
NATA

Client:

LumCAT: 3-1698-N

Luminaire: 92.70.065.00+92.70.089.00

Report No: nata-0100

Voltage(V): 36.2000

Test No: GC2018111317

Current(A): 0.5500

LampCAT: OSRAM SOLERIQ S15

Power (W): 19.9100

Lamp flux(lm): 2661.0

PF: 0.0000

Number of Lamps: 1

Ballast type: DC

Length(mm): 79

Width(mm): 79

Phm Type: C

Height(mm): 0

Photometric Results

Lumens(lm): 2321.07, Efficiency(%): 88.62% , Luminous Efficacy(lm/W): 116.58

Central intensity(cd): 15990.470, Maximum intensity(cd): 15990.470

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=16.8

[C90/270]Total=16.8

Field angle(10%Imax): [C0/180]Total=32.4

[C90/270]Total=32.4

Maximum s/h(1/2): C0_180=0.29 C90_270=0.29

Maximum s/h(1/4): C0_180=0.29 C90_270=0.29

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 88.77%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 97.920%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	15990.469	3.826	3.826	.146%	.165%
1.0	15873.750	30.380	34.206	1.160%	1.474%
2.0	15442.734	59.101	93.307	2.257%	4.020%
3.0	14807.109	84.981	178.288	3.245%	7.681%
4.0	13999.922	107.093	285.381	4.089%	12.295%
5.0	12751.453	121.873	407.254	4.653%	17.546%
6.0	11540.109	132.281	539.534	5.051%	23.245%
7.0	10102.430	135.012	674.546	5.155%	29.062%
8.0	8624.391	131.624	806.17	5.026%	34.733%
9.0	7174.477	123.076	929.247	4.699%	40.035%
10.0	5865.047	111.685	1040.931	4.264%	44.847%
11.0	4659.258	97.492	1138.423	3.722%	49.047%
12.0	3726.492	84.963	1223.386	3.244%	52.708%
13.0	3052.477	75.300	1298.686	2.875%	55.952%
14.0	2314.195	61.394	1360.08	2.344%	58.597%
15.0	2012.063	57.107	1417.187	2.180%	61.058%
16.0	1650.797	49.898	1467.085	1.905%	63.207%
17.0	1440.844	46.196	1513.281	1.764%	65.198%
18.0	1291.247	43.757	1557.037	1.671%	67.083%
19.0	1170.872	41.803	1598.84	1.596%	68.884%
20.0	1085.189	40.701	1639.541	1.554%	70.637%
21.0	996.715	39.170	1678.711	1.496%	72.325%
22.0	923.407	37.933	1716.644	1.448%	73.959%
23.0	849.804	36.412	1753.057	1.390%	75.528%
24.0	776.475	34.633	1787.69	1.322%	77.020%
25.0	714.818	33.128	1820.818	1.265%	78.447%
26.0	655.052	31.490	1852.308	1.202%	79.804%
27.0	598.591	29.801	1882.109	1.138%	81.088%
28.0	550.744	28.354	1910.462	1.083%	82.310%
29.0	503.487	26.768	1937.23	1.022%	83.463%
30.0	461.159	25.286	1962.516	.965%	84.552%
31.0	421.298	23.795	1986.31	.909%	85.577%
32.0	382.725	22.241	2008.551	.849%	86.536%
33.0	348.708	20.827	2029.378	.795%	87.433%
34.0	318.874	19.554	2048.932	.747%	88.275%
35.0	292.873	18.421	2067.353	.703%	89.069%
36.0	265.535	17.116	2084.469	.654%	89.806%
37.0	247.802	16.354	2100.823	.624%	90.511%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	225.295	15.211	2116.033	.581%	91.166%
39.0	206.880	14.277	2130.31	.545%	91.781%
40.0	192.895	13.597	2143.907	.519%	92.367%
41.0	179.494	12.914	2156.821	.493%	92.924%
42.0	165.284	12.128	2168.949	.463%	93.446%
43.0	152.248	11.386	2180.335	.435%	93.937%
44.0	140.716	10.719	2191.055	.409%	94.399%
45.0	127.920	9.919	2200.974	.379%	94.826%
46.0	116.951	9.225	2210.199	.352%	95.223%
47.0	105.855	8.490	2218.689	.324%	95.589%
48.0	94.697	7.717	2226.406	.295%	95.922%
49.0	85.008	7.035	2233.441	.269%	96.225%
50.0	75.600	6.351	2239.792	.242%	96.498%
51.0	66.902	5.702	2245.494	.218%	96.744%
52.0	59.822	5.169	2250.663	.197%	96.967%
53.0	52.819	4.626	2255.289	.177%	97.166%
54.0	46.062	4.086	2259.376	.156%	97.342%
55.0	40.838	3.668	2263.044	.140%	97.500%
56.0	36.077	3.280	2266.324	.125%	97.641%
57.0	31.613	2.907	2269.231	.111%	97.767%
58.0	28.209	2.623	2271.855	.100%	97.880%
59.0	25.474	2.395	2274.249	.091%	97.983%
60.0	23.140	2.198	2276.447	.084%	98.078%
61.0	21.586	2.070	2278.517	.079%	98.167%
62.0	20.623	1.997	2280.514	.076%	98.253%
63.0	19.835	1.938	2282.452	.074%	98.336%
64.0	19.223	1.895	2284.347	.072%	98.418%
65.0	18.675	1.856	2286.203	.071%	98.498%
66.0	18.127	1.816	2288.019	.069%	98.576%
67.0	17.634	1.780	2289.799	.068%	98.653%
68.0	17.184	1.747	2291.546	.067%	98.728%
69.0	16.713	1.711	2293.257	.065%	98.802%
70.0	16.327	1.682	2294.939	.064%	98.874%
71.0	15.912	1.650	2296.589	.063%	98.945%
72.0	15.455	1.612	2298.201	.062%	99.015%
73.0	15.082	1.582	2299.783	.060%	99.083%
74.0	14.723	1.552	2301.335	.059%	99.150%
75.0	14.330	1.518	2302.853	.058%	99.215%

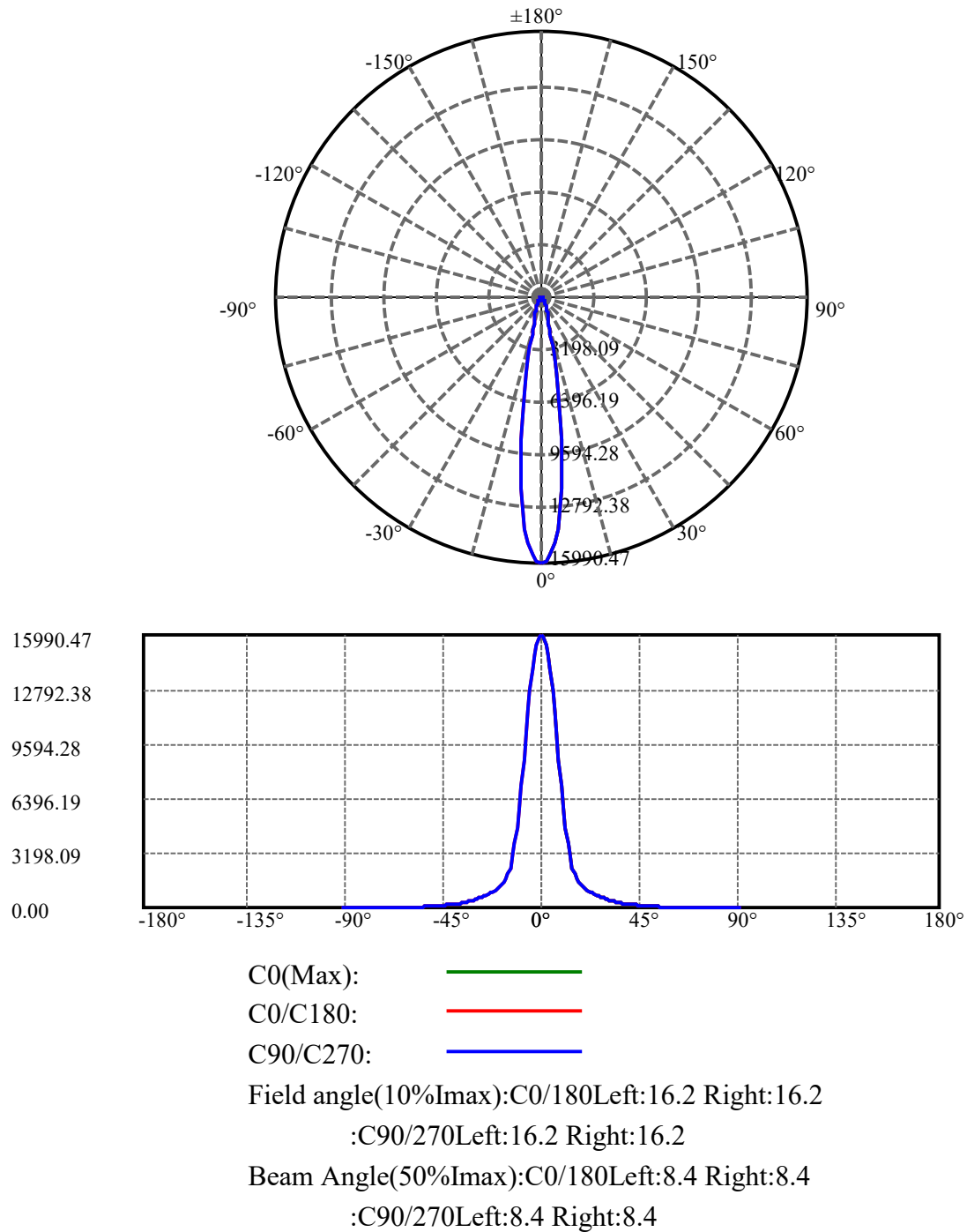
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	14.027	1.493	2304.345	.057%	99.279%
77.0	13.725	1.467	2305.812	.056%	99.343%
78.0	13.402	1.438	2307.249	.055%	99.405%
79.0	13.120	1.412	2308.662	.054%	99.465%
80.0	12.790	1.381	2310.043	.053%	99.525%
81.0	12.431	1.346	2311.389	.051%	99.583%
82.0	12.009	1.304	2312.693	.050%	99.639%
83.0	11.595	1.262	2313.955	.048%	99.694%
84.0	11.095	1.210	2315.165	.046%	99.746%
85.0	10.652	1.164	2316.329	.044%	99.796%
86.0	10.174	1.113	2317.442	.042%	99.844%
87.0	9.773	1.070	2318.512	.041%	99.890%
88.0	9.464	1.037	2319.55	.040%	99.935%
89.0	9.274	1.017	2320.566	.039%	99.978%
90.0	9.162	0.502	2321.069	.019%	100.000%

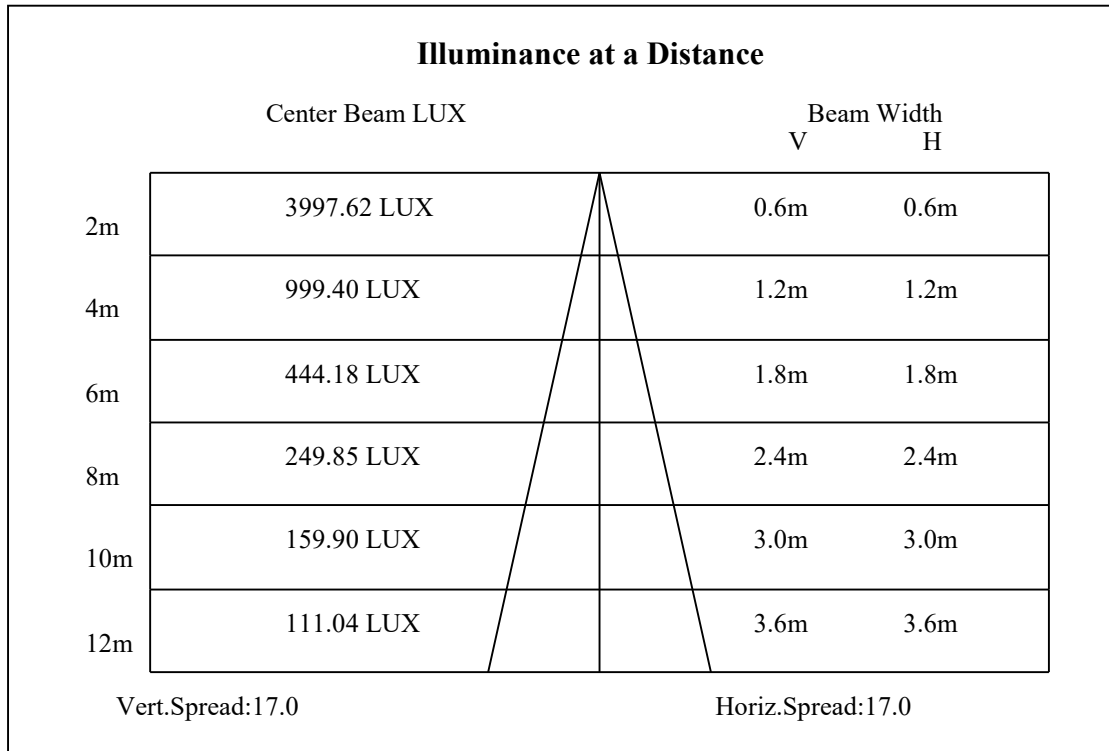
ZONAL LUMEN SUMMARY

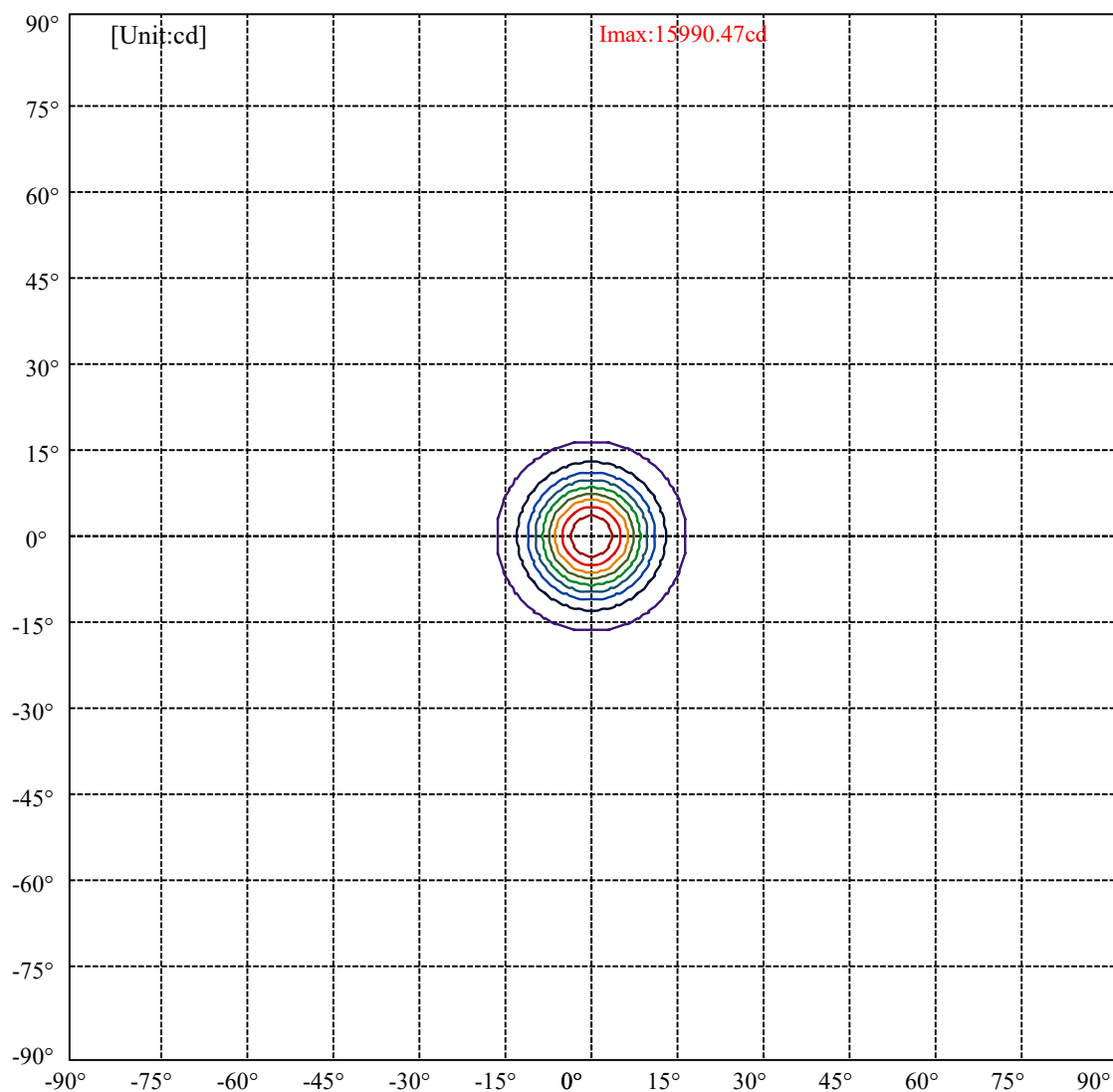
Zone	Lumens	%Lamp	%Fixt
0-30	1962.52	74.93%	84.55%
0-40	2143.91	81.86%	92.37%
0-60	2276.45	86.92%	98.08%
0-90	2320.57	88.61%	99.98%
0-120	2320.57	88.61%	99.98%
0-180	2321.07	88.62%	100.00%
60-90	46.32	1.77%	2.00%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-26.15	1856.86	70.90%	80.00%

ZONAL LUMEN SUMMARY

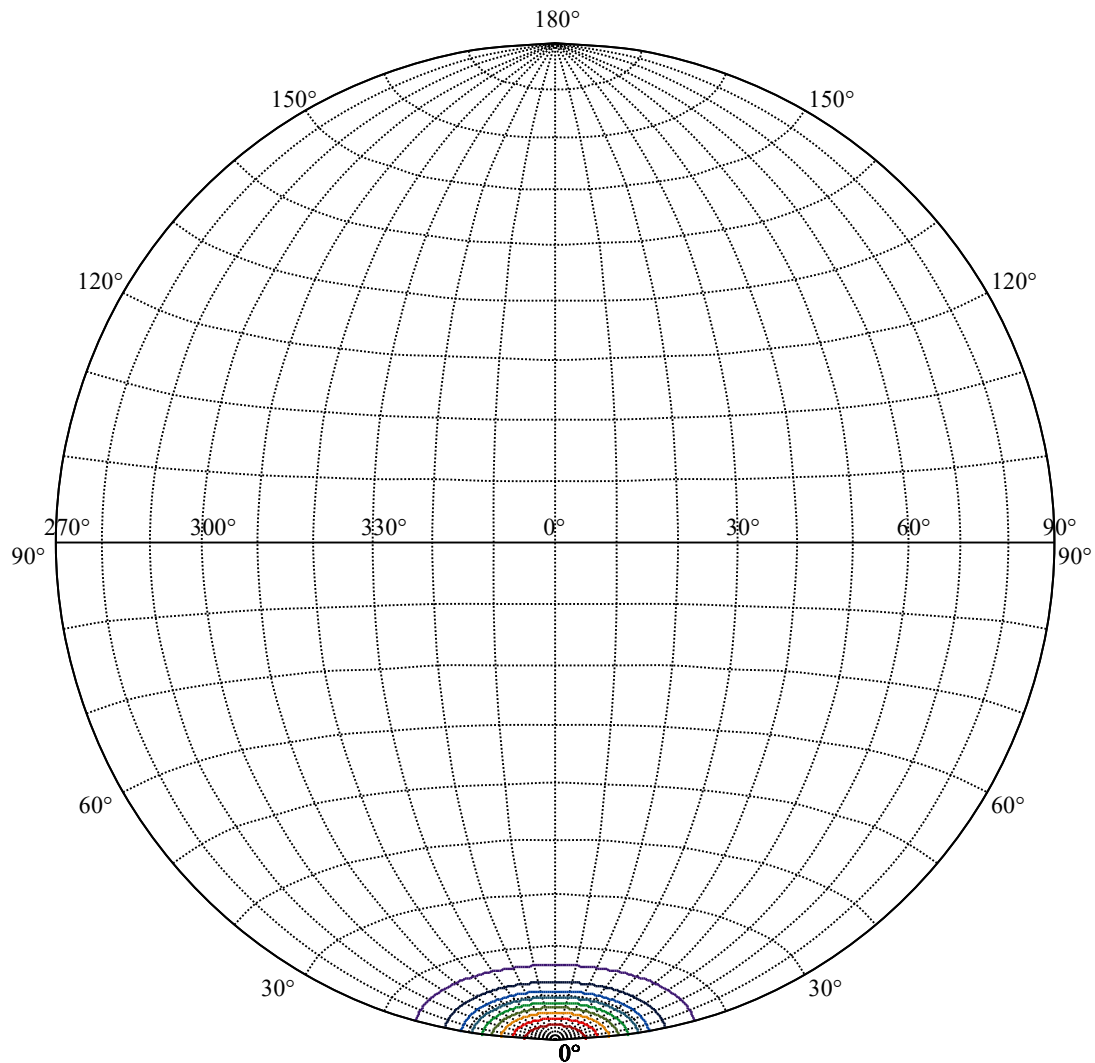
0-10	1040.93
10-20	598.61
20-30	322.97
30-40	181.39
40-50	95.89
50-60	36.65
60-70	18.49
70-80	15.10
80-90	10.52
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00







(10%Imax)	1599.05	—
(20%Imax)	3198.09	—
(30%Imax)	4797.14	—
(40%Imax)	6396.19	—
(50%Imax)	7995.23	—
(60%Imax)	9594.28	—
(70%Imax)	11193.3	—
(80%Imax)	12792.4	—
(90%Imax)	14391.4	—



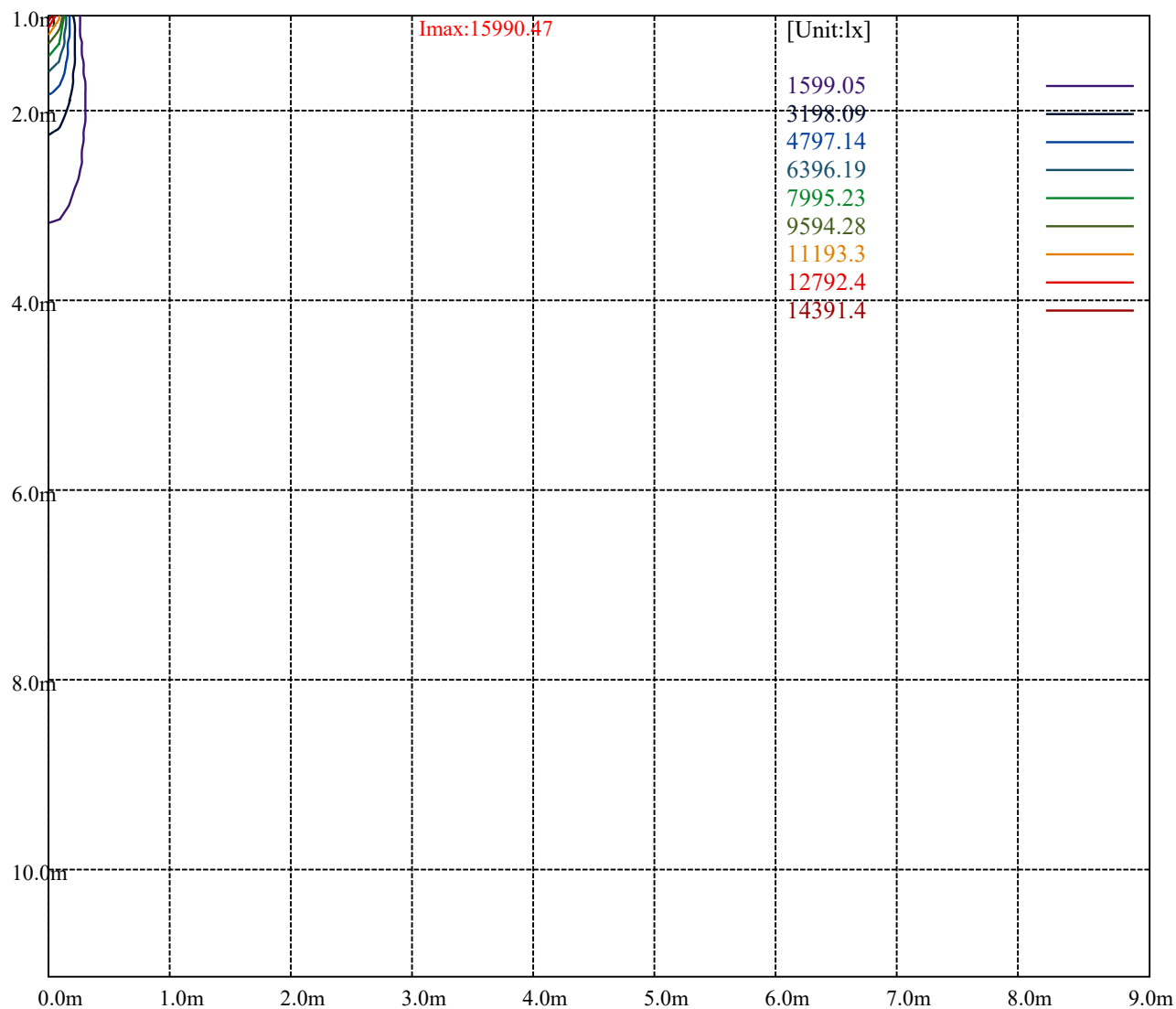
House

[Unit:cd]

Road

Imax:15990.47

(10%Imax)	1599.05	—
(20%Imax)	3198.09	—
(30%Imax)	4797.14	—
(40%Imax)	6396.19	—
(50%Imax)	7995.23	—
(60%Imax)	9594.28	—
(70%Imax)	11193.3	—
(80%Imax)	12792.4	—
(90%Imax)	14391.4	—



Luminance Table

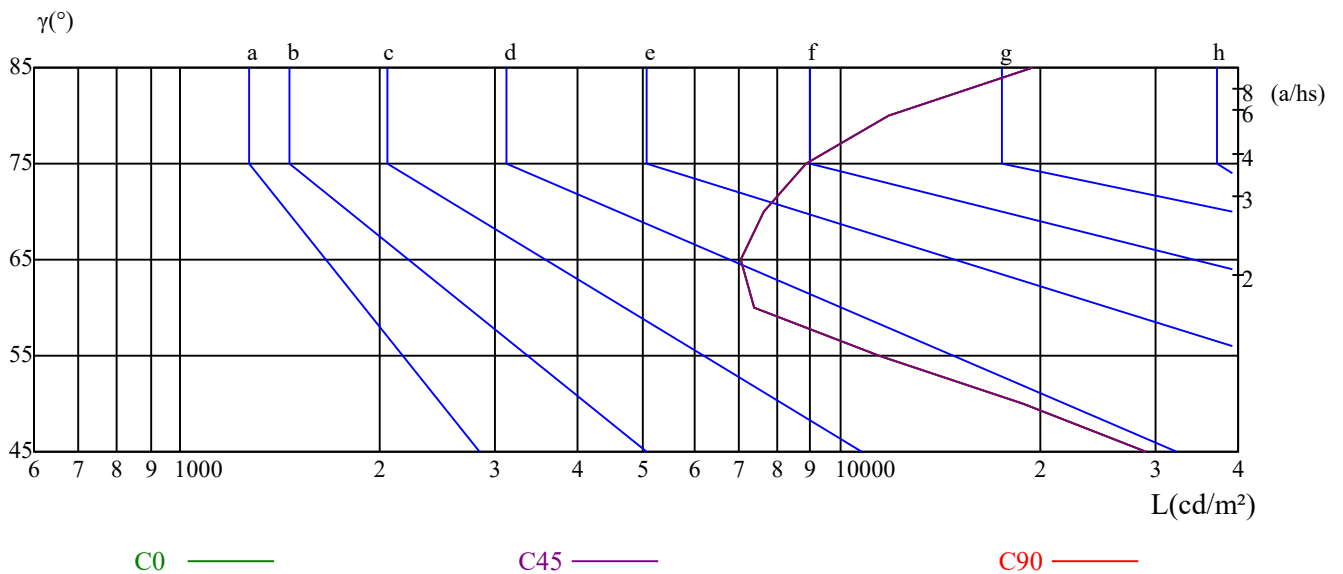
γ	45	50	55	60	65	70	75	80	85
C0	28987	18845	11408	7415	7080	7649	8871	11802	19584
C45	28987	18845	11408	7415	7080	7649	8871	11802	19584
C90	28987	18845	11408	7415	7080	7649	8871	11802	19584

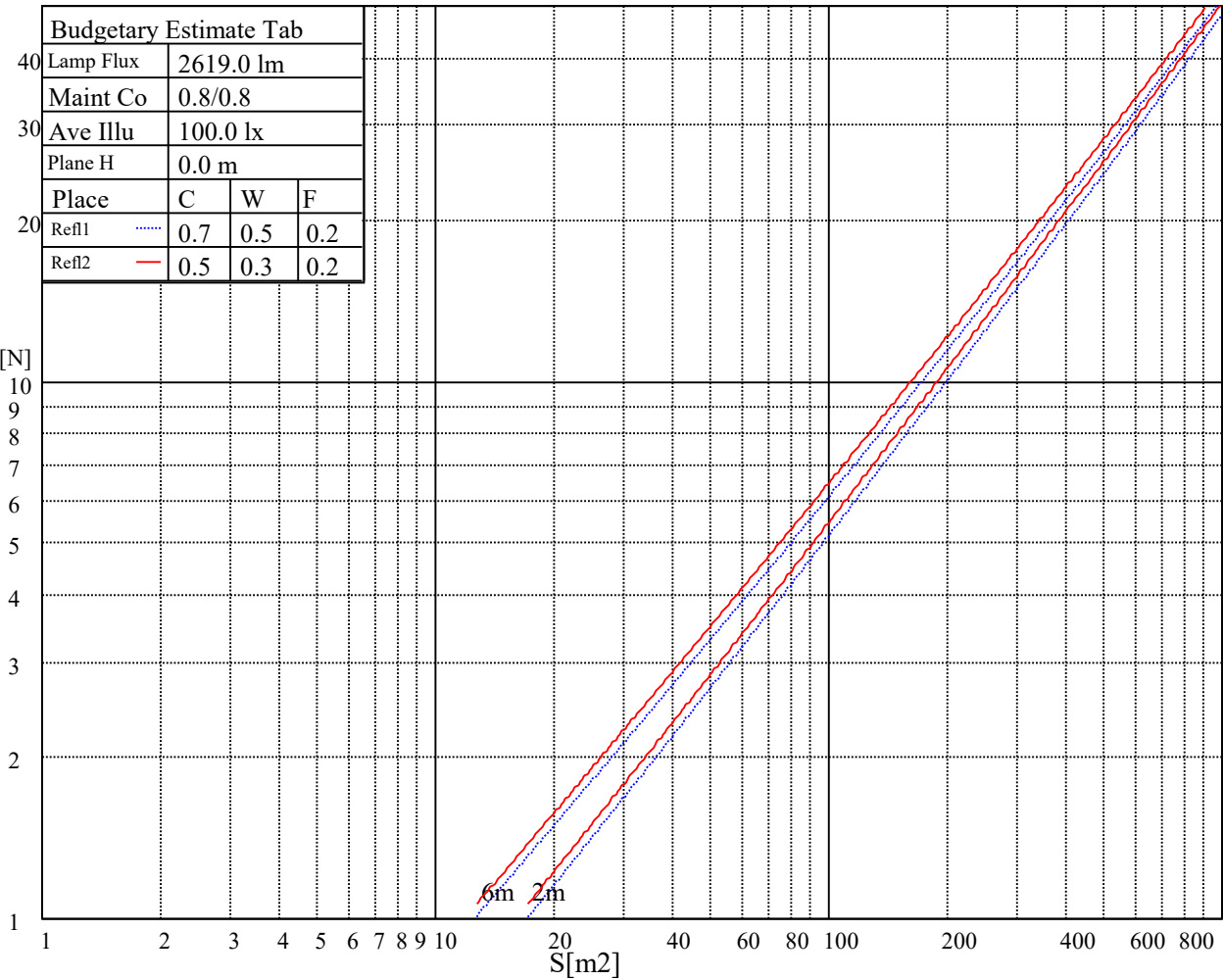
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
7080	7080	7080	8871	8871	8871	19584	19584	19584

Glare Table

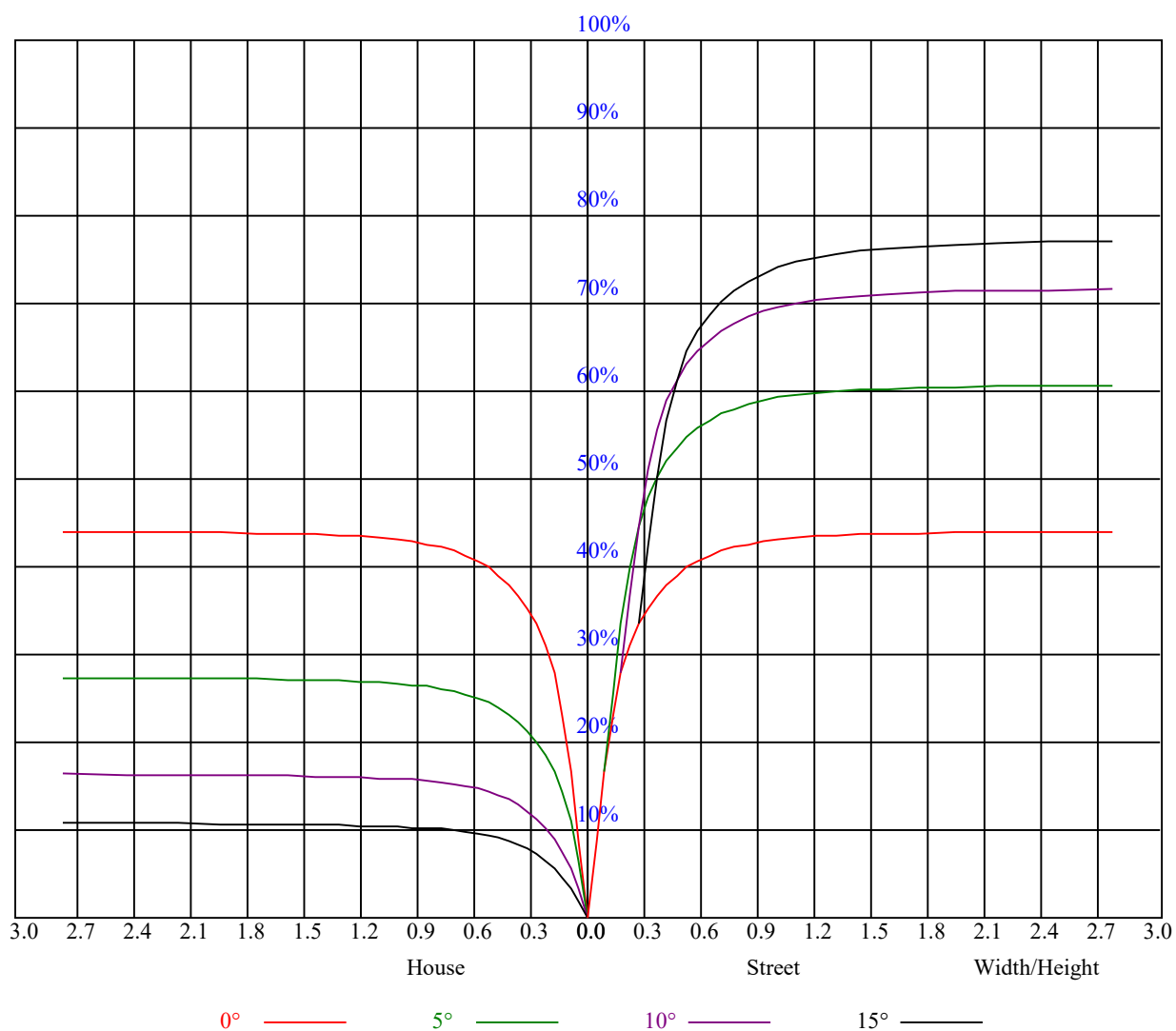
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

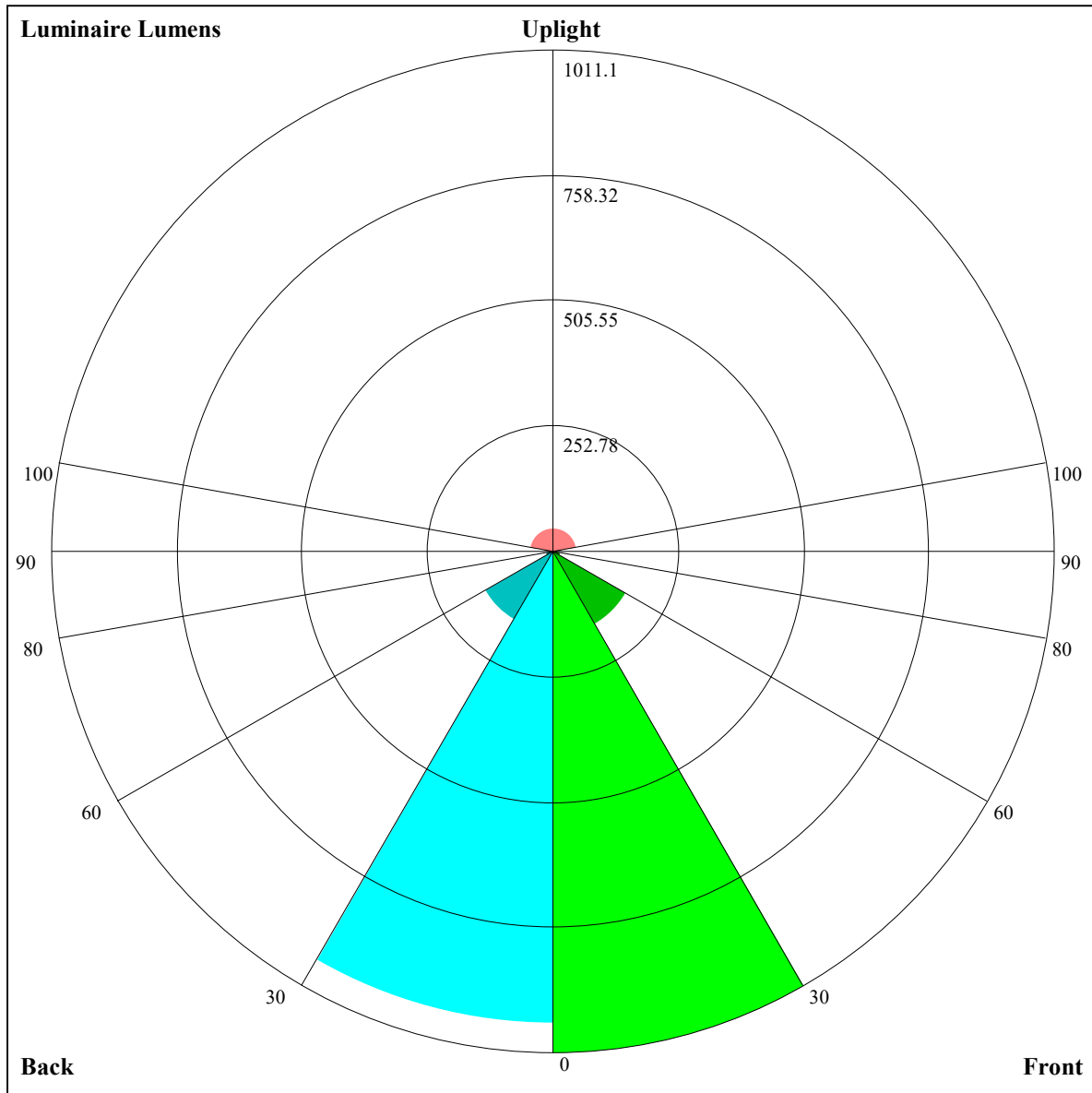
Luminance Limiting Curve





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	1.06	1.06	1.06	1.03	1.03	1.03	0.99	0.99	0.99	0.94	0.94	0.94	0.91	0.91	0.91	0.89
1	0.99	0.97	0.96	0.97	0.96	0.94	0.94	0.93	0.91	0.91	0.90	0.89	0.88	0.87	0.86	0.85
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	0.82	0.81
3	0.90	0.86	0.83	0.89	0.85	0.83	0.86	0.84	0.81	0.84	0.82	0.80	0.82	0.81	0.79	0.78
4	0.86	0.82	0.79	0.85	0.81	0.79	0.83	0.80	0.78	0.82	0.79	0.77	0.80	0.78	0.76	0.75
5	0.83	0.79	0.76	0.82	0.78	0.75	0.80	0.77	0.75	0.79	0.76	0.74	0.78	0.75	0.74	0.72
6	0.80	0.76	0.73	0.79	0.75	0.73	0.78	0.75	0.72	0.77	0.74	0.72	0.76	0.73	0.71	0.70
7	0.77	0.73	0.70	0.76	0.73	0.70	0.75	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.68
8	0.75	0.71	0.68	0.74	0.71	0.68	0.73	0.70	0.68	0.73	0.70	0.67	0.72	0.69	0.67	0.66
9	0.73	0.69	0.66	0.72	0.69	0.66	0.71	0.68	0.66	0.71	0.68	0.66	0.70	0.67	0.65	0.65
10	0.71	0.67	0.64	0.70	0.67	0.64	0.70	0.66	0.64	0.69	0.66	0.64	0.69	0.66	0.64	0.63





Luminaire Lumens:

FL=1011.1,FM=169.66,FH=17.21,FVH=5.91

BL=953.42,BM=158.92,BH=16.92,BVH=5.84

UL=10,UH=47.57

BUG Rating:B2-U2-G0

NATA 3-1698-N

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	15946.88	16098.75	15958.13	15570.00	14962.50	13933.13	12870.00	11643.75	10153.13	
45.0	16059.38	15721.88	15013.13	14203.13	13213.13	11711.25	10316.25	8881.88	7340.63	
90.0	15885.00	15457.50	14641.88	13725.00	12616.88	11166.19	9542.25	8093.81	6730.31	
135.0	16070.63	15766.88	15114.38	14377.50	13443.75	11986.88	10636.88	9225.00	7678.13	
180.0	15946.88	15558.75	14940.00	14040.00	13021.88	11161.69	10278.00	8678.81	6949.69	
225.0	16059.38	16143.75	15963.75	15468.75	14850.00	14011.88	12841.88	11098.13	10042.88	
270.0	15885.00	16121.25	16036.88	15705.00	15181.88	14326.88	13213.13	12031.88	10524.38	
315.0	16070.63	16121.25	15873.75	15367.50	14709.38	13713.75	12622.50	11166.19	9576.00	
360.0	15946.88	16098.75	15958.13	15570.00	14962.50	13933.13	12870.00	11643.75	10153.13	
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	
0.0	8583.75	7245.00	5850.00	4770.00	3735.00	2925.00	2840.63	1944.56	1650.94	
45.0	5911.88	4803.75	3751.88	3015.00	2857.50	1977.19	1713.94	1529.44	1353.38	
90.0	5378.63	4250.25	3438.00	2727.56	2228.63	1913.06	1674.00	1510.88	1359.56	
135.0	6187.50	5011.88	3903.75	3110.63	2857.50	1980.00	1701.56	1488.94	1329.75	
180.0	5845.50	4586.06	3447.00	2821.50	2286.56	1794.94	1591.88	1419.19	1267.88	
225.0	8417.25	6861.38	5592.94	4332.94	3414.94	2599.31	2045.81	1719.00	1497.38	
270.0	8926.88	7526.25	6030.00	4843.13	3723.75	2846.25	2505.38	1884.94	1566.00	
315.0	8144.44	6635.81	5260.50	4191.19	3315.94	2477.81	2023.31	1709.44	1501.88	
360.0	8583.75	7245.00	5850.00	4770.00	3735.00	2925.00	2840.63	1944.56	1650.94	
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	
0.0	1474.31	1339.31	1202.06	1109.25	1025.44	941.06	862.31	795.94	725.63	
45.0	1241.44	1147.50	1044.00	966.94	892.69	813.38	748.69	692.44	634.50	
90.0	1235.81	1118.08	1056.26	961.99	890.44	823.39	745.88	690.53	640.07	
135.0	1220.63	1131.19	1031.06	957.94	883.69	802.69	736.88	681.19	618.19	
180.0	1119.60	1053.28	975.15	884.98	816.53	751.16	682.88	622.13	574.03	
225.0	1312.31	1114.43	1103.57	1004.57	933.08	865.52	783.39	719.49	659.64	
270.0	1401.19	1273.50	1147.50	1064.81	992.25	916.31	841.50	777.38	708.75	
315.0	1324.69	1189.69	1121.91	1023.24	953.16	884.93	810.28	739.46	679.61	
360.0	1474.31	1339.31	1202.06	1109.25	1025.44	941.06	862.31	795.94	725.63	
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0	
0.0	662.06	610.88	560.25	519.19	474.75	436.50	397.13	360.56	331.88	
45.0	582.19	535.50	489.38	448.88	408.38	370.69	342.56	312.75	285.75	
90.0	587.42	538.31	497.03	454.11	418.22	381.15	345.43	317.76	288.79	
135.0	567.56	521.44	474.19	432.56	392.63	356.63	327.38	298.13	286.31	
180.0	525.09	485.61	442.41	399.26	363.83	329.12	298.52	274.73	253.41	
225.0	593.61	551.53	502.65	458.66	419.40	377.16	340.71	312.02	285.92	
270.0	651.94	594.00	543.94	504.00	461.25	419.63	384.19	351.00	314.44	
315.0	618.86	568.69	518.06	472.61	431.94	390.94	353.76	324.06	296.49	
360.0	662.06	610.88	560.25	519.19	474.75	436.50	397.13	360.56	331.88	
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0	
0.0	302.06	284.63	256.28	232.71	216.56	202.84	186.53	172.07	159.64	
45.0	271.35	243.56	223.65	209.59	196.09	179.66	165.15	152.78	139.44	
90.0	260.33	243.00	225.90	206.10	192.49	177.24	162.34	148.16	135.84	
135.0	249.69	231.47	213.92	198.90	186.24	174.66	157.73	146.36	136.63	
180.0	229.56	212.63	197.44	182.87	169.82	157.61	145.46	133.99	123.81	
225.0	256.78	236.64	218.87	199.69	186.58	175.22	163.29	149.91	139.67	
270.0	288.00	284.63	238.56	217.35	201.04	185.79	172.35	159.24	146.19	
315.0	266.51	245.87	227.76	207.84	194.34	182.93	169.43	155.48	144.51	
360.0	302.06	284.63	256.28	232.71	216.56	202.84	186.53	172.07	159.64	

NATA 3-1698-N

Intensity data(cd)										Appendix Page: 18 Total:19	
C/ γ (°)	45.0	46.0	47.0	48.0	49.0	50.0	51.0	52.0	53.0		
0.0	145.13	133.65	122.29	109.74	97.59	87.30	76.84	68.57	60.53		
45.0	125.55	114.64	101.81	91.58	80.33	70.59	63.56	56.59	48.26		
90.0	122.23	109.18	97.99	85.16	77.12	67.73	59.46	52.99	46.91		
135.0	121.22	110.59	101.64	89.10	78.86	71.66	62.72	56.14	49.78		
180.0	112.50	102.77	91.97	81.90	73.69	66.09	57.71	51.64	45.84		
225.0	128.48	118.58	107.49	96.92	88.09	78.64	69.86	62.89	56.64		
270.0	135.73	124.20	112.89	103.22	93.77	82.29	73.91	66.15	57.54		
315.0	132.53	122.01	110.76	99.96	90.62	80.49	71.16	63.62	57.04		
360.0	145.13	133.65	122.29	109.74	97.59	87.30	76.84	68.57	60.53		
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0		
0.0	53.38	47.31	41.29	36.11	32.12	28.74	25.14	22.89	21.54		
45.0	42.98	37.97	32.85	29.36	26.21	23.40	21.66	20.76	20.08		
90.0	40.16	35.55	31.61	27.45	24.75	22.78	21.43	20.53	19.91		
135.0	42.53	37.74	33.58	29.14	26.16	23.63	21.66	20.81	20.08		
180.0	39.09	34.59	30.83	27.39	24.53	22.50	21.15	20.31	19.63		
225.0	49.11	43.54	38.42	33.58	29.70	26.78	24.30	21.94	20.76		
270.0	51.58	45.90	40.78	35.33	31.73	28.58	25.37	23.29	21.83		
315.0	49.67	44.10	39.26	34.54	30.49	27.39	24.41	22.16	21.15		
360.0	53.38	47.31	41.29	36.11	32.12	28.74	25.14	22.89	21.54		
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0		
0.0	20.64	19.91	19.35	18.79	18.23	17.78	17.33	16.93	16.48		
45.0	19.35	18.79	18.28	17.72	17.27	16.82	16.37	15.98	15.53		
90.0	19.24	18.62	18.11	17.61	17.16	16.71	16.20	15.86	15.47		
135.0	19.29	18.79	18.23	17.72	17.21	16.82	16.37	15.98	15.58		
180.0	19.01	18.51	18.00	17.49	17.10	16.65	16.20	15.81	15.47		
225.0	19.91	19.29	18.73	18.17	17.66	17.21	16.82	16.37	15.98		
270.0	20.87	20.14	19.58	19.01	18.45	17.94	17.44	17.04	16.59		
315.0	20.36	19.74	19.13	18.51	18.00	17.55	16.99	16.65	16.20		
360.0	20.64	19.91	19.35	18.79	18.23	17.78	17.33	16.93	16.48		
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0		
0.0	16.03	15.64	15.24	14.79	14.51	14.18	13.84	13.56	13.28		
45.0	15.13	14.79	14.40	14.01	13.67	13.33	12.99	12.66	12.26		
90.0	14.96	14.63	14.23	13.84	13.50	13.16	12.77	12.38	12.04		
135.0	15.19	14.79	14.46	14.06	13.73	13.44	13.11	12.77	12.43		
180.0	15.02	14.63	14.34	14.01	13.78	13.50	13.22	12.94	12.49		
225.0	15.53	15.13	14.79	14.46	14.12	13.84	13.61	13.39	13.11		
270.0	16.14	15.75	15.41	14.96	14.74	14.40	14.06	13.84	13.56		
315.0	15.64	15.30	14.91	14.51	14.18	13.95	13.61	13.44	13.16		
360.0	16.03	15.64	15.24	14.79	14.51	14.18	13.84	13.56	13.28		
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0		
0.0	12.94	12.49	12.15	11.59	11.08	10.58	10.13	9.73	9.39		
45.0	11.81	11.42	10.91	10.52	10.07	9.62	9.39	9.11	9.11		
90.0	11.64	11.25	10.80	10.29	9.90	9.56	9.23	9.11	9.11		
135.0	11.98	11.53	11.08	10.58	10.18	9.73	9.39	9.23	9.11		
180.0	12.09	11.59	11.14	10.58	10.18	9.68	9.39	9.11	9.11		
225.0	12.88	12.49	12.09	11.59	11.14	10.74	10.18	9.79	9.39		
270.0	13.28	12.83	12.49	12.04	11.59	10.97	10.41	9.90	9.56		
315.0	12.83	12.49	12.09	11.59	11.08	10.52	10.07	9.73	9.39		
360.0	12.94	12.49	12.15	11.59	11.08	10.58	10.13	9.73	9.39		

Intensity data(cd)

Appendix Page: 19 Total:19

C/ γ (°)	90.0
0.0	9.17
45.0	9.11
90.0	9.11
135.0	9.11
180.0	9.11
225.0	9.23
270.0	9.28
315.0	9.17
360.0	9.17