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Nata

LumCAT: 2-2180-M
Luminaire: BJB 47.360.1010
Report No: NATA0100
Test No: GC2020021306
LampCAT: CITIZEN CLU038
Lamp flux(lm): 2617.0
Number of Lamps: 1
Length(mm): 0
Phm Type: C

Voltage(V): 35.6900
Current(A): 0.5970
Power (W): 21.3000
PF: 0.0000
Ballast type: DC
Width(mm): 0
Height(mm): 0

Photometric Results

Lumens(lm): 2019.38
Efficiency(%): 77.16%
Lumens(lm)/Power(W): 94.81
Central intensity(cd): 13762.970
Maximum intensity(cd): 13762.970
Angle of maximum intensity: C=0.0 γ =0.0
Beam Angle(50%Imax): [C0/180]Total=17.3
[C90/270]Total=17.3
Field angle(10%Imax): [C0/180]Total=41.3
[C90/270]Total=41.3
Maximum s/h(1/2): C0_180=0.30 C90_270=0.30
Maximum s/h(1/4): C0_180=0.34 C90_270=0.34
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 77.16%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.296%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	13762.969	0.000	0	.000%	.000%
1.0	13624.453	13.104	13.104	.501%	.649%
2.0	13070.813	38.316	51.42	1.464%	2.546%
3.0	12304.969	60.691	112.11	2.319%	5.552%
4.0	11610.211	80.052	192.162	3.059%	9.516%
5.0	10534.852	95.267	287.429	3.640%	14.234%
6.0	9444.094	104.995	392.424	4.012%	19.433%
7.0	8448.539	111.059	503.483	4.244%	24.933%
8.0	7502.414	114.158	617.641	4.362%	30.586%
9.0	6566.555	114.021	731.662	4.357%	36.232%
10.0	5770.688	111.648	843.31	4.266%	41.761%
11.0	5087.039	108.491	951.801	4.146%	47.133%
12.0	4485.867	104.646	1056.446	3.999%	52.315%
13.0	3921.188	99.771	1156.217	3.812%	57.256%
14.0	3465.563	94.550	1250.767	3.613%	61.938%
15.0	3082.008	89.888	1340.655	3.435%	66.389%
16.0	2708.719	84.850	1425.505	3.242%	70.591%
17.0	2406.586	79.659	1505.164	3.044%	74.536%
18.0	2076.680	73.919	1579.083	2.825%	78.196%
19.0	1799.086	67.430	1646.514	2.577%	81.535%
20.0	1530.401	60.939	1707.453	2.329%	84.553%
21.0	1284.188	54.046	1761.498	2.065%	87.230%
22.0	1048.908	46.885	1808.383	1.792%	89.551%
23.0	861.652	40.089	1848.472	1.532%	91.536%
24.0	647.684	32.999	1881.471	1.261%	93.171%
25.0	474.420	25.514	1906.985	.975%	94.434%
26.0	328.219	18.946	1925.932	.724%	95.372%
27.0	207.527	13.107	1939.039	.501%	96.021%
28.0	112.366	8.099	1947.138	.309%	96.422%
29.0	52.959	4.325	1951.463	.165%	96.637%
30.0	26.670	2.150	1953.613	.082%	96.743%
31.0	18.464	1.256	1954.869	.048%	96.805%
32.0	16.678	1.007	1955.876	.038%	96.855%
33.0	15.834	0.958	1956.834	.037%	96.903%
34.0	15.195	0.939	1957.773	.036%	96.949%
35.0	14.562	0.924	1958.697	.035%	96.995%
36.0	14.112	0.913	1959.61	.035%	97.040%
37.0	13.760	0.909	1960.519	.035%	97.085%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	13.451	0.908	1961.427	.035%	97.130%
39.0	13.170	0.909	1962.336	.035%	97.175%
40.0	13.008	0.913	1963.249	.035%	97.220%
41.0	12.860	0.921	1964.17	.035%	97.266%
42.0	12.755	0.931	1965.101	.036%	97.312%
43.0	12.663	0.942	1966.042	.036%	97.359%
44.0	12.614	0.954	1966.996	.036%	97.406%
45.0	12.586	0.968	1967.965	.037%	97.454%
46.0	12.572	0.984	1968.949	.038%	97.502%
47.0	12.586	1.001	1969.949	.038%	97.552%
48.0	12.607	1.018	1970.968	.039%	97.602%
49.0	12.642	1.037	1972.004	.040%	97.654%
50.0	12.720	1.057	1973.062	.040%	97.706%
51.0	12.790	1.079	1974.141	.041%	97.760%
52.0	12.874	1.101	1975.242	.042%	97.814%
53.0	12.987	1.125	1976.367	.043%	97.870%
54.0	13.092	1.149	1977.517	.044%	97.927%
55.0	13.240	1.175	1978.692	.045%	97.985%
56.0	13.380	1.203	1979.895	.046%	98.045%
57.0	13.528	1.230	1981.125	.047%	98.105%
58.0	13.648	1.257	1982.382	.048%	98.168%
59.0	13.802	1.283	1983.665	.049%	98.231%
60.0	13.957	1.311	1984.977	.050%	98.296%
61.0	14.112	1.339	1986.316	.051%	98.363%
62.0	14.189	1.364	1987.68	.052%	98.430%
63.0	14.203	1.381	1989.061	.053%	98.498%
64.0	14.189	1.393	1990.454	.053%	98.567%
65.0	14.112	1.401	1991.855	.054%	98.637%
66.0	13.992	1.402	1993.257	.054%	98.706%
67.0	13.774	1.396	1994.653	.053%	98.775%
68.0	13.458	1.379	1996.033	.053%	98.844%
69.0	13.191	1.359	1997.392	.052%	98.911%
70.0	12.895	1.340	1998.732	.051%	98.977%
71.0	12.502	1.313	2000.044	.050%	99.042%
72.0	12.038	1.276	2001.32	.049%	99.106%
73.0	11.391	1.225	2002.546	.047%	99.166%
74.0	11.102	1.183	2003.728	.045%	99.225%
75.0	10.786	1.156	2004.885	.044%	99.282%

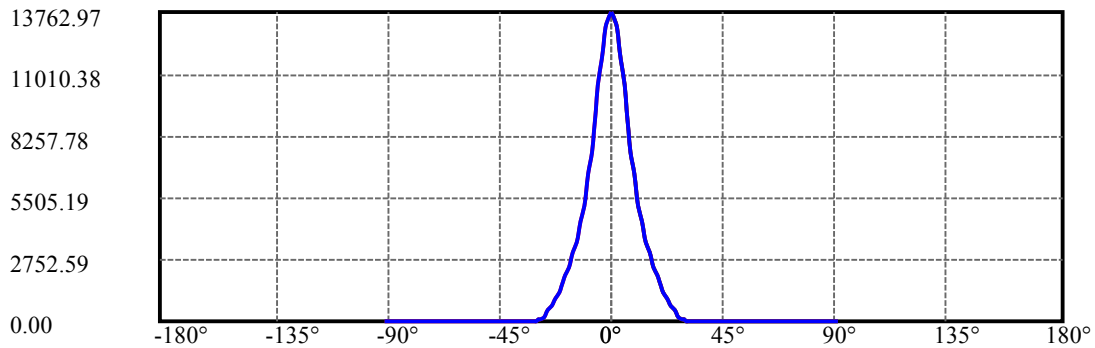
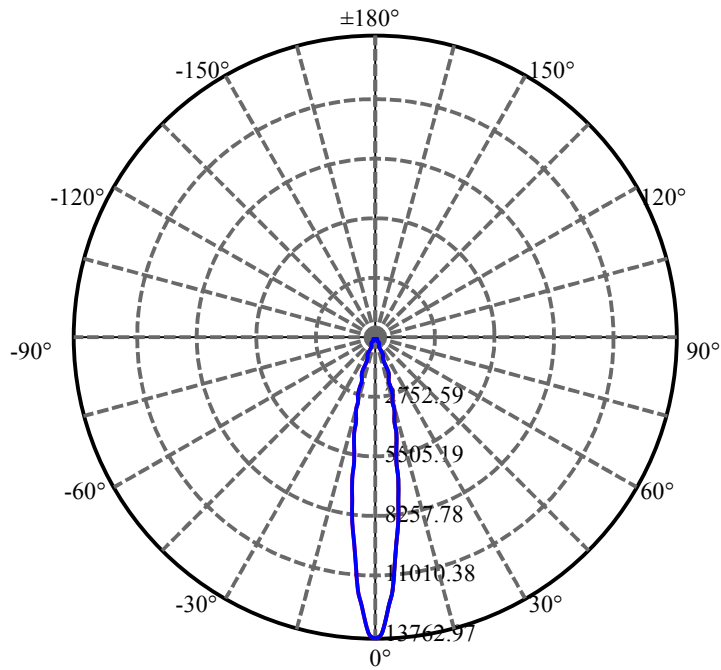
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	10.448	1.127	2006.012	.043%	99.338%
77.0	10.118	1.097	2007.108	.042%	99.392%
78.0	9.780	1.065	2008.173	.041%	99.445%
79.0	9.422	1.032	2009.205	.039%	99.496%
80.0	9.155	1.002	2010.207	.038%	99.546%
81.0	8.944	0.979	2011.185	.037%	99.594%
82.0	8.754	0.960	2012.145	.037%	99.642%
83.0	8.592	0.943	2013.088	.036%	99.688%
84.0	8.487	0.930	2014.019	.036%	99.734%
85.0	8.409	0.922	2014.941	.035%	99.780%
86.0	8.367	0.917	2015.858	.035%	99.825%
87.0	8.198	0.907	2016.764	.035%	99.870%
88.0	7.988	0.887	2017.651	.034%	99.914%
89.0	7.882	0.870	2018.521	.033%	99.957%
90.0	7.840	0.862	2019.383	.033%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	1953.61	74.65%	96.74%
0-40	1963.25	75.02%	97.22%
0-60	1984.98	75.85%	98.30%
0-90	2018.52	77.13%	99.96%
0-120	2018.52	77.13%	99.96%
0-180	2019.38	77.16%	100.00%
60-90	34.86	1.33%	1.73%
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%
0-18.54	1615.51	61.73%	80.00%

ZONAL LUMEN SUMMARY

0-10	843.31
10-20	864.14
20-30	246.16
30-40	9.64
40-50	9.81
50-60	11.92
60-70	13.75
70-80	11.47
80-90	8.31
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:

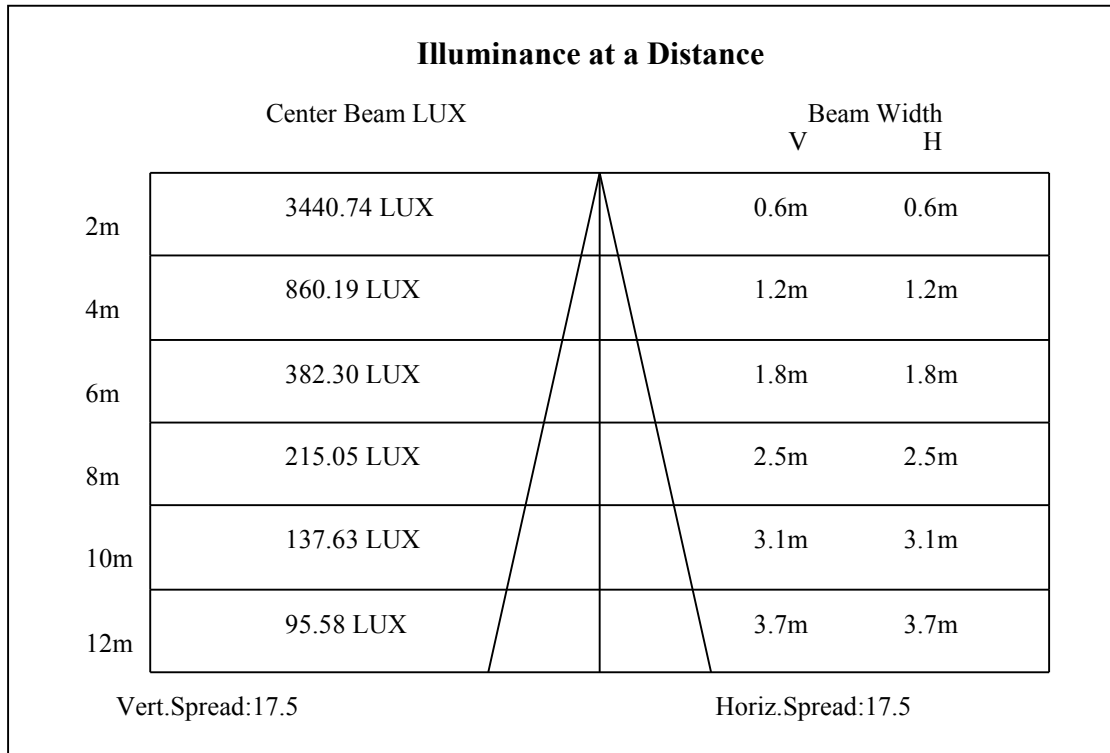
C90/C270:

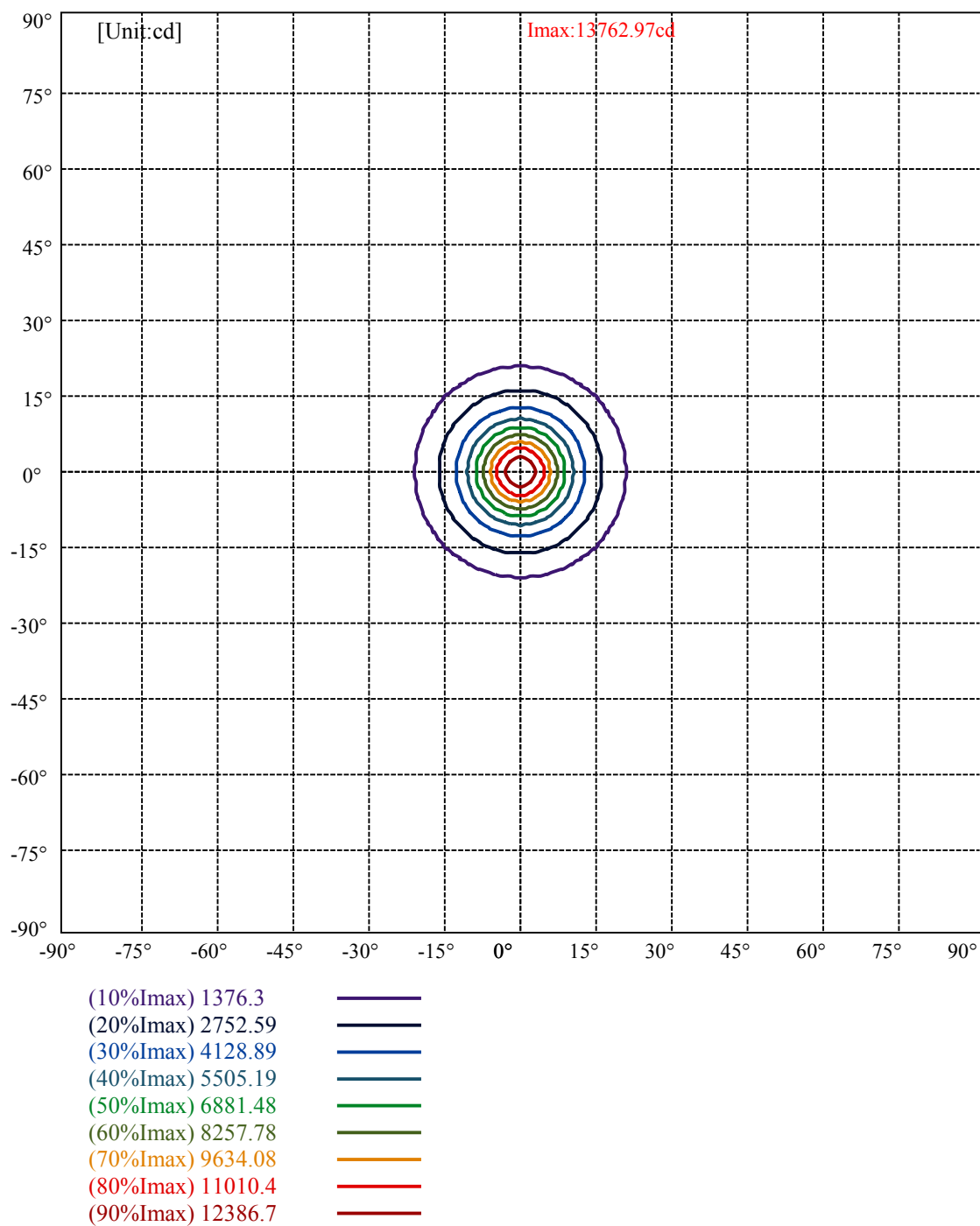
Field angle(10%Imax):C0/180Left:20.6 Right:20.6

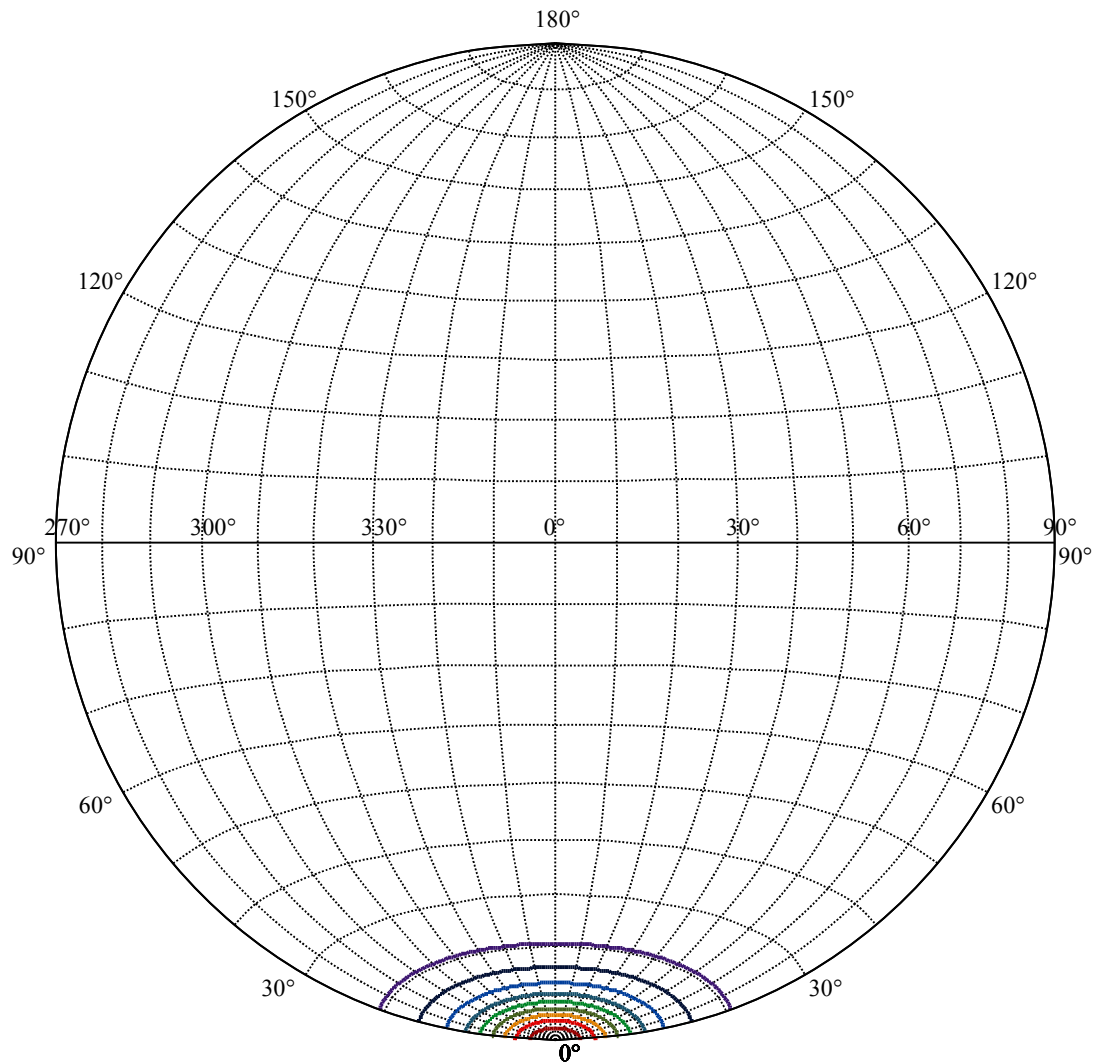
:C90/270Left:20.6 Right:20.6

Beam Angle(50%Imax):C0/180Left:8.7 Right:8.7

:C90/270Left:8.7 Right:8.7







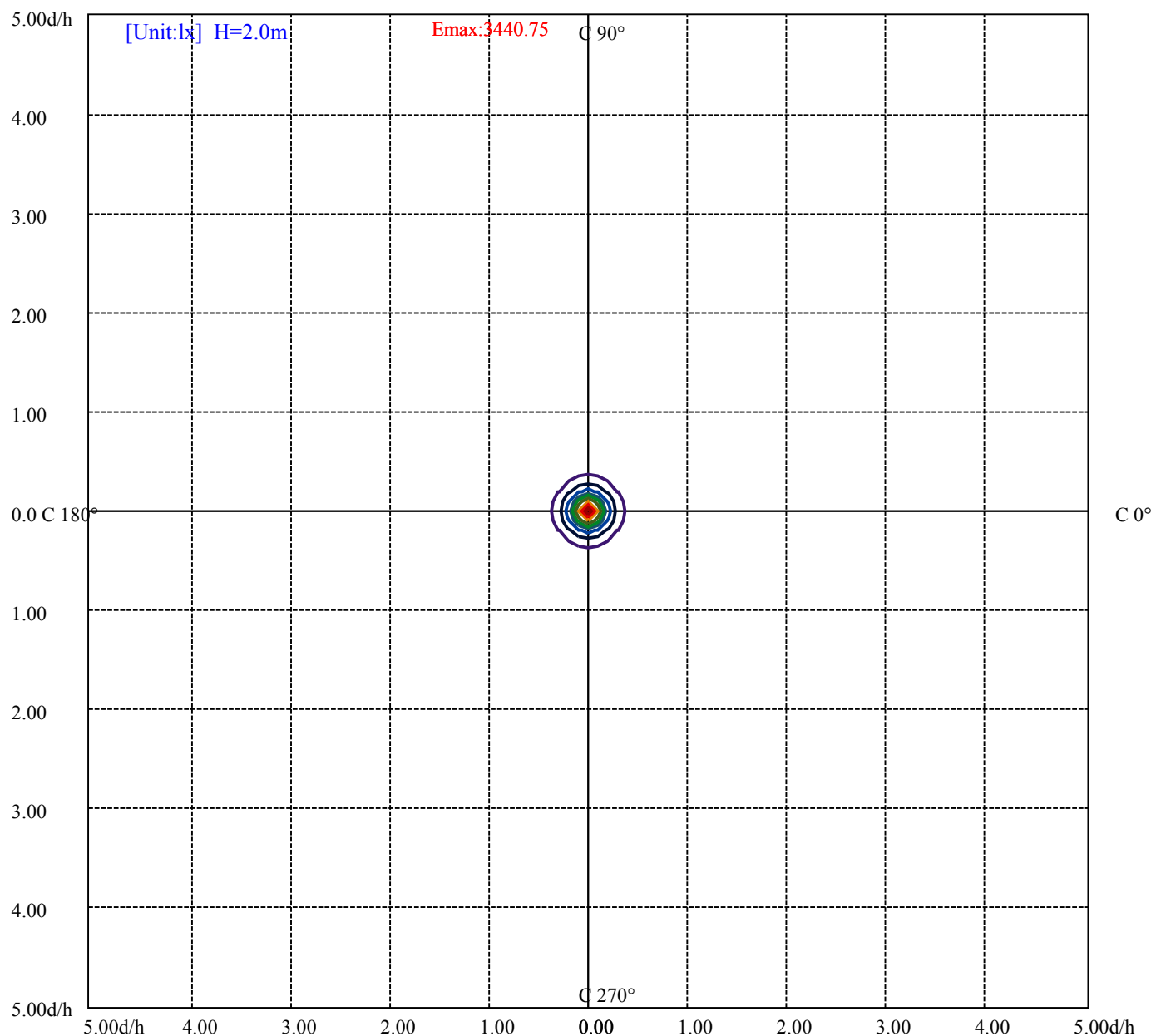
House

[Unit:cd]

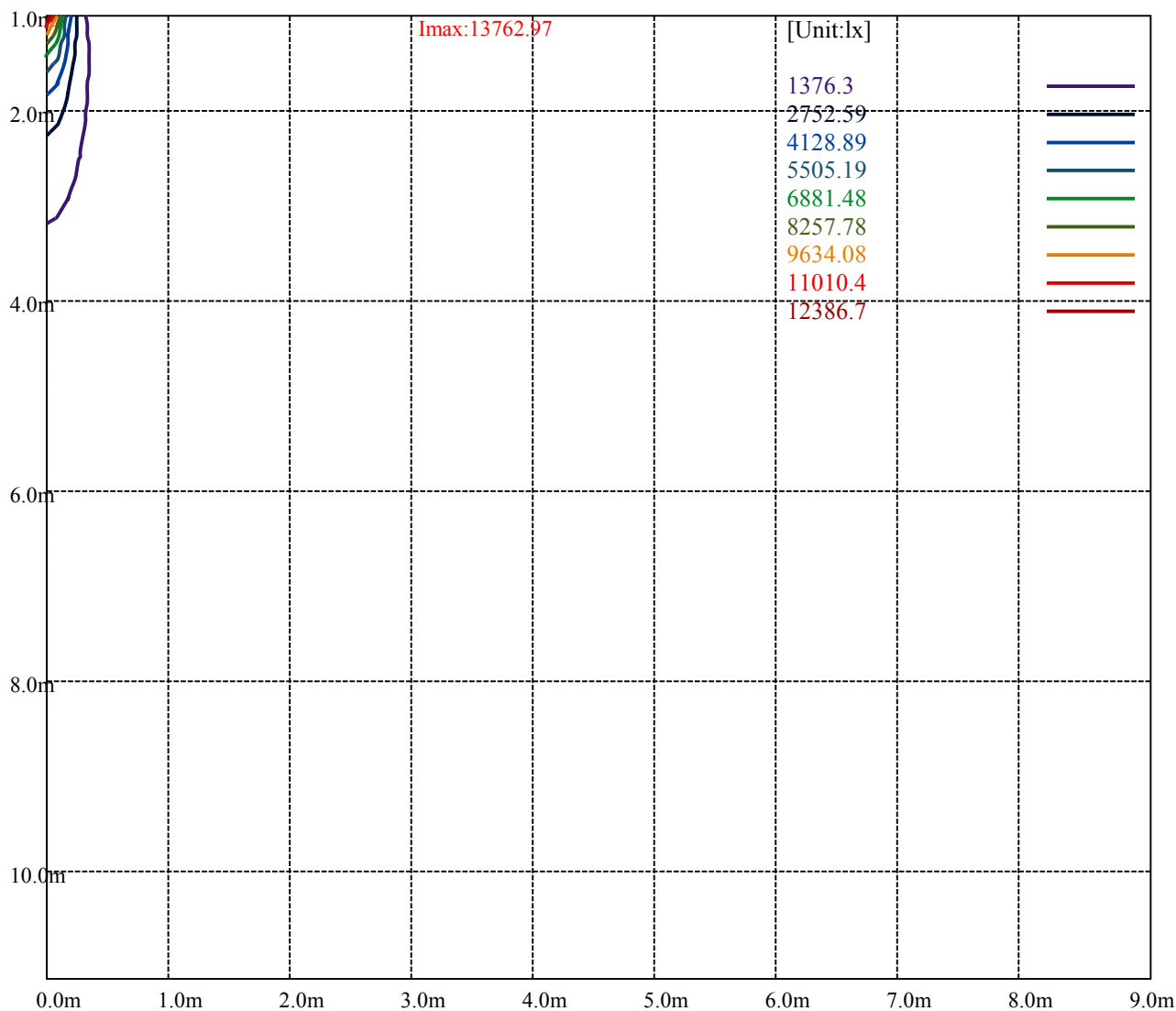
Road

Imax:13762.97

(10%Imax)	1376.3	—
(20%Imax)	2752.59	—
(30%Imax)	4128.89	—
(40%Imax)	5505.19	—
(50%Imax)	6881.48	—
(60%Imax)	8257.78	—
(70%Imax)	9634.08	—
(80%Imax)	11010.4	—
(90%Imax)	12386.7	—



(10%Emax) 344.0725	—
(20%Emax) 688.1475	—
(30%Emax) 1032.22	—
(40%Emax) 1376.295	—
(50%Emax) 1720.368	—
(60%Emax) 2064.442	—
(70%Emax) 2408.515	—
(80%Emax) 2752.6	—
(90%Emax) 3096.675	—



Luminance Table

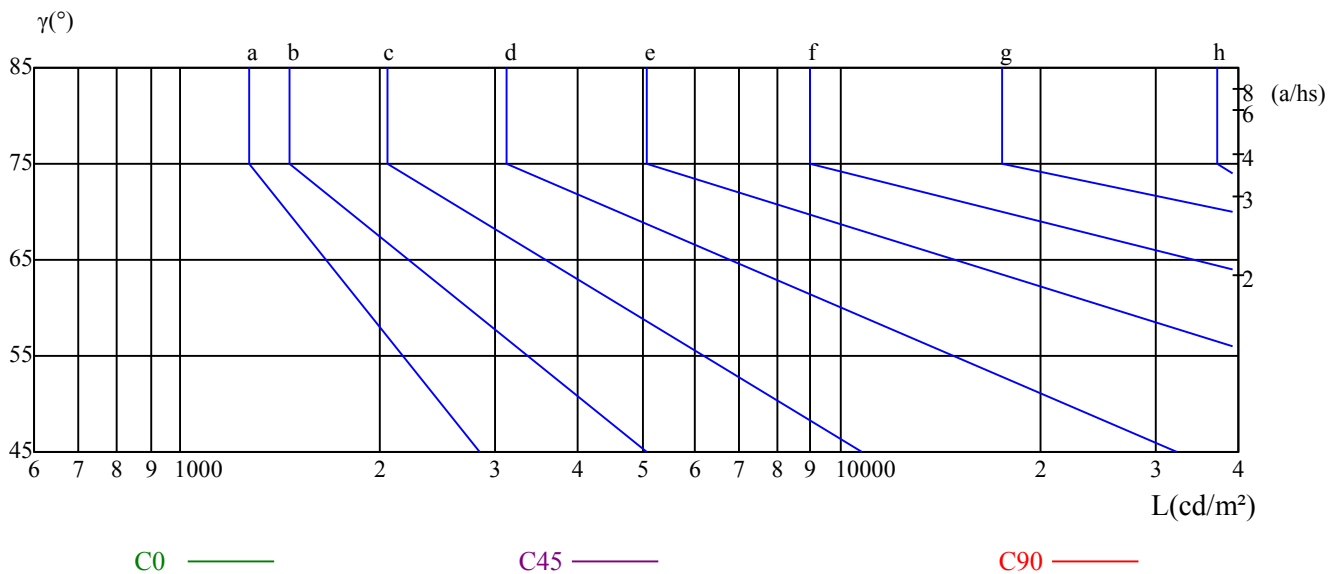
γ	45	50	55	60	65	70	75	80	85
C0	0	0	0	0	0	0	0	0	0
C45	0	0	0	0	0	0	0	0	0
C90	0	0	0	0	0	0	0	0	0

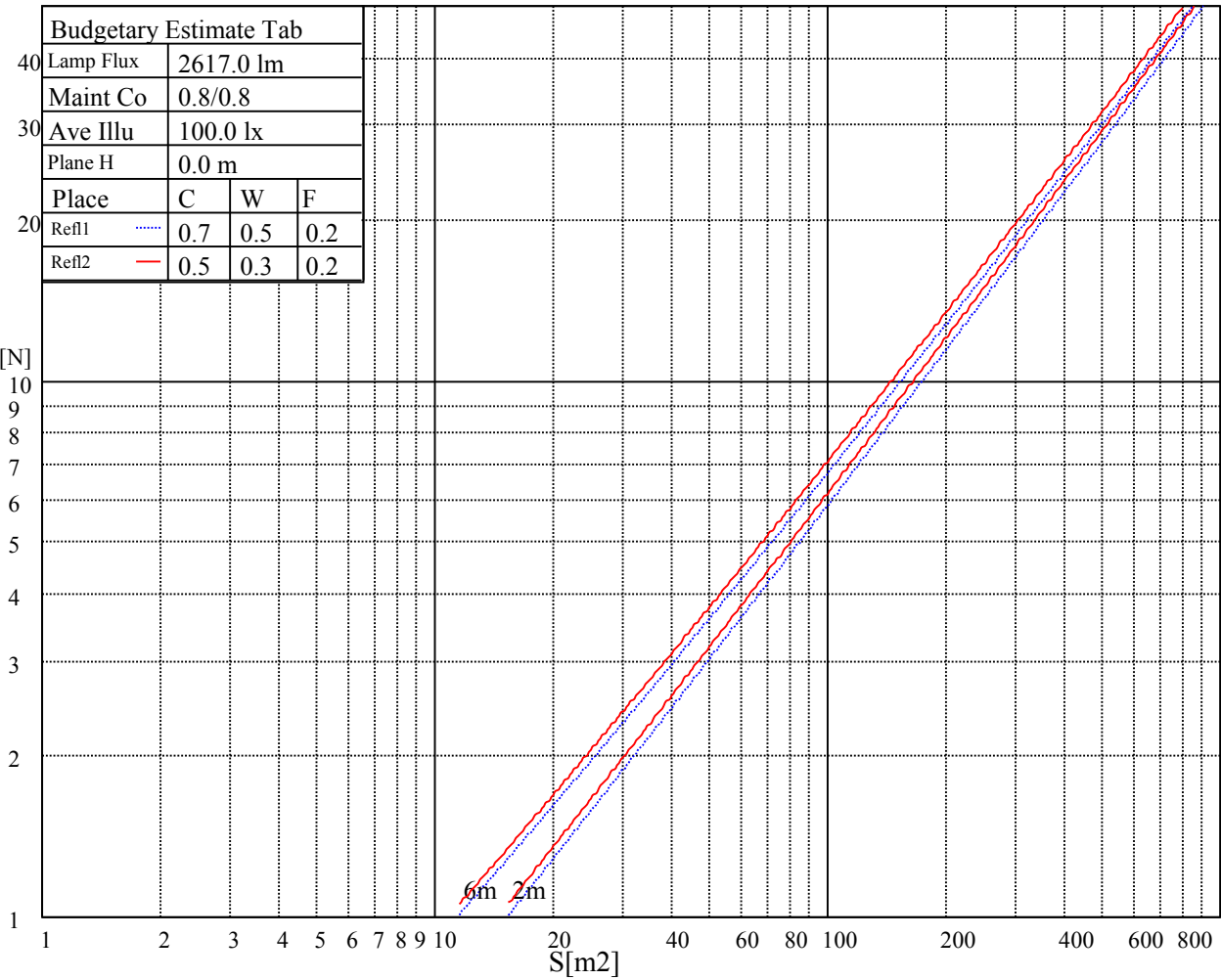
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
0	0	0	0	0	0	0	0	0

Glare Table

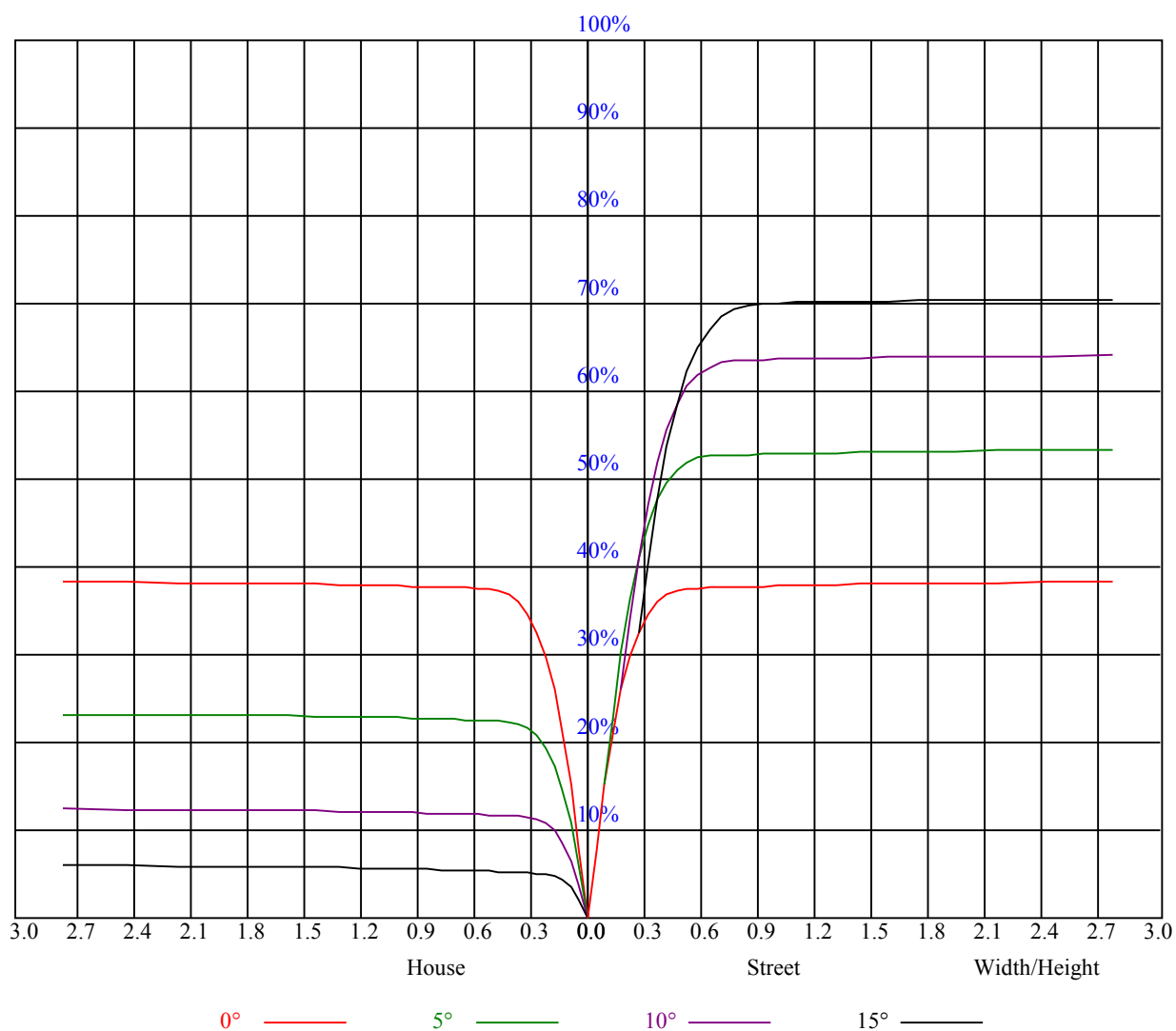
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

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	0.92	0.92	0.92	0.90	0.90	0.90	0.86	0.86	0.86	0.82	0.82	0.82	0.79	0.79	0.79	0.77
1	0.87	0.86	0.84	0.85	0.84	0.83	0.82	0.81	0.80	0.79	0.79	0.78	0.77	0.76	0.76	0.74
2	0.83	0.81	0.79	0.82	0.80	0.78	0.79	0.78	0.76	0.77	0.76	0.75	0.75	0.74	0.73	0.72
3	0.80	0.77	0.75	0.79	0.76	0.74	0.77	0.75	0.73	0.75	0.73	0.72	0.73	0.72	0.71	0.70
4	0.77	0.74	0.72	0.76	0.73	0.71	0.75	0.72	0.70	0.73	0.71	0.70	0.72	0.70	0.69	0.68
5	0.74	0.71	0.69	0.74	0.71	0.69	0.72	0.70	0.68	0.71	0.69	0.68	0.70	0.69	0.67	0.66
6	0.72	0.69	0.67	0.72	0.69	0.67	0.71	0.68	0.66	0.70	0.67	0.66	0.69	0.67	0.65	0.65
7	0.70	0.67	0.65	0.70	0.67	0.65	0.69	0.66	0.64	0.68	0.66	0.64	0.67	0.65	0.64	0.63
8	0.68	0.65	0.63	0.68	0.65	0.63	0.67	0.65	0.63	0.67	0.64	0.63	0.66	0.64	0.62	0.62
9	0.67	0.64	0.62	0.66	0.63	0.61	0.66	0.63	0.61	0.65	0.63	0.61	0.65	0.62	0.61	0.60
10	0.65	0.62	0.60	0.65	0.62	0.60	0.64	0.62	0.60	0.64	0.61	0.60	0.63	0.61	0.60	0.59



Nata 2-2180-M

Intensity data(cd)										Appendix Page: 16 Total:18	
C/γ(°)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0		
0.0	13618.13	13955.63	14045.63	13798.13	13359.38	12403.13	11351.25	10462.50	9191.25		
45.0	13831.88	13876.88	13567.50	13027.50	12166.88	11272.50	10158.75	9005.63	8043.75		
90.0	13736.25	13365.00	12746.25	11115.00	10746.56	9738.56	8477.44	7521.75	6672.38		
135.0	13865.63	13353.75	12538.13	11626.88	10507.50	9478.13	8341.88	7273.13	6451.88		
180.0	13618.13	13027.50	11135.25	11007.56	9965.25	8933.06	7698.94	6805.69	6023.81		
225.0	13831.88	13494.38	12909.38	11185.31	10936.13	9901.69	8502.75	7670.81	6807.38		
270.0	13736.25	13871.25	13651.88	13173.75	12341.25	11435.63	10288.13	9151.88	8167.50		
315.0	13865.63	14051.25	13972.50	13505.63	12858.75	11116.13	10733.63	9696.94	8661.38		
360.0	13618.13	13955.63	14045.63	13798.13	13359.38	12403.13	11351.25	10462.50	9191.25		
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0		
0.0	8088.75	7284.38	6260.63	5546.25	4916.25	4230.00	3751.88	3324.38	2868.75		
45.0	7053.75	6165.00	5473.13	4860.00	4201.88	3740.63	3335.63	2930.63	2851.88		
90.0	5832.56	5108.06	4547.81	3998.25	3516.19	3135.94	2754.00	2449.69	2136.38		
135.0	5658.75	5028.75	4404.38	3920.63	3448.13	3031.88	2863.13	2403.00	2062.13		
180.0	5258.25	4598.44	4088.81	3592.69	3157.31	2812.50	2460.94	2179.13	1883.81		
225.0	5940.56	5182.31	4597.88	4023.56	3522.94	3137.06	2754.56	2441.81	2122.31		
270.0	7138.13	6221.25	5512.50	4888.13	4201.88	3729.38	3313.13	2902.50	2674.13		
315.0	7561.69	6577.31	5811.19	5057.44	4404.94	3907.13	3422.81	3038.63	2653.31		
360.0	8088.75	7284.38	6260.63	5546.25	4916.25	4230.00	3751.88	3324.38	2868.75		
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0		
0.0	2686.50	2261.81	1931.63	1685.81	1454.06	1217.25	984.38	786.38	574.31		
45.0	2283.19	1977.19	1700.44	1460.81	1209.38	1011.38	786.94	571.50	399.38		
90.0	1839.38	1595.25	1371.94	1104.30	898.93	706.50	489.71	341.66	217.01		
135.0	1801.13	1555.88	1287.56	1061.44	858.94	642.94	461.81	305.44	219.04		
180.0	1604.81	1377.00	1107.39	904.28	712.86	535.95	346.05	224.55	127.01		
225.0	1834.88	1596.94	1373.63	1111.61	907.99	715.16	512.04	335.98	212.91		
270.0	2246.63	1981.13	1675.69	1445.63	1231.31	999.56	780.75	596.25	410.06		
315.0	2316.94	2047.50	1794.94	1499.63	1117.80	1064.48	819.79	633.60	466.03		
360.0	2686.50	2261.81	1931.63	1685.81	1454.06	1217.25	984.38	786.38	574.31		
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0		
0.0	407.81	286.31	132.92	59.85	23.85	17.16	15.86	14.79	13.73		
45.0	297.00	152.16	60.58	25.26	18.34	17.21	16.43	15.86	15.13		
90.0	120.04	40.84	21.04	19.07	17.94	17.04	16.43	15.86	15.47		
135.0	90.56	31.73	17.55	16.37	15.47	14.79	14.29	13.89	13.50		
180.0	50.18	19.97	16.09	14.74	13.84	12.99	12.38	11.93	11.48		
225.0	117.68	43.88	21.99	19.18	17.83	16.88	16.09	15.41	14.79		
270.0	288.00	143.94	60.81	28.63	20.76	19.35	18.39	17.61	16.88		
315.0	288.96	180.11	92.70	30.26	19.69	18.00	16.82	16.20	15.53		
360.0	407.81	286.31	132.92	59.85	23.85	17.16	15.86	14.79	13.73		
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0		
0.0	12.94	12.43	11.93	11.42	11.08	10.86	10.58	10.46	10.35		
45.0	14.68	14.29	13.95	13.73	13.56	13.39	13.28	13.16	13.05		
90.0	15.13	14.85	14.68	14.46	14.34	14.23	14.18	14.12	14.18		
135.0	13.28	12.99	12.77	12.54	12.49	12.38	12.26	12.21	12.09		
180.0	11.14	10.91	10.69	10.46	10.35	10.24	10.18	10.07	10.07		
225.0	14.40	14.06	13.73	13.50	13.39	13.22	13.16	13.05	12.99		
270.0	16.43	16.03	15.75	15.53	15.36	15.24	15.19	15.19	15.24		
315.0	14.91	14.51	14.12	13.73	13.50	13.33	13.22	13.05	12.94		
360.0	12.94	12.43	11.93	11.42	11.08	10.86	10.58	10.46	10.35		

Nata 2-2180-M

Intensity data(cd)										Appendix Page: 17 Total:18	
C/ γ (°)	45.0	46.0	47.0	48.0	49.0	50.0	51.0	52.0	53.0		
0.0	10.24	10.18	10.13	10.13	10.01	10.01	9.96	9.96	9.96		
45.0	12.99	12.88	12.83	12.71	12.66	12.60	12.60	12.54	12.49		
90.0	14.29	14.40	14.57	14.79	14.96	15.30	15.53	15.81	16.09		
135.0	12.04	11.98	11.93	11.87	11.81	11.81	11.76	11.70	11.64		
180.0	10.01	10.01	10.01	9.96	10.01	9.96	10.01	10.01	10.01		
225.0	12.94	12.88	12.88	12.83	12.83	12.83	12.77	12.83	12.88		
270.0	15.36	15.53	15.75	16.03	16.37	16.82	17.27	17.78	18.45		
315.0	12.83	12.71	12.60	12.54	12.49	12.43	12.43	12.38	12.38		
360.0	10.24	10.18	10.13	10.13	10.01	10.01	9.96	9.96	9.96		
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0		
0.0	9.96	10.01	9.96	10.01	9.96	9.96	10.01	10.01	10.01		
45.0	12.43	12.43	12.49	12.49	12.49	12.49	12.49	12.43	12.38		
90.0	16.43	16.82	17.16	17.55	17.94	18.51	19.07	19.86	20.25		
135.0	11.64	11.59	11.59	11.53	11.53	11.53	11.53	11.53	11.48		
180.0	9.96	10.01	10.01	10.01	9.96	9.96	9.96	9.90	9.90		
225.0	12.94	13.05	13.16	13.28	13.33	13.39	13.44	13.50	13.44		
270.0	19.07	19.69	20.36	21.04	21.60	22.22	22.78	23.29	23.63		
315.0	12.32	12.32	12.32	12.32	12.38	12.38	12.38	12.38	12.43		
360.0	9.96	10.01	9.96	10.01	9.96	9.96	10.01	10.01	10.01		
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0		
0.0	10.01	10.01	10.01	10.01	10.01	10.01	10.01	10.07	10.18		
45.0	12.32	12.26	12.21	12.09	12.04	11.93	11.81	11.70	11.48		
90.0	20.36	20.48	20.31	19.97	19.13	18.00	16.93	15.69	14.46		
135.0	11.48	11.53	11.59	11.70	11.76	12.04	12.43	12.71	12.71		
180.0	9.96	9.96	9.90	9.96	10.01	10.13	10.24	10.41	10.63		
225.0	13.39	13.28	13.16	12.99	12.83	12.60	12.38	12.09	11.76		
270.0	23.68	23.57	23.29	22.78	21.99	20.53	19.29	18.00	16.31		
315.0	12.43	12.43	12.43	12.43	12.43	12.43	12.43	12.49	12.49		
360.0	10.01	10.01	10.01	10.01	10.01	10.01	10.01	10.07	10.18		
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0		
0.0	10.29	10.46	10.63	10.86	11.14	11.19	11.08	10.35	9.68		
45.0	11.31	11.03	10.80	10.58	10.35	10.13	9.96	9.62	9.34		
90.0	12.83	10.63	10.18	9.96	9.62	9.45	9.23	9.00	8.83		
135.0	12.71	12.77	12.60	11.42	10.35	9.90	9.56	9.28	9.00		
180.0	10.91	10.97	10.91	10.41	9.79	9.28	8.89	8.66	8.61		
225.0	11.42	10.97	10.69	10.35	10.01	9.79	9.45	9.17	8.89		
270.0	14.40	11.98	10.63	10.41	10.18	9.84	9.56	9.23	9.00		
315.0	12.43	12.32	12.38	12.32	12.15	11.36	10.52	10.07	9.90		
360.0	10.29	10.46	10.63	10.86	11.14	11.19	11.08	10.35	9.68		
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0		
0.0	9.28	8.94	8.66	8.61	8.49	8.38	8.33	8.27	8.21		
45.0	9.11	8.89	8.66	8.55	8.38	8.33	8.27	8.16	7.82		
90.0	8.72	8.61	8.49	8.38	8.38	8.33	8.27	7.82	7.76		
135.0	8.72	8.55	8.44	8.38	8.27	8.33	8.10	7.88	7.82		
180.0	8.49	8.44	8.38	8.27	8.21	8.16	8.10	8.04	7.99		
225.0	8.72	8.55	8.49	8.38	8.33	8.21	7.93	7.88	7.82		
270.0	8.89	8.83	8.66	8.61	8.55	8.55	8.27	7.82	7.76		
315.0	9.62	9.23	8.94	8.72	8.66	8.66	8.33	8.04	7.88		
360.0	9.28	8.94	8.66	8.61	8.49	8.38	8.33	8.27	8.21		

Intensity data(cd)

Appendix Page: 18 Total:18

C/ $\gamma(^{\circ})$	90.0
0.0	8.04
45.0	7.82
90.0	7.76
135.0	7.82
180.0	7.99
225.0	7.82
270.0	7.71
315.0	7.76
360.0	8.04