	1.462%	68.004%
21.0	669.108	26.295	1090.331	1.480%	69.685%
22.0	649.146	26.667	1116.997	1.501%	71.389%
23.0	630.155	27.001	1143.998	1.519%	73.115%
24.0	613.920	27.383	1171.381	1.541%	74.865%
25.0	600.630	27.836	1199.217	1.566%	76.644%
26.0	588.734	28.302	1227.519	1.593%	78.453%
27.0	578.138	28.783	1256.301	1.620%	80.293%
28.0	568.027	29.244	1285.545	1.646%	82.162%
29.0	558.879	29.713	1315.257	1.672%	84.061%
30.0	550.610	30.190	1345.447	1.699%	85.990%
31.0	540.759	30.542	1375.989	1.719%	87.942%
32.0	523.645	30.430	1406.419	1.712%	89.887%
33.0	489.923	29.261	1435.68	1.647%	91.757%
34.0	433.533	26.585	1462.265	1.496%	93.456%
35.0	352.448	22.169	1484.434	1.248%	94.873%
36.0	279.401	18.009	1502.443	1.013%	96.024%
37.0	197.339	13.024	1515.466	.733%	96.856%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	120.649	8.146	1523.612	.458%	97.377%
39.0	56.384	3.891	1527.503	.219%	97.626%
40.0	27.084	1.909	1529.412	.107%	97.748%
41.0	17.107	1.231	1530.643	.069%	97.826%
42.0	14.498	1.064	1531.707	.060%	97.894%
43.0	12.502	0.935	1532.642	.053%	97.954%
44.0	10.891	0.830	1533.471	.047%	98.007%
45.0	9.788	0.759	1534.23	.043%	98.056%
46.0	9.000	0.710	1534.94	.040%	98.101%
47.0	8.754	0.702	1535.642	.040%	98.146%
48.0	8.564	0.698	1536.34	.039%	98.190%
49.0	8.381	0.694	1537.034	.039%	98.235%
50.0	8.205	0.689	1537.723	.039%	98.279%
51.0	8.072	0.688	1538.411	.039%	98.323%
52.0	7.910	0.684	1539.095	.038%	98.366%
53.0	7.763	0.680	1539.775	.038%	98.410%
54.0	7.629	0.677	1540.451	.038%	98.453%
55.0	7.509	0.675	1541.126	.038%	98.496%
56.0	7.418	0.674	1541.8	.038%	98.539%
57.0	7.327	0.674	1542.474	.038%	98.582%
58.0	7.242	0.674	1543.148	.038%	98.625%
59.0	7.172	0.674	1543.822	.038%	98.669%
60.0	7.095	0.674	1544.496	.038%	98.712%
61.0	7.010	0.672	1545.168	.038%	98.755%
62.0	6.947	0.673	1545.841	.038%	98.798%
63.0	6.877	0.672	1546.512	.038%	98.840%
64.0	6.820	0.672	1547.185	.038%	98.883%
65.0	6.785	0.674	1547.859	.038%	98.927%
66.0	6.736	0.675	1548.534	.038%	98.970%
67.0	6.701	0.676	1549.21	.038%	99.013%
68.0	6.630	0.674	1549.884	.038%	99.056%
69.0	6.623	0.678	1550.562	.038%	99.099%
70.0	6.574	0.677	1551.24	.038%	99.143%
71.0	6.539	0.678	1551.918	.038%	99.186%
72.0	6.525	0.681	1552.598	.038%	99.229%
73.0	6.511	0.683	1553.281	.038%	99.273%
74.0	6.483	0.683	1553.965	.038%	99.317%
75.0	6.455	0.684	1554.648	.038%	99.360%

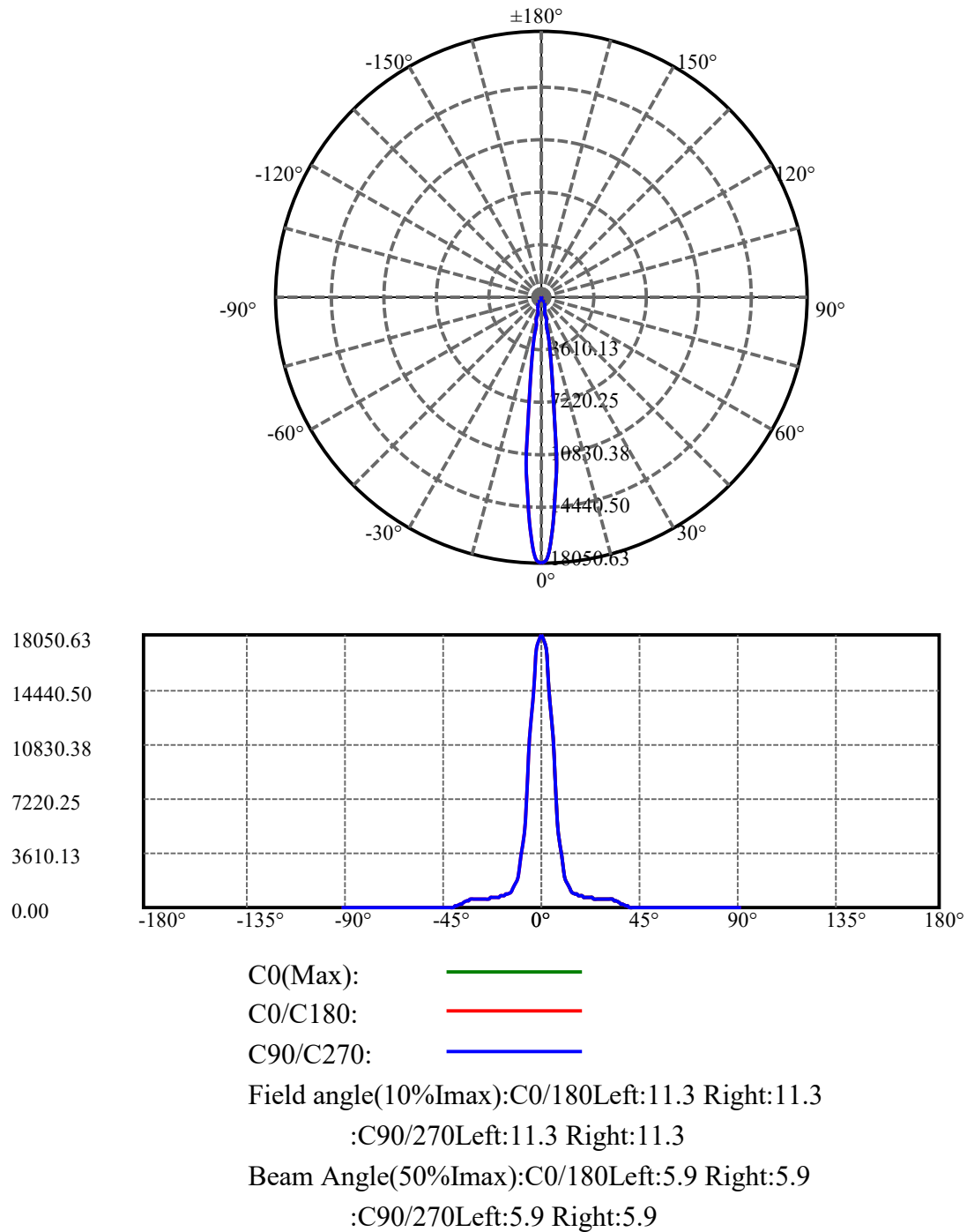
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	6.427	0.684	1555.332	.038%	99.404%
77.0	6.420	0.686	1556.018	.039%	99.448%
78.0	6.420	0.689	1556.707	.039%	99.492%
79.0	6.405	0.690	1557.396	.039%	99.536%
80.0	6.405	0.692	1558.088	.039%	99.580%
81.0	6.384	0.691	1558.779	.039%	99.624%
82.0	6.363	0.691	1559.47	.039%	99.669%
83.0	6.377	0.694	1560.165	.039%	99.713%
84.0	6.363	0.694	1560.859	.039%	99.757%
85.0	6.349	0.694	1561.552	.039%	99.802%
86.0	6.314	0.691	1562.243	.039%	99.846%
87.0	6.293	0.689	1562.932	.039%	99.890%
88.0	6.286	0.689	1563.621	.039%	99.934%
89.0	6.286	0.689	1564.31	.039%	99.978%
90.0	6.286	0.345	1564.655	.019%	100.000%

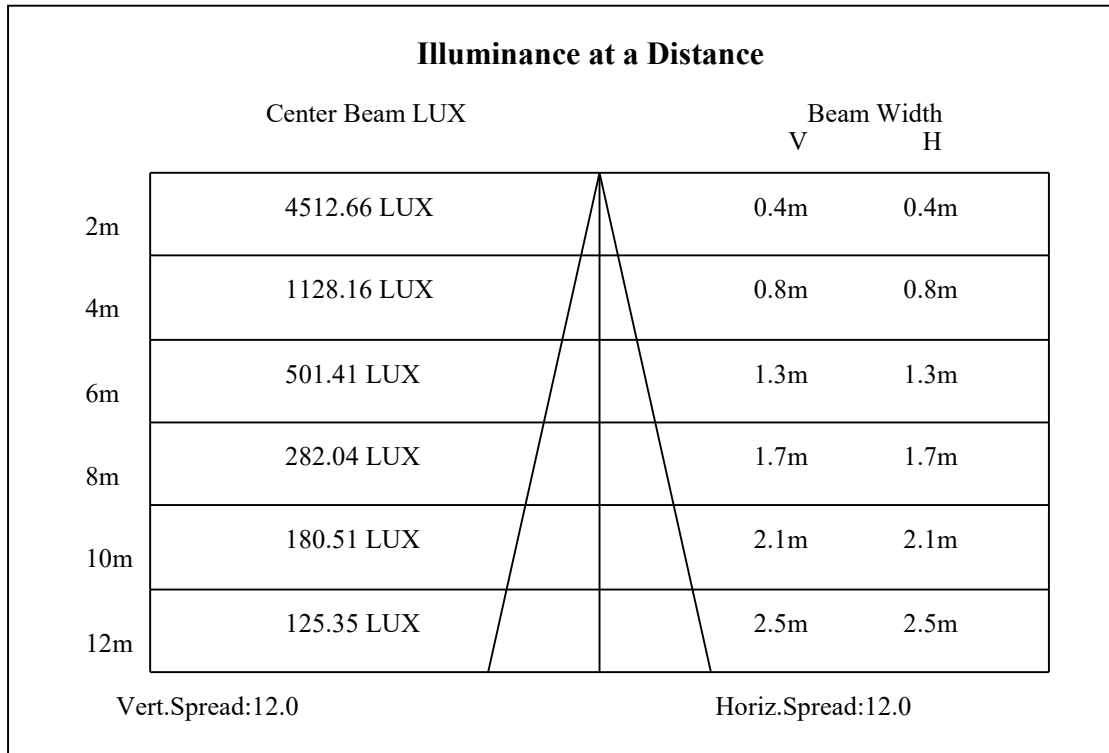
ZONAL LUMEN SUMMARY

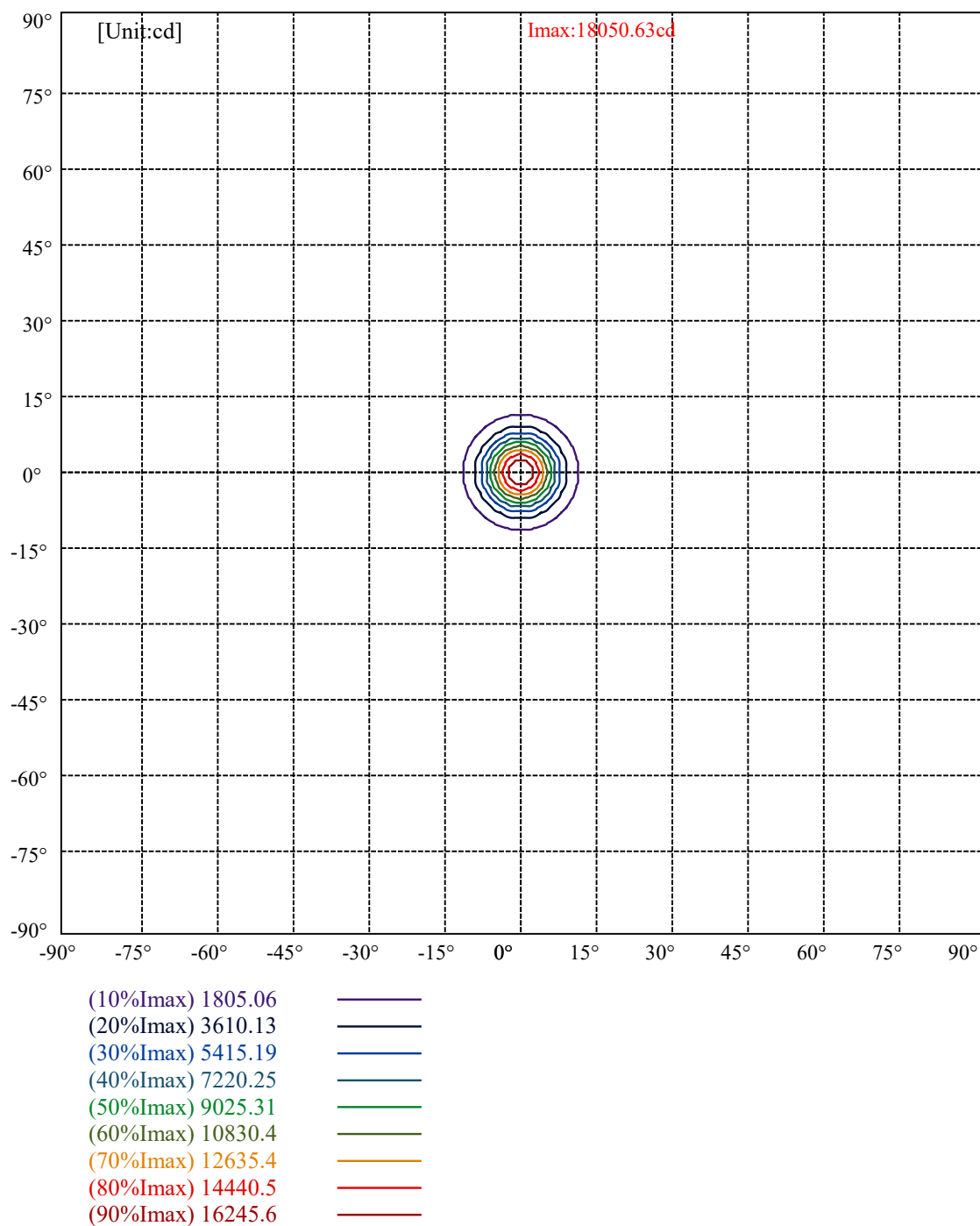
Zone	Lumens	%Lamp	%Fixt
0-30	1345.45	75.71%	85.99%
0-40	1529.41	86.07%	97.75%
0-60	1544.50	86.92%	98.71%
0-90	1564.31	88.03%	99.98%
0-120	1564.31	88.03%	99.98%
0-180	1564.65	88.05%	100.00%
60-90	20.49	1.15%	1.31%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-26.84	1251.72	70.44%	80.00%

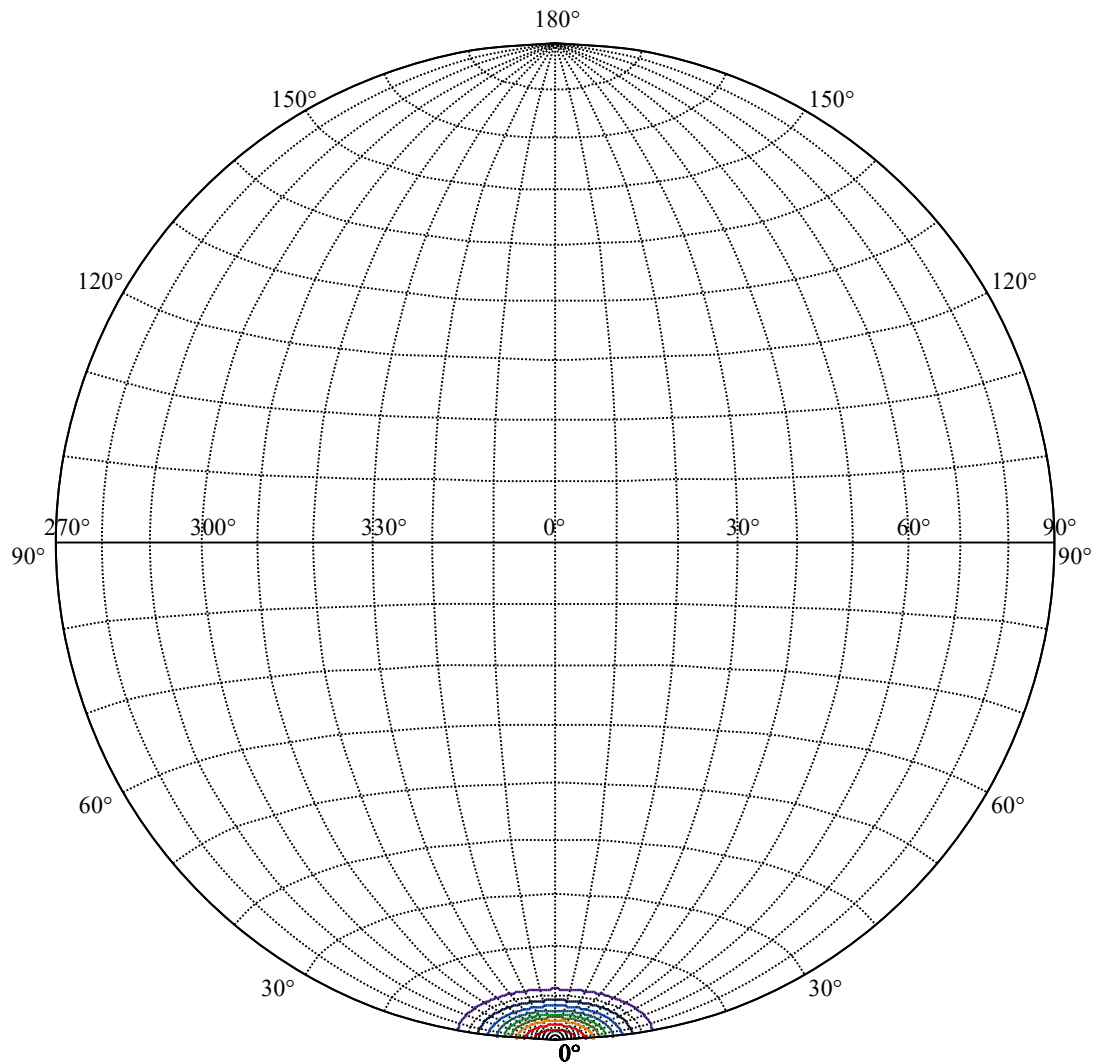
ZONAL LUMEN SUMMARY

0-10	777.14
10-20	286.89
20-30	281.41
30-40	183.96
40-50	8.31
50-60	6.77
60-70	6.74
70-80	6.85
80-90	6.22
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









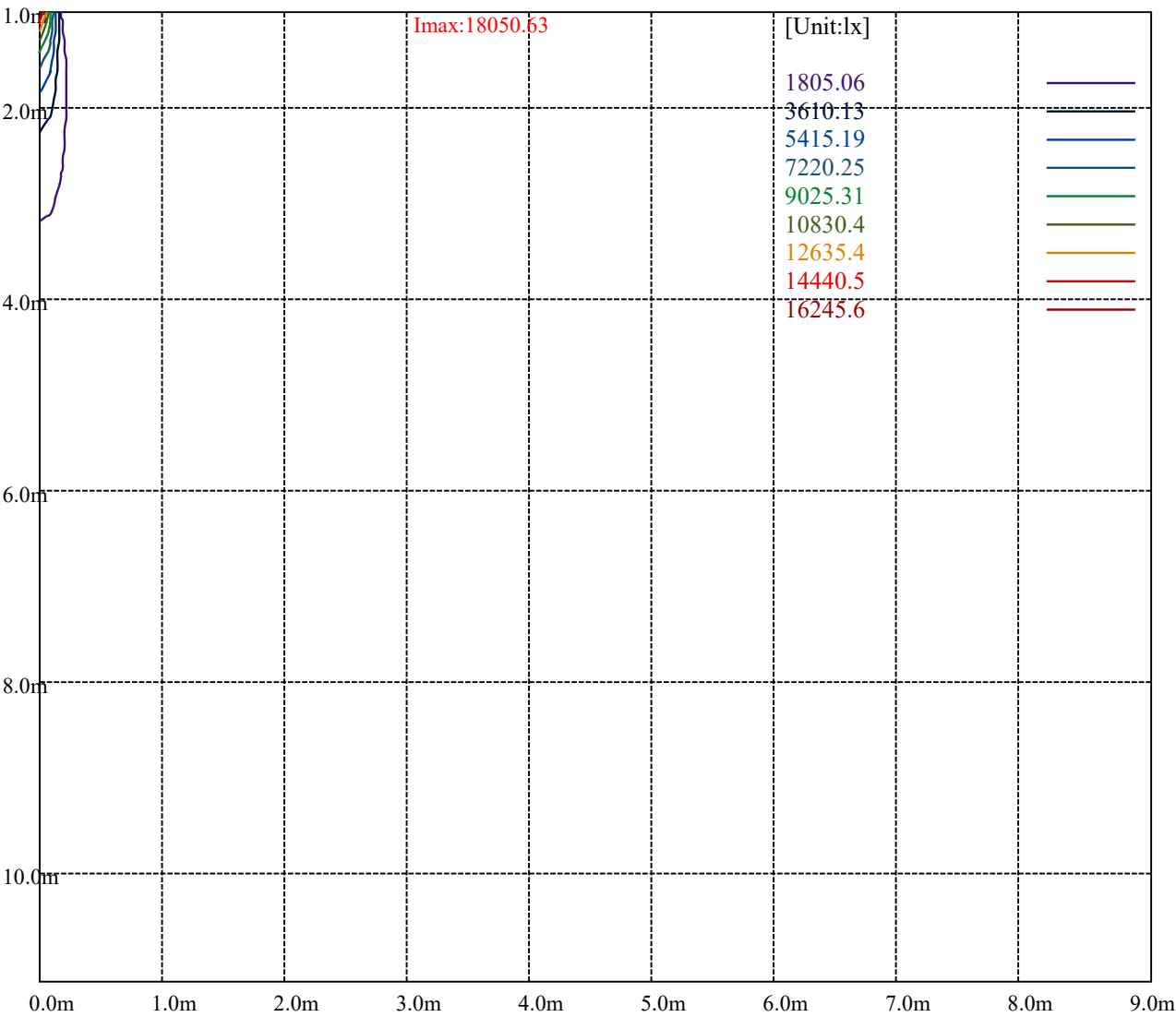
House

[Unit:cd]

Road

Imax:18050.63

(10%Imax)	1805.06	_____
(20%Imax)	3610.13	_____
(30%Imax)	5415.19	_____
(40%Imax)	7220.25	_____
(50%Imax)	9025.31	_____
(60%Imax)	10830.4	_____
(70%Imax)	12635.4	_____
(80%Imax)	14440.5	_____
(90%Imax)	16245.6	_____



Luminance Table

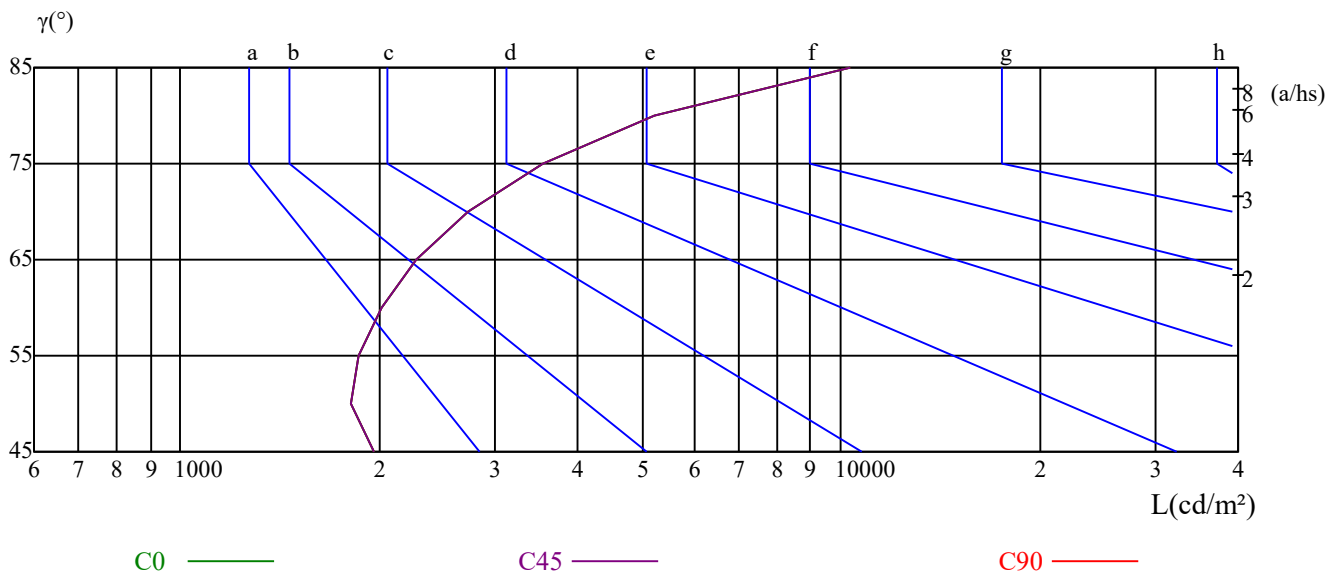
γ	45	50	55	60	65	70	75	80	85
C0	1962	1809	1855	2011	2275	2724	3534	5228	10324
C45	1962	1809	1855	2011	2275	2724	3534	5228	10324
C90	1962	1809	1855	2011	2275	2724	3534	5228	10324

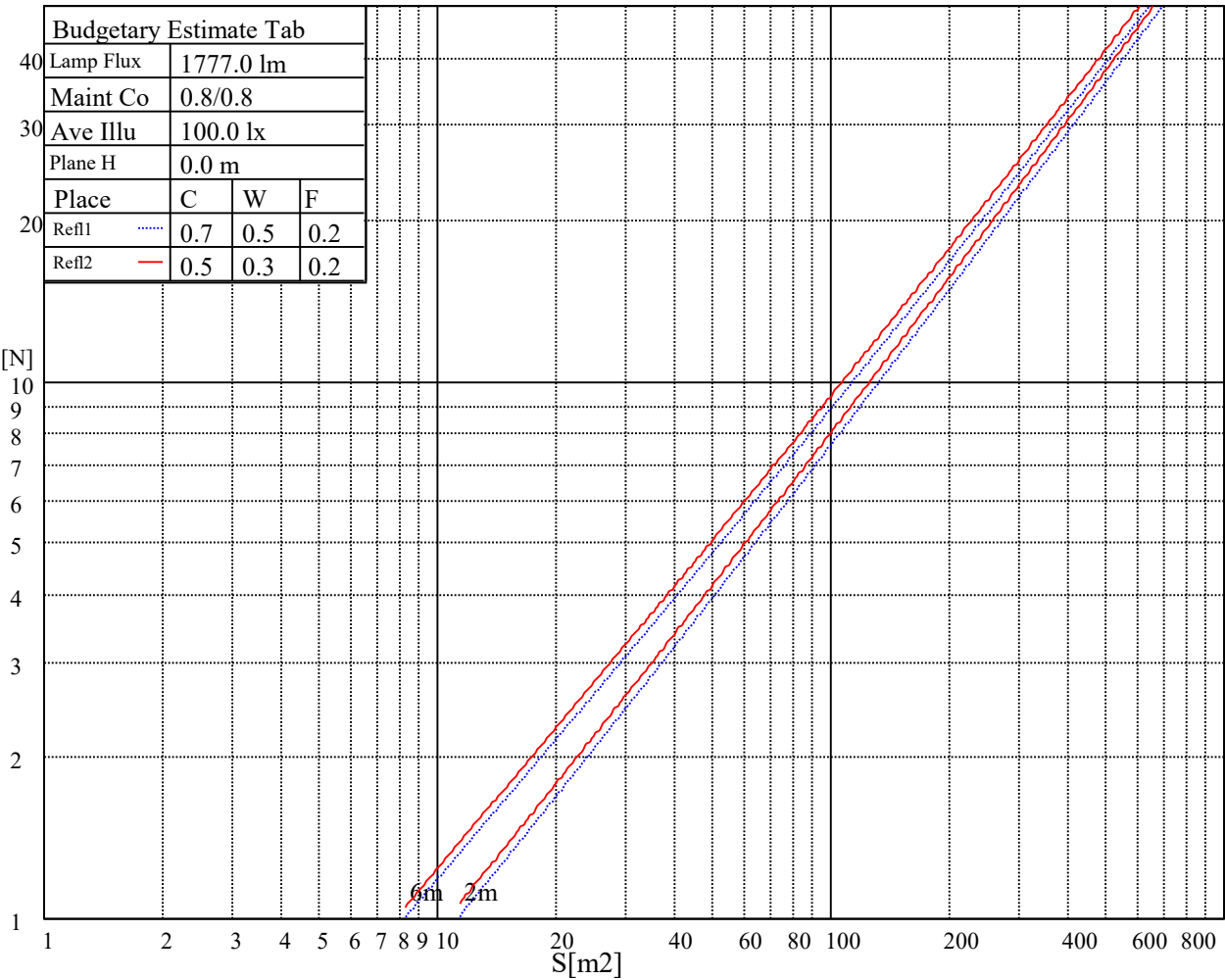
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
2275	2275	2275	3534	3534	3534	10324	10324	10324

Glare Table

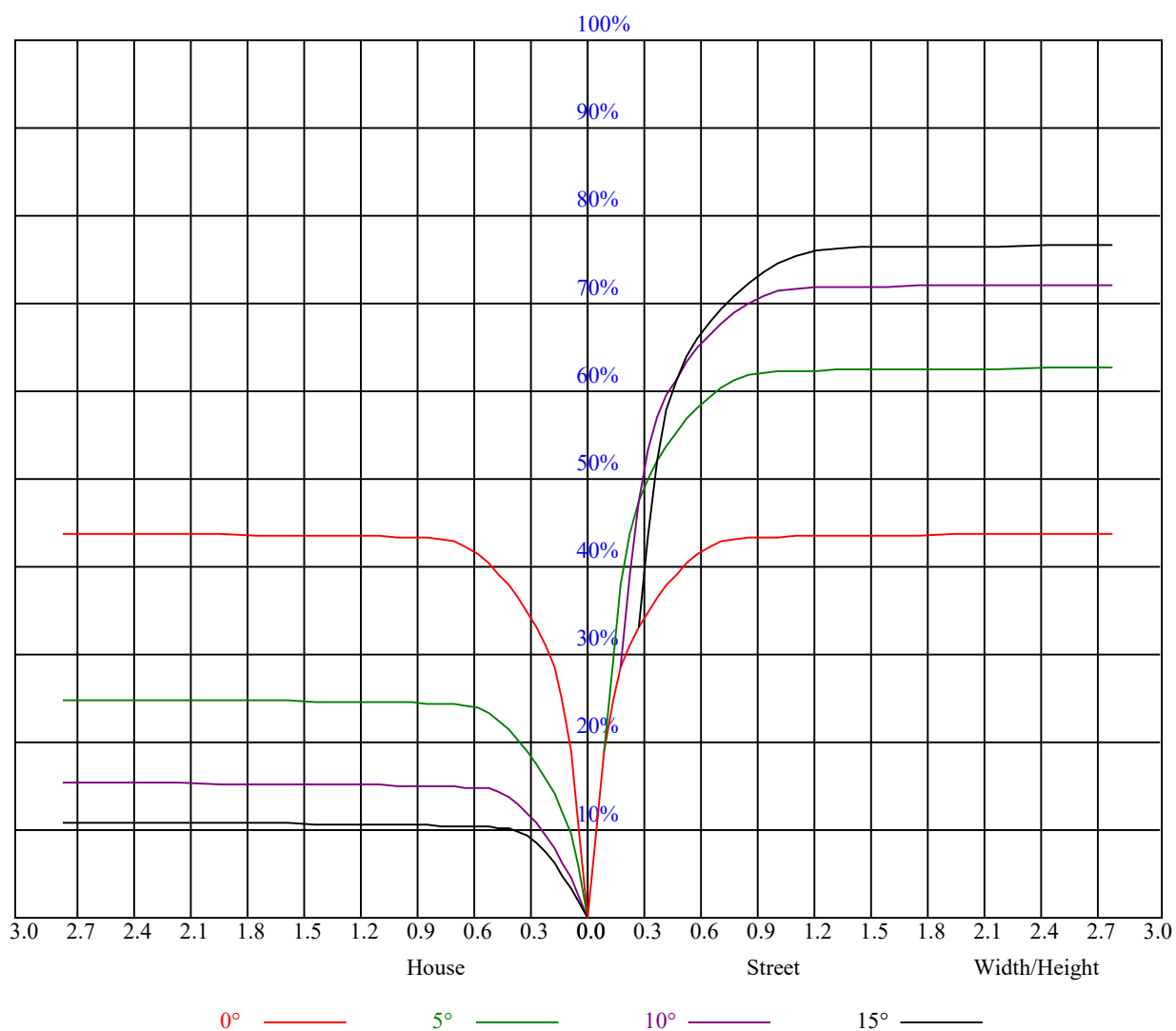
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

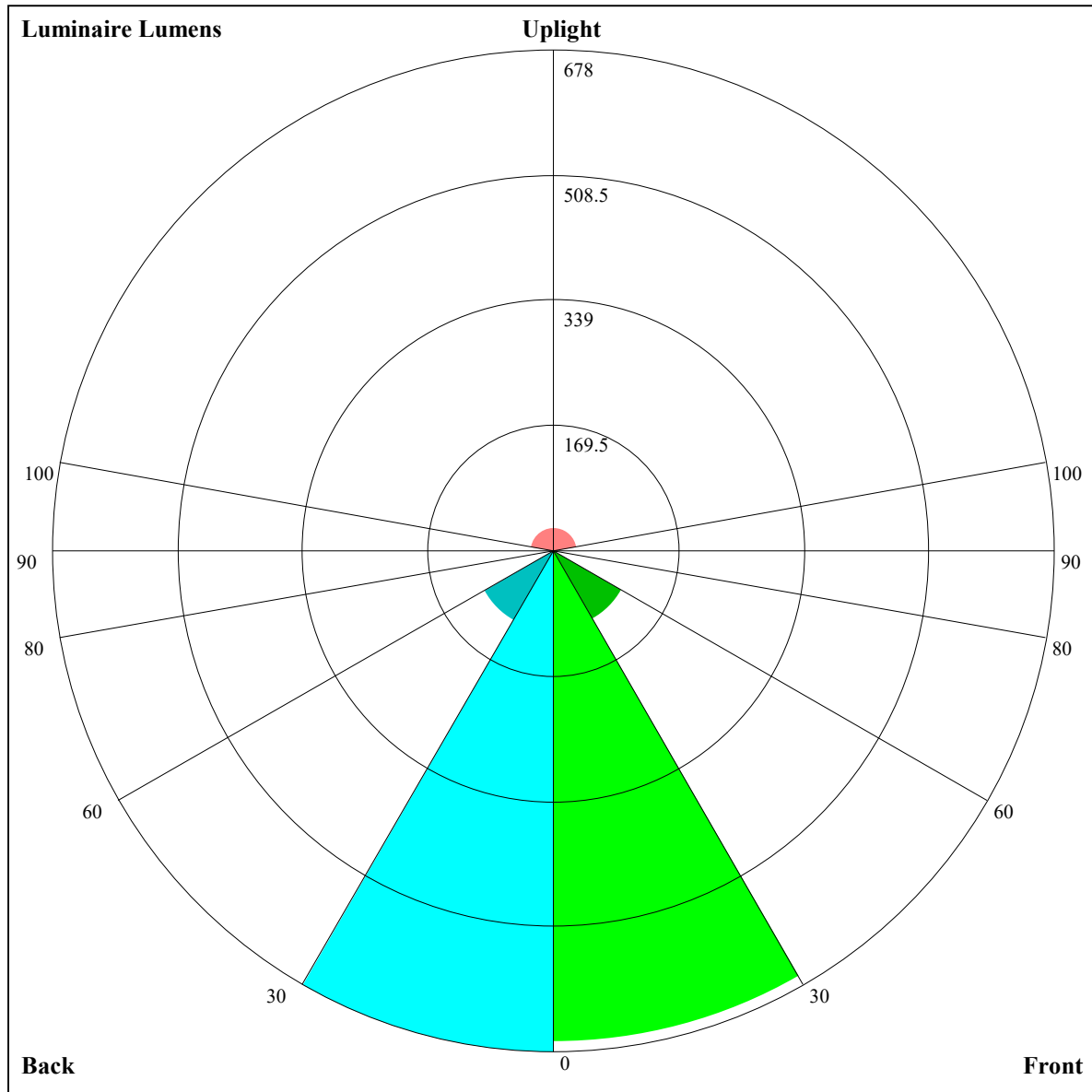
Luminance Limiting Curve





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	1.05	1.05	1.05	1.03	1.03	1.03	0.98	0.98	0.98	0.94	0.94	0.94	0.90	0.90	0.90	0.88
1	0.99	0.97	0.96	0.97	0.95	0.94	0.94	0.92	0.91	0.90	0.89	0.88	0.87	0.87	0.86	0.84
2	0.94	0.91	0.89	0.93	0.90	0.88	0.90	0.88	0.86	0.87	0.86	0.84	0.85	0.84	0.83	0.81
3	0.90	0.87	0.84	0.89	0.86	0.83	0.87	0.84	0.82	0.85	0.83	0.81	0.83	0.81	0.80	0.78
4	0.86	0.83	0.80	0.86	0.82	0.80	0.84	0.81	0.79	0.82	0.80	0.78	0.81	0.79	0.77	0.76
5	0.83	0.80	0.77	0.83	0.79	0.76	0.81	0.78	0.76	0.80	0.77	0.75	0.79	0.76	0.75	0.74
6	0.80	0.77	0.74	0.80	0.76	0.74	0.79	0.76	0.73	0.78	0.75	0.73	0.77	0.74	0.72	0.71
7	0.78	0.74	0.72	0.77	0.74	0.71	0.76	0.73	0.71	0.76	0.73	0.71	0.75	0.72	0.70	0.69
8	0.76	0.72	0.69	0.75	0.72	0.69	0.74	0.71	0.69	0.74	0.71	0.69	0.73	0.70	0.69	0.68
9	0.74	0.70	0.68	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
10	0.72	0.68	0.66	0.71	0.68	0.66	0.71	0.68	0.66	0.70	0.67	0.65	0.70	0.67	0.65	0.64





Luminaire Lumens:

FL=663.97,FM=106.45,FH=6.8,FVH=3.47

BL=678,BM=107.91,BH=6.81,BVH=3.46

UL=6.86,UH=32.64

BUG Rating:B2-U2-G0

NATA 3-2042-M

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	18135.00	17915.63	17128.13	15800.63	13933.13	11463.75	8915.63	6789.38	4792.50		
45.0	18106.88	17431.88	16042.50	14203.13	11778.75	9540.00	7065.00	4961.25	3600.00		
90.0	17836.88	16959.38	15474.38	10983.38	10701.00	8448.19	6081.75	4199.63	3054.38		
135.0	18123.75	17730.00	16678.13	15103.13	12819.38	10603.13	8071.88	5765.63	4179.38		
180.0	18135.00	17898.75	17083.13	15513.75	13584.38	11064.94	8496.56	6360.75	4609.69		
225.0	18106.88	18241.88	17971.88	16976.25	15536.25	13550.63	10411.31	8443.13	6378.75		
270.0	17836.88	18225.00	18112.50	17555.63	16273.13	14248.13	12060.00	9506.25	7340.63		
315.0	18123.75	18022.50	17409.38	16138.13	14416.88	11140.31	9449.44	7291.13	5394.94		
360.0	18135.00	17915.63	17128.13	15800.63	13933.13	11463.75	8915.63	6789.38	4792.50		
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0		
0.0	3363.75	2891.25	1887.75	1527.19	1279.13	1069.88	958.50	879.75	812.25		
45.0	2863.13	1925.44	1546.88	1288.13	1071.00	955.69	876.94	816.19	772.88		
90.0	2217.38	1698.19	1392.75	1118.14	1014.41	903.15	829.91	783.96	749.36		
135.0	2930.63	2139.19	1688.06	1382.63	1130.63	993.94	896.06	829.69	774.56		
180.0	3189.94	2286.56	1774.13	1398.94	1104.02	995.29	879.41	811.58	759.49		
225.0	4491.56	3146.63	2337.19	1746.56	1372.50	1105.37	996.81	879.30	803.25		
270.0	5461.88	3678.75	2908.13	2052.00	1569.38	1258.31	1074.38	933.75	842.63		
315.0	3615.19	2653.31	2012.06	1513.69	1115.49	1077.69	944.27	862.88	799.54		
360.0	3363.75	2891.25	1887.75	1527.19	1279.13	1069.88	958.50	879.75	812.25		
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0		
0.0	774.56	745.88	713.81	690.75	668.25	644.63	624.94	612.00	600.19		
45.0	739.69	709.31	682.31	659.81	635.63	617.63	601.88	589.50	575.44		
90.0	712.80	688.67	667.69	642.94	625.61	609.75	595.13	580.84	569.36		
135.0	739.13	712.13	685.69	662.06	642.38	623.25	606.94	595.13	582.19		
180.0	718.43	695.76	675.34	650.14	635.01	619.26	604.01	591.36	582.02		
225.0	757.86	721.35	697.50	674.16	653.40	636.41	622.13	606.43	595.97		
270.0	788.06	752.63	712.69	690.19	673.31	649.13	633.38	621.56	606.94		
315.0	756.06	728.49	706.05	682.82	659.59	641.19	622.97	608.23	597.77		
360.0	774.56	745.88	713.81	690.75	668.25	644.63	624.94	612.00	600.19		
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0		
0.0	587.25	576.56	567.56	558.56	549.00	538.88	511.31	455.63	365.06		
45.0	567.00	556.31	547.88	538.88	528.19	502.31	444.38	377.44	290.25		
90.0	560.42	551.42	541.41	533.08	521.21	476.21	412.59	328.61	250.76		
135.0	571.50	563.06	552.94	545.06	536.06	519.75	473.63	407.25	311.63		
180.0	570.09	560.64	552.88	543.32	534.88	525.26	485.27	424.01	342.45		
225.0	586.86	574.43	566.33	558.79	548.89	539.38	531.11	490.05	418.56		
270.0	595.69	587.25	575.44	568.69	559.69	549.00	541.13	523.69	461.81		
315.0	586.29	574.54	566.61	558.51	548.16	538.37	519.98	461.59	379.07		
360.0	587.25	576.56	567.56	558.56	549.00	538.88	511.31	455.63	365.06		
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0		
0.0	284.63	234.79	117.62	49.39	19.58	16.82	14.57	12.32	10.46		
45.0	199.86	132.81	61.82	20.64	16.93	14.68	12.26	10.80	9.28		
90.0	166.44	91.07	40.84	17.21	15.41	13.44	11.36	10.01	9.11		
135.0	292.50	160.43	79.54	28.52	16.71	14.68	12.60	10.69	9.51		
180.0	254.31	176.29	106.48	40.16	18.00	16.43	14.51	11.81	10.69		
225.0	344.53	255.77	177.58	99.73	39.04	19.01	17.33	14.91	12.71		
270.0	391.50	312.75	242.44	131.57	68.34	24.47	17.83	16.37	14.12		
315.0	301.44	214.82	138.88	63.84	22.67	17.33	15.53	13.11	11.25		
360.0	284.63	234.79	117.62	49.39	19.58	16.82	14.57	12.32	10.46		

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	9.23	8.94	8.72	8.55	8.33	8.16	8.04	7.93	7.76
45.0	9.06	8.83	8.66	8.49	8.38	8.21	8.04	7.93	7.76
90.0	8.94	8.72	8.49	8.33	8.21	7.99	7.88	7.71	7.65
135.0	9.06	8.83	8.61	8.44	8.27	8.16	8.04	7.88	7.71
180.0	9.23	9.00	8.78	8.61	8.44	8.21	8.10	7.93	7.76
225.0	11.08	9.17	8.94	8.72	8.49	8.33	8.16	7.99	7.82
270.0	11.81	9.51	9.06	8.83	8.55	8.38	8.27	8.04	7.93
315.0	9.90	9.00	8.78	8.55	8.38	8.21	8.04	7.88	7.71
360.0	9.23	8.94	8.72	8.55	8.33	8.16	8.04	7.93	7.76
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	7.59	7.54	7.43	7.37	7.26	7.20	7.09	6.98	6.92
45.0	7.65	7.54	7.43	7.37	7.31	7.20	7.14	7.03	6.98
90.0	7.54	7.37	7.31	7.26	7.14	7.09	7.03	6.92	6.92
135.0	7.59	7.48	7.43	7.31	7.26	7.14	7.09	7.03	6.98
180.0	7.65	7.48	7.43	7.31	7.26	7.20	7.14	6.98	6.92
225.0	7.65	7.54	7.48	7.31	7.26	7.20	7.09	7.03	6.98
270.0	7.76	7.59	7.48	7.43	7.31	7.26	7.14	7.09	6.98
315.0	7.59	7.54	7.37	7.26	7.14	7.09	7.03	7.03	6.92
360.0	7.59	7.54	7.43	7.37	7.26	7.20	7.09	6.98	6.92
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	6.92	6.86	6.81	6.75	6.69	6.64	6.58	6.58	6.53
45.0	6.86	6.75	6.75	6.69	6.64	6.58	6.58	6.53	6.53
90.0	6.81	6.81	6.75	6.69	6.69	6.64	6.64	6.58	6.58
135.0	6.86	6.81	6.81	6.75	6.69	6.64	6.64	6.58	6.53
180.0	6.86	6.81	6.81	6.75	6.75	6.64	6.64	6.58	6.53
225.0	6.92	6.81	6.75	6.75	6.69	6.64	6.64	6.58	6.53
270.0	6.92	6.92	6.86	6.81	6.75	6.69	6.69	6.64	6.58
315.0	6.86	6.81	6.75	6.69	6.69	6.58	6.58	6.53	6.53
360.0	6.92	6.86	6.81	6.75	6.69	6.64	6.58	6.58	6.53
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	6.53	6.53	6.47	6.47	6.41	6.41	6.41	6.41	6.36
45.0	6.47	6.47	6.41	6.41	6.36	6.36	6.36	6.36	6.36
90.0	6.53	6.58	6.53	6.47	6.47	6.47	6.47	6.47	6.47
135.0	6.53	6.47	6.47	6.47	6.41	6.41	6.41	6.41	6.41
180.0	6.53	6.47	6.47	6.47	6.41	6.41	6.36	6.36	6.41
225.0	6.53	6.53	6.47	6.41	6.41	6.36	6.41	6.36	6.36
270.0	6.58	6.58	6.58	6.53	6.53	6.53	6.53	6.53	6.53
315.0	6.53	6.47	6.47	6.41	6.41	6.41	6.41	6.36	6.36
360.0	6.53	6.53	6.47	6.47	6.41	6.41	6.41	6.41	6.36
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	6.36	6.36	6.36	6.36	6.36	6.36	6.30	6.30	6.30
45.0	6.36	6.30	6.30	6.30	6.30	6.30	6.24	6.30	6.24
90.0	6.47	6.47	6.53	6.47	6.36	6.30	6.24	6.24	6.30
135.0	6.36	6.36	6.36	6.36	6.36	6.30	6.30	6.30	6.30
180.0	6.36	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30
225.0	6.36	6.30	6.30	6.30	6.30	6.30	6.24	6.24	6.24
270.0	6.47	6.47	6.53	6.53	6.47	6.36	6.36	6.30	6.30
315.0	6.36	6.36	6.36	6.30	6.36	6.30	6.36	6.30	6.30
360.0	6.36	6.36	6.36	6.36	6.36	6.36	6.30	6.30	6.30

Intensity data(cd)

Appendix Page: 19 Total:19

C/ $\gamma(^{\circ})$	90.0
0.0	6.30
45.0	6.24
90.0	6.30
135.0	6.30
180.0	6.30
225.0	6.24
270.0	6.30
315.0	6.30
360.0	6.30