
NATA

Client:

LumCAT: 3-2044-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): 1571.06, Efficiency(%): 88.41% , Luminous Efficacy(lm/W): 85.38

Central intensity(cd): 6020.719, Maximum intensity(cd): 6020.719

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=24.6

[C90/270]Total=24.6

Field angle(10%Imax): [C0/180]Total=51.4

[C90/270]Total=51.4

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

Maximum s/h(1/4): C0_180=0.41 C90_270=0.41

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 88.49%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 98.594%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	6020.719	1.440	1.44	.081%	.092%
1.0	6003.703	11.490	12.931	.647%	.823%
2.0	5947.875	22.763	35.694	1.281%	2.272%
3.0	5839.523	33.514	69.208	1.886%	4.405%
4.0	5691.023	43.534	112.742	2.450%	7.176%
5.0	5489.648	52.468	165.21	2.953%	10.516%
6.0	5243.836	60.108	225.318	3.383%	14.342%
7.0	4954.852	66.218	291.536	3.726%	18.557%
8.0	4656.164	71.062	362.598	3.999%	23.080%
9.0	4291.734	73.624	436.221	4.143%	27.766%
10.0	3899.109	74.248	510.47	4.178%	32.492%
11.0	3524.836	73.755	584.224	4.151%	37.187%
12.0	3125.039	71.250	655.475	4.010%	41.722%
13.0	2724.398	67.206	722.681	3.782%	46.000%
14.0	2355.820	62.498	785.179	3.517%	49.978%
15.0	2031.609	57.662	842.841	3.245%	53.648%
16.0	1738.477	52.548	895.39	2.957%	56.993%
17.0	1501.875	48.153	943.542	2.710%	60.058%
18.0	1273.641	43.160	986.702	2.429%	62.805%
19.0	1108.350	39.570	1026.273	2.227%	65.324%
20.0	968.646	36.330	1062.603	2.044%	67.636%
21.0	840.867	33.045	1095.648	1.860%	69.739%
22.0	755.198	31.023	1126.671	1.746%	71.714%
23.0	691.770	29.641	1156.312	1.668%	73.601%
24.0	646.031	28.815	1185.127	1.622%	75.435%
25.0	616.120	28.554	1213.681	1.607%	77.252%
26.0	595.329	28.619	1242.3	1.611%	79.074%
27.0	577.716	28.762	1271.061	1.619%	80.905%
28.0	564.806	29.078	1300.139	1.636%	82.756%
29.0	554.196	29.464	1329.603	1.658%	84.631%
30.0	544.570	29.859	1359.462	1.680%	86.532%
31.0	534.797	30.205	1389.667	1.700%	88.454%
32.0	516.080	29.990	1419.657	1.688%	90.363%
33.0	479.095	28.614	1448.271	1.610%	92.184%
34.0	416.138	25.518	1473.79	1.436%	93.809%
35.0	340.488	21.416	1495.206	1.205%	95.172%
36.0	261.661	16.866	1512.072	.949%	96.245%
37.0	192.537	12.707	1524.778	.715%	97.054%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	98.142	6.626	1531.404	.373%	97.476%
39.0	45.555	3.144	1534.548	.177%	97.676%
40.0	21.994	1.550	1536.098	.087%	97.775%
41.0	14.857	1.069	1537.167	.060%	97.843%
42.0	12.930	0.949	1538.116	.053%	97.903%
43.0	11.046	0.826	1538.942	.046%	97.956%
44.0	9.541	0.727	1539.669	.041%	98.002%
45.0	8.803	0.683	1540.352	.038%	98.045%
46.0	8.430	0.665	1541.017	.037%	98.088%
47.0	8.248	0.661	1541.678	.037%	98.130%
48.0	8.114	0.661	1542.339	.037%	98.172%
49.0	7.980	0.660	1543	.037%	98.214%
50.0	7.861	0.660	1543.66	.037%	98.256%
51.0	7.755	0.661	1544.321	.037%	98.298%
52.0	7.671	0.663	1544.984	.037%	98.340%
53.0	7.559	0.662	1545.646	.037%	98.382%
54.0	7.488	0.664	1546.31	.037%	98.425%
55.0	7.418	0.666	1546.977	.037%	98.467%
56.0	7.341	0.667	1547.644	.038%	98.510%
57.0	7.284	0.670	1548.314	.038%	98.552%
58.0	7.214	0.671	1548.985	.038%	98.595%
59.0	7.165	0.673	1549.658	.038%	98.638%
60.0	7.109	0.675	1550.334	.038%	98.681%
61.0	7.073	0.678	1551.012	.038%	98.724%
62.0	7.045	0.682	1551.694	.038%	98.767%
63.0	7.010	0.685	1552.379	.039%	98.811%
64.0	6.954	0.685	1553.064	.039%	98.855%
65.0	6.919	0.688	1553.752	.039%	98.898%
66.0	6.891	0.690	1554.442	.039%	98.942%
67.0	6.841	0.691	1555.133	.039%	98.986%
68.0	6.820	0.693	1555.826	.039%	99.030%
69.0	6.799	0.696	1556.523	.039%	99.075%
70.0	6.771	0.698	1557.22	.039%	99.119%
71.0	6.743	0.699	1557.919	.039%	99.164%
72.0	6.736	0.703	1558.622	.040%	99.208%
73.0	6.701	0.703	1559.325	.040%	99.253%
74.0	6.694	0.706	1560.03	.040%	99.298%
75.0	6.666	0.706	1560.736	.040%	99.343%

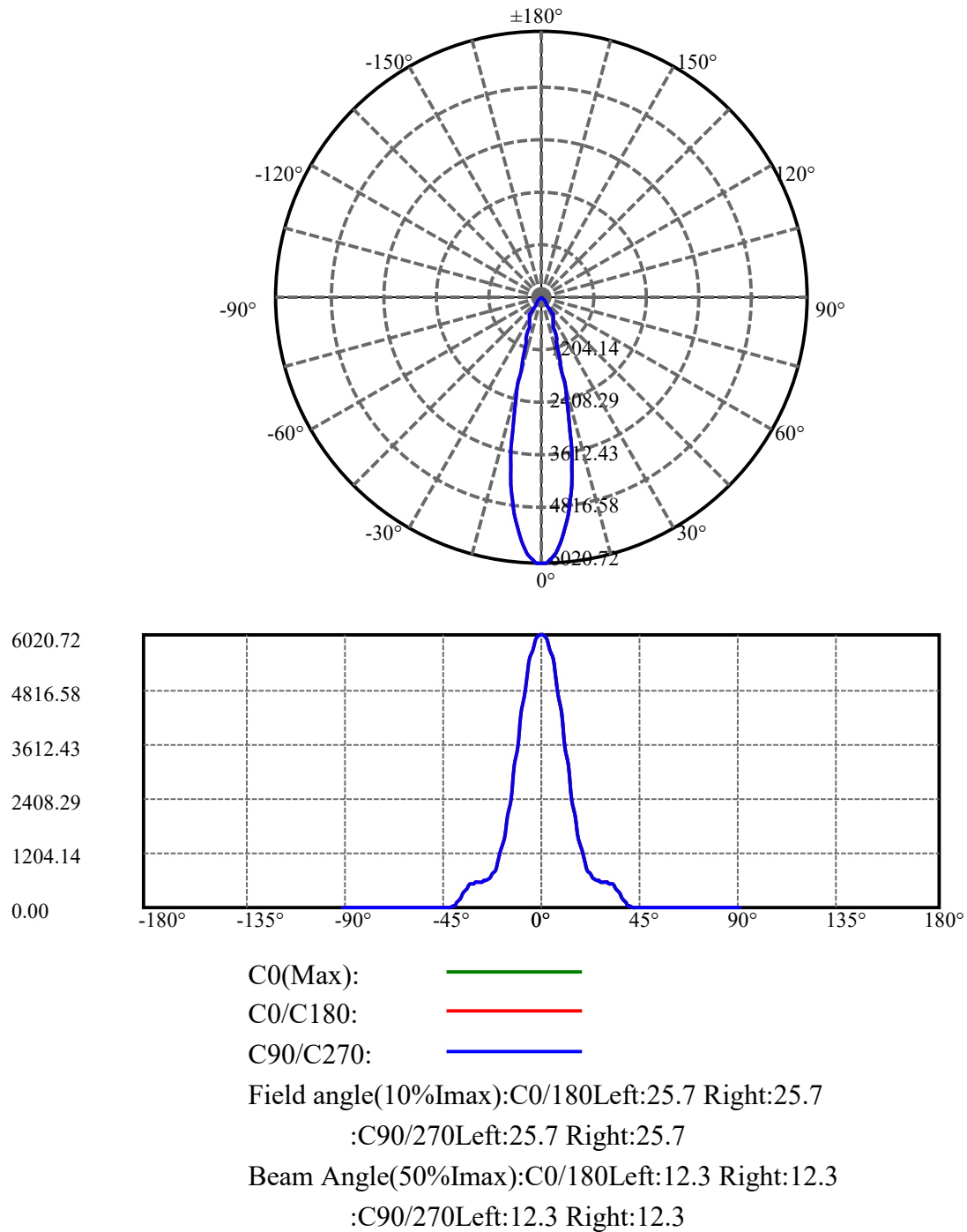
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	6.652	0.708	1561.444	.040%	99.388%
77.0	6.616	0.707	1562.151	.040%	99.433%
78.0	6.616	0.710	1562.861	.040%	99.478%
79.0	6.602	0.711	1563.571	.040%	99.523%
80.0	6.602	0.713	1564.284	.040%	99.569%
81.0	6.581	0.713	1564.997	.040%	99.614%
82.0	6.574	0.714	1565.711	.040%	99.660%
83.0	6.588	0.717	1566.428	.040%	99.705%
84.0	6.574	0.717	1567.145	.040%	99.751%
85.0	6.546	0.715	1567.86	.040%	99.796%
86.0	6.504	0.711	1568.572	.040%	99.842%
87.0	6.483	0.710	1569.282	.040%	99.887%
88.0	6.490	0.711	1569.993	.040%	99.932%
89.0	6.476	0.710	1570.703	.040%	99.977%
90.0	6.476	0.355	1571.058	.020%	100.000%

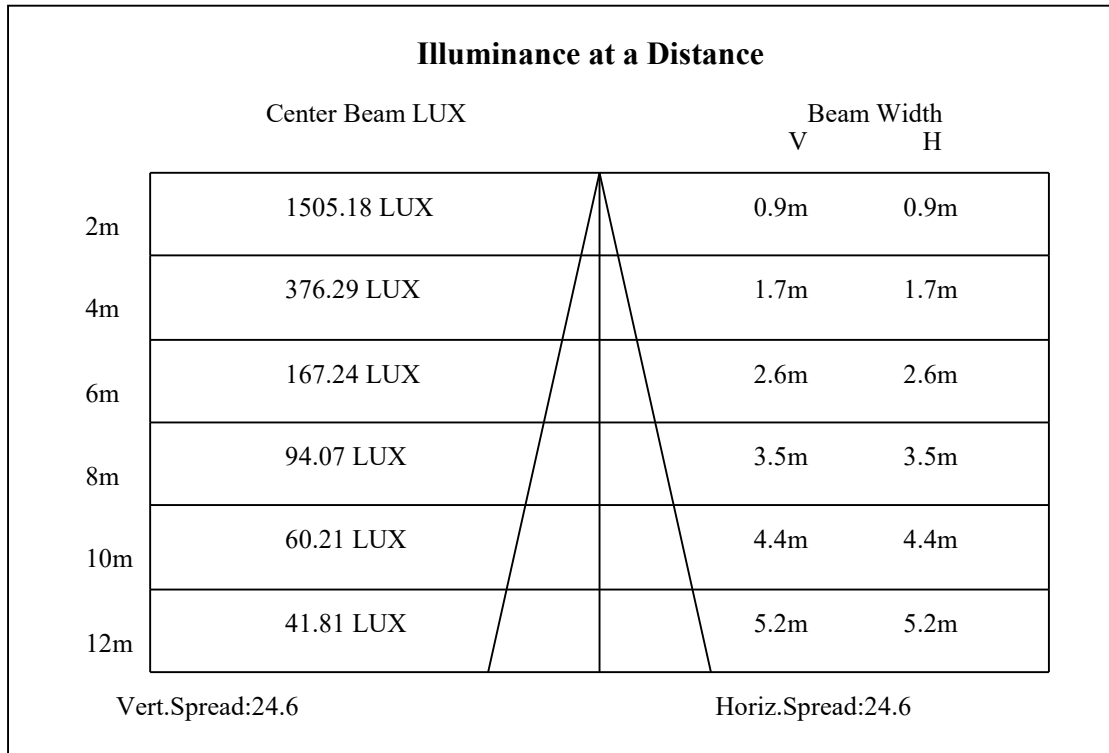
ZONAL LUMEN SUMMARY

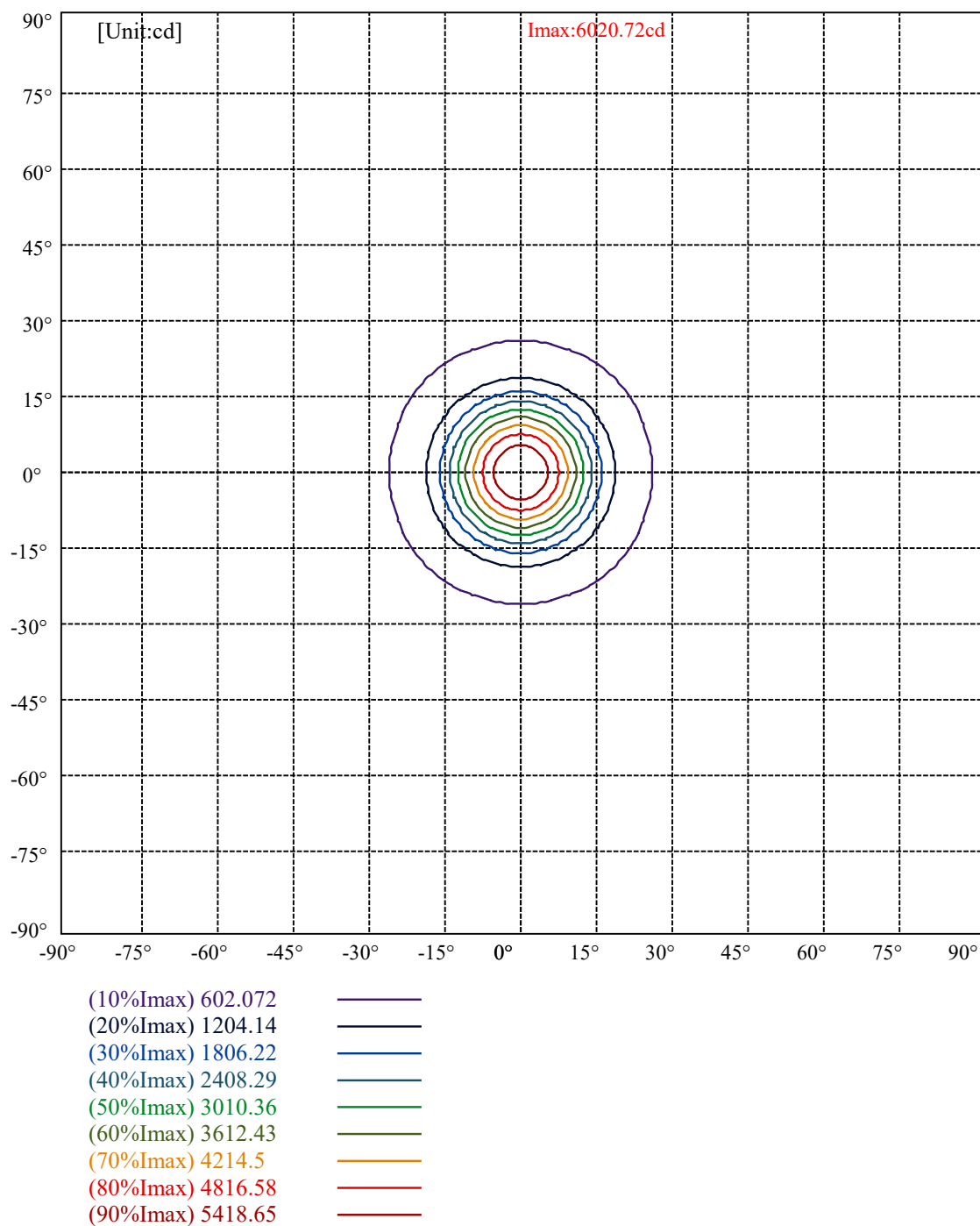
Zone	Lumens	%Lamp	%Fixt
0-30	1359.46	76.50%	86.53%
0-40	1536.10	86.44%	97.77%
0-60	1550.33	87.24%	98.68%
0-90	1570.70	88.39%	99.98%
0-120	1570.70	88.39%	99.98%
0-180	1571.06	88.41%	100.00%
60-90	21.04	1.18%	1.34%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-26.51	1256.85	70.73%	80.00%

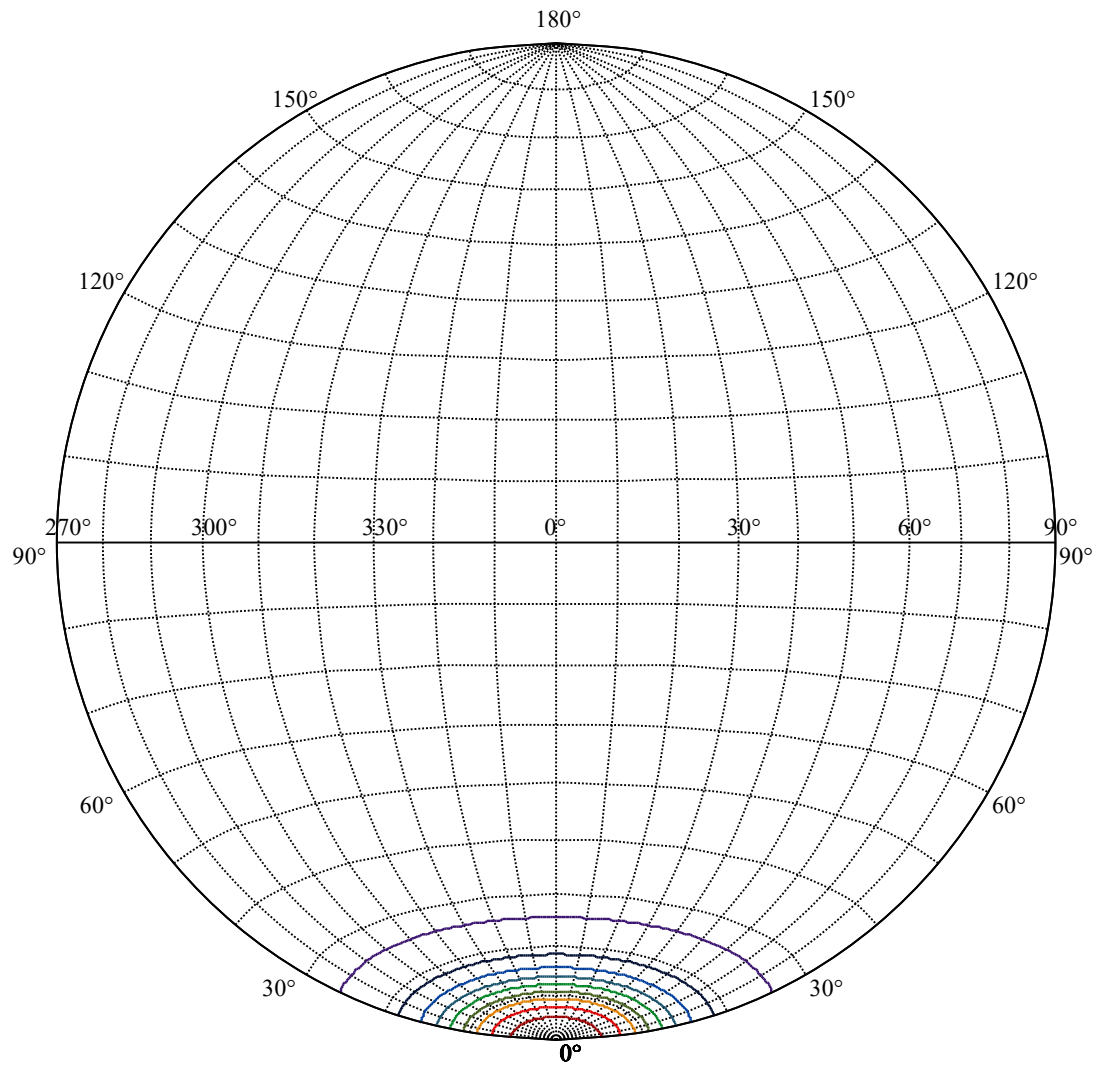
ZONAL LUMEN SUMMARY

0-10	510.47
10-20	552.13
20-30	296.86
30-40	176.64
40-50	7.56
50-60	6.67
60-70	6.89
70-80	7.06
80-90	6.42
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







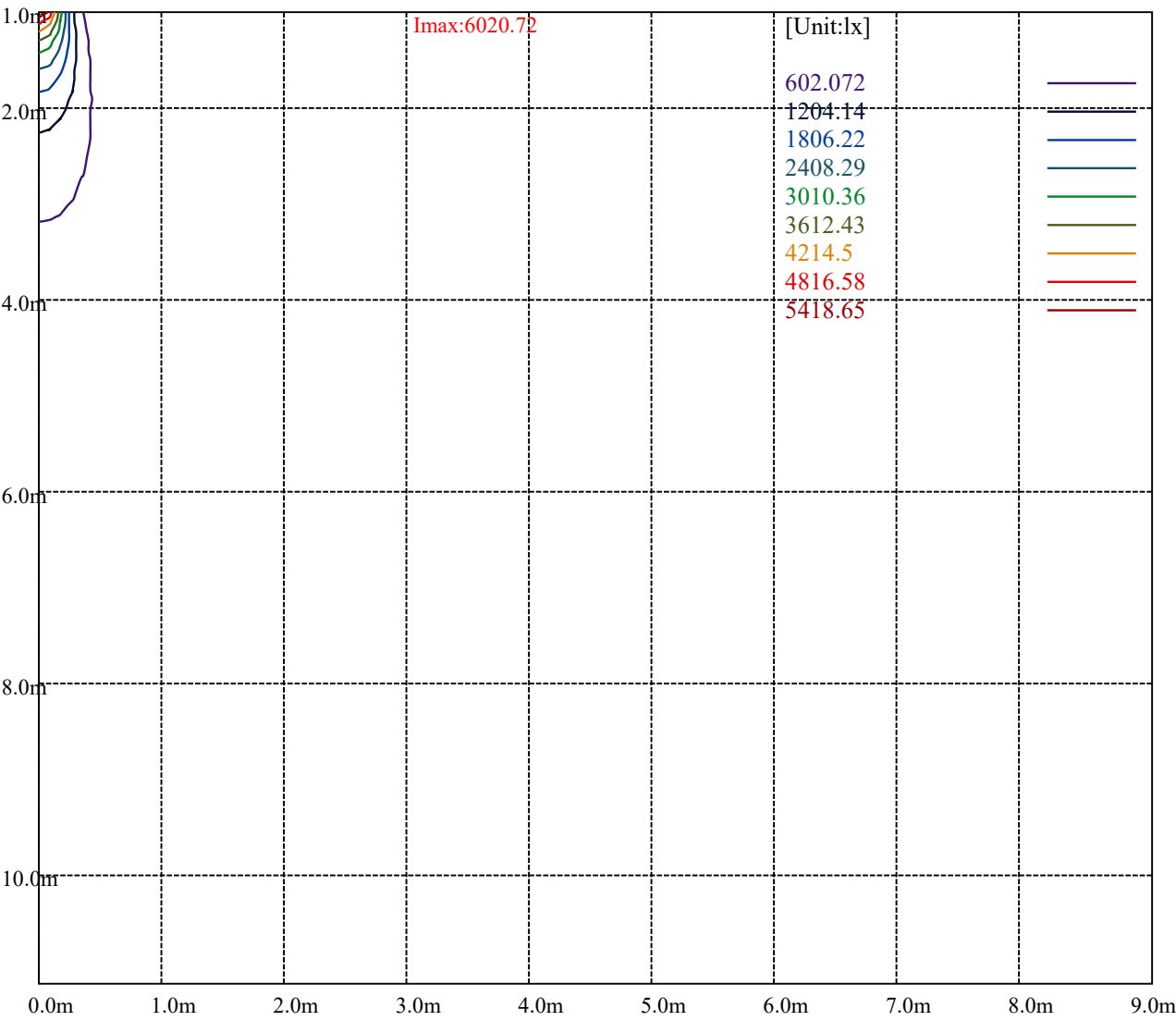


House

[Unit:cd]

Road

Imax:6020.72	
(10%Imax) 602.072	_____
(20%Imax) 1204.14	_____
(30%Imax) 1806.22	_____
(40%Imax) 2408.29	_____
(50%Imax) 3010.36	_____
(60%Imax) 3612.43	_____
(70%Imax) 4214.5	_____
(80%Imax) 4816.58	_____
(90%Imax) 5418.65	_____



Luminance Table

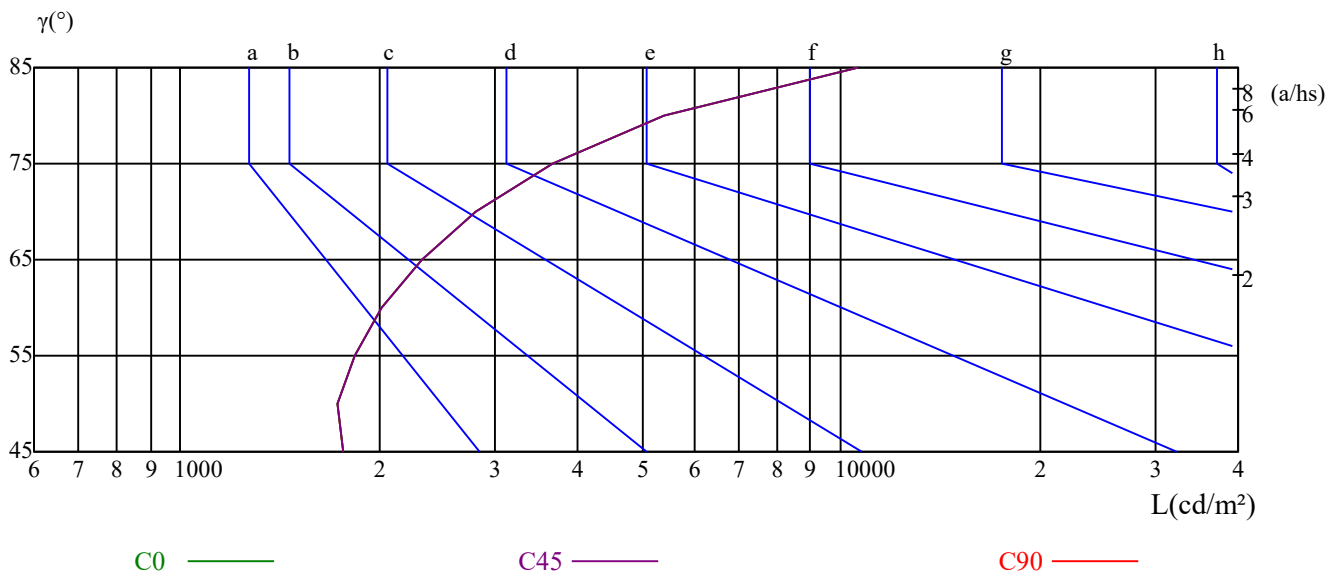
γ	45	50	55	60	65	70	75	80	85
C0	1764	1733	1833	2015	2320	2806	3650	5389	10645
C45	1764	1733	1833	2015	2320	2806	3650	5389	10645
C90	1764	1733	1833	2015	2320	2806	3650	5389	10645

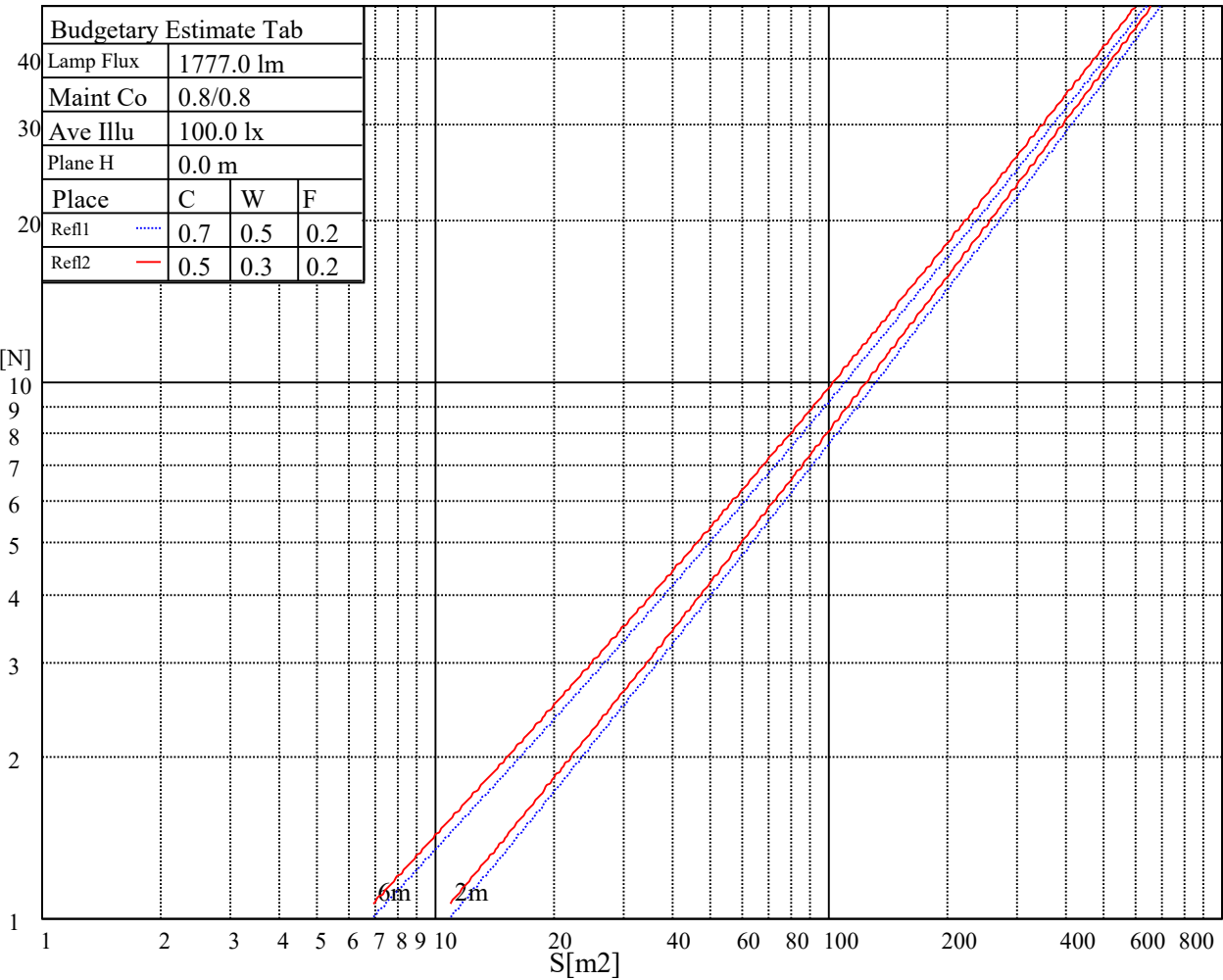
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
2320	2320	2320	3650	3650	3650	10645	10645	10645

Glare Table

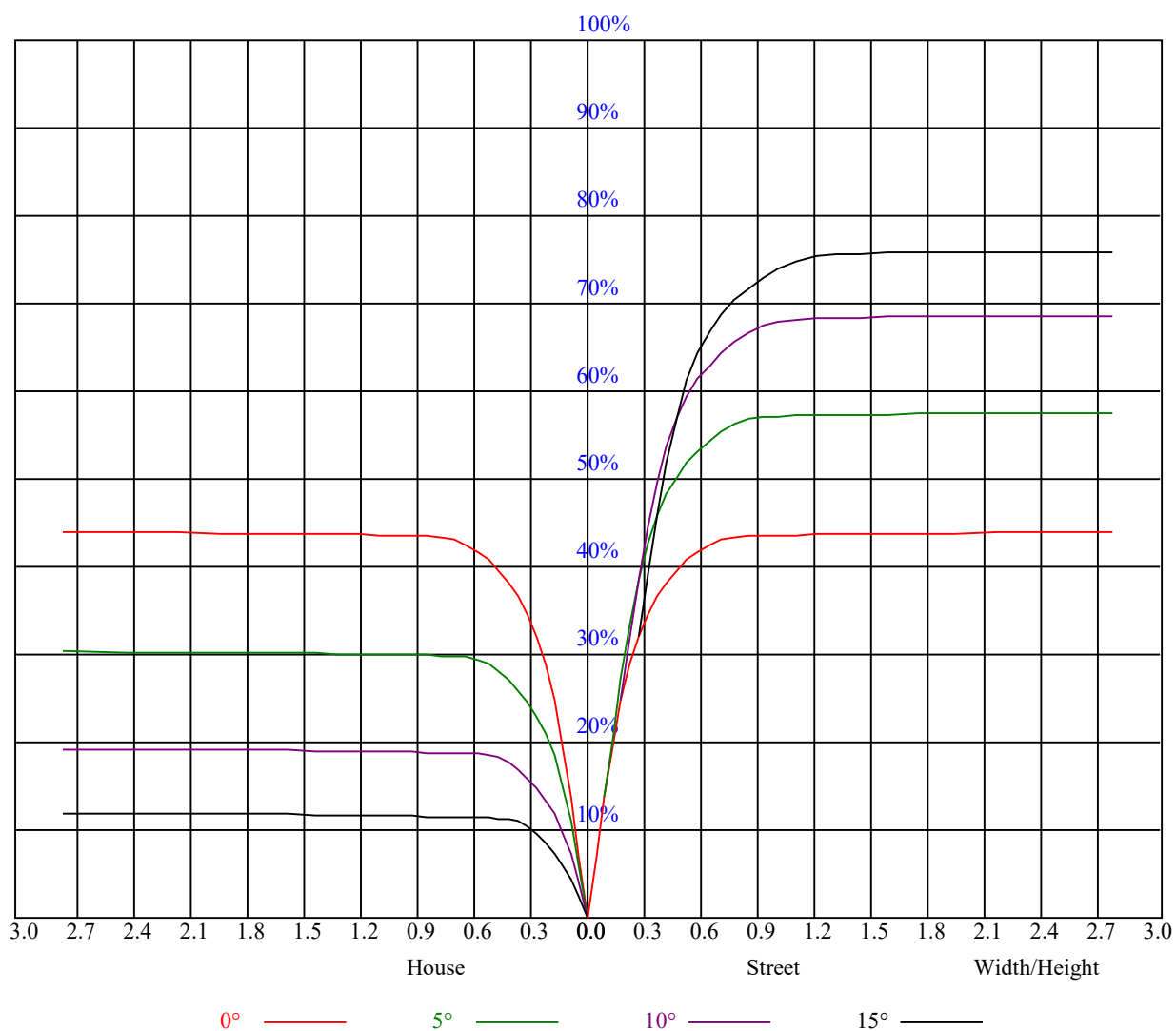
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

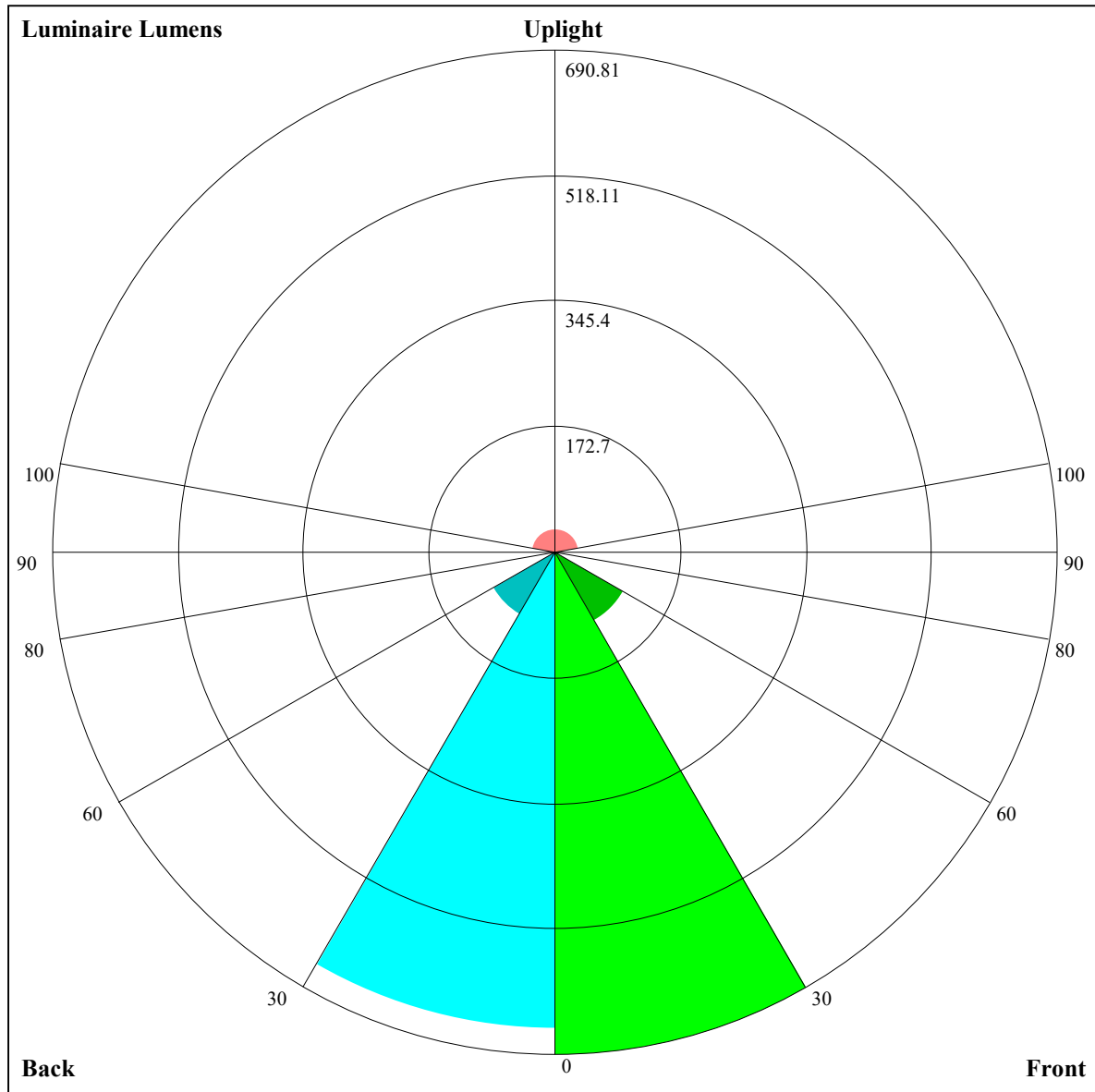
Luminance Limiting Curve





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	0.95	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	0.88	0.92	0.90	0.87	0.90	0.87	0.85	0.87	0.85	0.84	0.85	0.83	0.82	0.81
3	0.89	0.86	0.83	0.88	0.85	0.82	0.86	0.83	0.81	0.84	0.82	0.80	0.82	0.80	0.78	0.77
4	0.85	0.81	0.78	0.84	0.81	0.78	0.82	0.79	0.77	0.81	0.78	0.76	0.79	0.77	0.75	0.74
5	0.82	0.78	0.75	0.81	0.77	0.74	0.79	0.76	0.74	0.78	0.75	0.73	0.77	0.74	0.72	0.71
6	0.78	0.74	0.71	0.78	0.74	0.71	0.76	0.73	0.71	0.75	0.72	0.70	0.74	0.72	0.70	0.69
7	0.75	0.71	0.68	0.75	0.71	0.68	0.74	0.70	0.68	0.73	0.70	0.68	0.72	0.69	0.67	0.66
8	0.73	0.69	0.66	0.72	0.68	0.66	0.71	0.68	0.65	0.71	0.67	0.65	0.70	0.67	0.65	0.64
9	0.70	0.66	0.64	0.70	0.66	0.63	0.69	0.66	0.63	0.68	0.65	0.63	0.68	0.65	0.63	0.62
10	0.68	0.64	0.61	0.68	0.64	0.61	0.67	0.64	0.61	0.66	0.63	0.61	0.66	0.63	0.61	0.60





Luminaire Lumens:

FL=690.81,FM=107.84,FH=6.97,FVH=3.57

BL=656.43,BM=98.2,BH=6.98,BVH=3.57

UL=7.07,UH=33.62

BUG Rating:B2-U2-G0

NATA 3-2044-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	6010.31	6028.88	5999.06	5935.50	5819.63	5647.50	5447.81	5187.94	4924.13
45.0	6017.63	6033.94	6006.94	5941.13	5848.31	5695.31	5479.88	5258.81	5015.81
90.0	6033.94	6028.31	5991.19	5895.56	5771.25	5608.69	5353.88	5116.50	4835.25
135.0	6021.00	6014.81	5965.31	5887.69	5753.25	5565.94	5360.06	5081.63	4794.75
180.0	6010.31	5964.19	5886.56	5722.31	5538.38	5319.56	5033.25	4695.75	4367.81
225.0	6017.63	5961.38	5878.13	5727.94	5514.75	5282.44	5022.00	4656.38	4334.06
270.0	6033.94	6005.25	5927.63	5815.69	5652.56	5375.81	5114.25	4822.88	4471.31
315.0	6021.00	5992.88	5928.19	5790.38	5630.06	5421.94	5139.56	4818.94	4506.19
360.0	6010.31	6028.88	5999.06	5935.50	5819.63	5647.50	5447.81	5187.94	4924.13
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	4591.13	4222.69	3867.75	3448.69	3022.88	2654.44	2313.56	1941.75	1687.50
45.0	4651.31	4314.38	3954.94	3536.44	3106.13	2724.75	2333.25	2000.81	1746.00
90.0	4470.75	4076.44	3718.69	3310.31	2935.13	2527.31	2165.63	1891.13	1619.44
135.0	4431.38	4033.13	3667.50	3293.44	2819.25	2462.63	2145.38	1807.88	1572.19
180.0	3975.75	3567.94	3192.75	2779.88	2429.44	2079.56	1775.25	1540.13	1333.69
225.0	3992.06	3531.38	3151.69	2781.00	2391.19	2045.25	1775.81	1514.25	1294.31
270.0	4095.00	3733.88	3314.81	2945.81	2545.31	2171.25	1877.06	1590.19	1353.94
315.0	4126.50	3713.06	3330.56	2904.75	2545.88	2181.38	1866.94	1621.69	1407.94
360.0	4591.13	4222.69	3867.75	3448.69	3022.88	2654.44	2313.56	1941.75	1687.50
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	1469.81	1262.81	1085.63	948.94	825.75	736.31	682.31	640.69	615.38
45.0	1487.81	1294.31	1117.69	952.88	839.81	754.88	677.25	638.44	610.88
90.0	1385.44	1122.30	1047.26	888.30	788.79	714.77	658.91	622.18	599.51
135.0	1355.06	1176.75	999.00	876.94	783.56	704.81	654.19	623.81	598.50
180.0	1091.81	966.71	848.14	728.89	679.28	640.01	610.65	590.34	574.14
225.0	1110.71	973.69	860.06	760.16	692.16	651.21	623.19	596.42	583.43
270.0	1180.13	1033.31	881.44	785.81	717.19	665.44	631.13	610.31	591.19
315.0	1108.35	1036.91	909.96	785.03	715.05	666.73	630.62	606.77	589.61
360.0	1469.81	1262.81	1085.63	948.94	825.75	736.31	682.31	640.69	615.38
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	594.56	577.69	567.56	558.56	546.19	537.75	527.63	474.19	408.38
45.0	586.13	572.06	559.69	550.13	539.44	530.44	518.06	476.44	401.06
90.0	578.70	562.95	552.32	541.63	532.52	523.18	499.95	448.82	381.15
135.0	579.38	567.00	554.63	545.06	535.50	525.94	506.81	441.56	367.31
180.0	560.87	550.13	540.56	530.55	522.06	487.97	421.26	349.09	272.19
225.0	571.89	558.28	549.68	540.68	530.55	490.22	429.30	357.19	267.30
270.0	576.00	567.00	556.31	547.31	537.75	515.81	466.88	390.94	312.75
315.0	574.20	563.34	552.83	542.64	534.38	517.33	462.88	390.88	313.76
360.0	594.56	577.69	567.56	558.56	546.19	537.75	527.63	474.19	408.38
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	333.00	293.63	148.73	80.83	36.51	16.31	14.74	12.94	10.52
45.0	318.94	289.69	151.65	87.81	32.63	16.48	14.85	12.66	10.63
90.0	287.49	211.05	137.93	60.86	22.39	15.69	14.06	11.76	10.01
135.0	288.00	243.00	117.00	56.42	21.66	15.13	13.39	11.59	9.84
180.0	177.75	108.73	50.63	16.88	15.24	13.33	11.14	9.39	8.61
225.0	178.26	108.79	43.54	17.49	15.53	13.44	11.36	9.51	8.78
270.0	292.50	143.27	61.93	22.61	16.26	14.34	11.93	10.29	9.11
315.0	217.35	142.14	73.74	21.54	15.75	14.12	11.98	10.24	8.83
360.0	333.00	293.63	148.73	80.83	36.51	16.31	14.74	12.94	10.52

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	9.39	8.49	8.33	8.16	7.99	7.88	7.76	7.65	7.54
45.0	9.39	8.61	8.44	8.27	8.10	7.99	7.93	7.82	7.71
90.0	8.72	8.49	8.33	8.21	8.04	7.93	7.82	7.76	7.65
135.0	9.00	8.49	8.27	8.16	8.04	7.93	7.82	7.76	7.59
180.0	8.44	8.27	8.16	8.04	7.93	7.76	7.71	7.59	7.48
225.0	8.55	8.38	8.21	8.04	7.93	7.82	7.71	7.65	7.54
270.0	8.49	8.38	8.16	8.04	7.93	7.82	7.71	7.59	7.54
315.0	8.44	8.33	8.10	7.99	7.88	7.76	7.59	7.54	7.43
360.0	9.39	8.49	8.33	8.16	7.99	7.88	7.76	7.65	7.54
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	7.48	7.43	7.31	7.26	7.20	7.14	7.09	7.09	7.03
45.0	7.59	7.54	7.48	7.37	7.31	7.26	7.20	7.14	7.14
90.0	7.54	7.48	7.37	7.31	7.26	7.20	7.14	7.09	7.09
135.0	7.54	7.48	7.37	7.31	7.26	7.20	7.14	7.09	7.09
180.0	7.48	7.37	7.31	7.26	7.20	7.14	7.09	7.09	6.98
225.0	7.43	7.37	7.31	7.31	7.20	7.14	7.09	7.03	7.03
270.0	7.48	7.37	7.31	7.26	7.20	7.14	7.09	7.09	7.03
315.0	7.37	7.31	7.26	7.20	7.09	7.09	7.03	6.98	6.98
360.0	7.48	7.43	7.31	7.26	7.20	7.14	7.09	7.09	7.03
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	6.98	6.92	6.92	6.86	6.86	6.81	6.75	6.75	6.69
45.0	7.09	7.03	6.98	6.98	6.92	6.86	6.86	6.81	6.81
90.0	7.03	6.98	6.98	6.92	6.86	6.86	6.86	6.81	6.81
135.0	7.03	6.98	6.92	6.92	6.86	6.86	6.81	6.81	6.75
180.0	6.98	6.92	6.92	6.86	6.81	6.81	6.81	6.75	6.69
225.0	7.03	6.98	6.92	6.86	6.81	6.81	6.81	6.75	6.75
270.0	7.03	6.98	6.92	6.92	6.86	6.81	6.81	6.81	6.81
315.0	6.92	6.86	6.81	6.81	6.75	6.75	6.69	6.69	6.64
360.0	6.98	6.92	6.92	6.86	6.86	6.81	6.75	6.75	6.69
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	6.69	6.69	6.69	6.64	6.64	6.58	6.58	6.58	6.58
45.0	6.81	6.75	6.69	6.69	6.64	6.64	6.64	6.64	6.64
90.0	6.75	6.75	6.75	6.75	6.75	6.69	6.69	6.69	6.69
135.0	6.75	6.69	6.69	6.64	6.64	6.64	6.58	6.58	6.58
180.0	6.69	6.64	6.64	6.64	6.64	6.58	6.58	6.53	6.53
225.0	6.75	6.69	6.69	6.64	6.64	6.64	6.64	6.58	6.58
270.0	6.75	6.75	6.75	6.75	6.69	6.64	6.69	6.69	6.69
315.0	6.69	6.64	6.64	6.58	6.58	6.53	6.53	6.53	6.53
360.0	6.69	6.69	6.69	6.64	6.64	6.58	6.58	6.58	6.58
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	6.58	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.47
45.0	6.58	6.58	6.58	6.53	6.58	6.53	6.53	6.53	6.53
90.0	6.69	6.69	6.75	6.75	6.58	6.47	6.47	6.47	6.47
135.0	6.53	6.53	6.53	6.53	6.53	6.47	6.47	6.47	6.47
180.0	6.53	6.53	6.53	6.53	6.53	6.47	6.47	6.47	6.47
225.0	6.58	6.58	6.58	6.53	6.53	6.53	6.47	6.53	6.53
270.0	6.64	6.69	6.69	6.75	6.64	6.58	6.47	6.47	6.47
315.0	6.53	6.47	6.53	6.47	6.47	6.47	6.47	6.47	6.41
360.0	6.58	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.47

Intensity data(cd)

Appendix Page: 19 Total:19

C/ $\gamma(^{\circ})$	90.0
0.0	6.47
45.0	6.53
90.0	6.47
135.0	6.47
180.0	6.41
225.0	6.53
270.0	6.47
315.0	6.47
360.0	6.47