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Nata

Client:

LumCAT: 2-2004-M

Luminaire: 92.70.131.00

Report No: GC2019091909

Test No: NATA07

LampCAT: OSRAM OPTO SOLERIQ S13

Lamp flux(lm): 1209.0

Number of Lamps: 1

Length(mm): 70

Phm Type: C

Voltage(V): 220.4000

Current(A): 0.0720

Power (W): 14.6500

PF: 0.9220

Ballast type: AC

Width(mm): 70

Height(mm): 0

Photometric Results

Lumens(lm): 1051.72, Efficiency(%): 86.99% , Luminous Efficacy(lm/W): 71.79

Central intensity(cd): 6722.266, Maximum intensity(cd): 6722.266

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=15.6

[C90/270]Total=15.6

Field angle(10%Imax): [C0/180]Total=35.6

[C90/270]Total=35.6

Maximum s/h(1/2): C0_180=0.27 C90_270=0.27

Maximum s/h(1/4): C0_180=0.28 C90_270=0.28

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 86.99%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 99.600%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	6722.267	0.000	0	.000%	.000%
1.0	6623.196	6.386	6.386	.528%	.607%
2.0	6437.176	18.745	25.131	1.550%	2.390%
3.0	6078.536	29.933	55.065	2.476%	5.236%
4.0	5640.083	39.226	94.29	3.244%	8.965%
5.0	5096.468	46.188	140.479	3.820%	13.357%
6.0	4459.930	50.221	190.7	4.154%	18.132%
7.0	3844.621	51.546	242.246	4.264%	23.033%
8.0	3223.223	50.583	292.829	4.184%	27.843%
9.0	2692.484	47.944	340.773	3.966%	32.401%
10.0	2202.233	44.295	385.068	3.664%	36.613%
11.0	1814.835	40.139	425.207	3.320%	40.430%
12.0	1494.942	36.181	461.388	2.993%	43.870%
13.0	1252.055	32.600	493.988	2.696%	46.969%
14.0	1054.928	29.529	523.517	2.442%	49.777%
15.0	899.517	26.831	550.348	2.219%	52.328%
16.0	818.033	25.167	575.515	2.082%	54.721%
17.0	732.343	24.144	599.659	1.997%	57.017%
18.0	660.778	22.970	622.628	1.900%	59.201%
19.0	604.583	22.015	644.643	1.821%	61.294%
20.0	559.711	21.310	665.953	1.763%	63.320%
21.0	524.915	20.827	686.78	1.723%	65.301%
22.0	493.714	20.470	707.25	1.693%	67.247%
23.0	469.863	20.218	727.468	1.672%	69.169%
24.0	449.370	20.098	747.566	1.662%	71.080%
25.0	432.073	20.042	767.608	1.658%	72.986%
26.0	419.179	20.094	787.702	1.662%	74.897%
27.0	407.607	20.227	807.929	1.673%	76.820%
28.0	398.257	20.403	828.332	1.688%	78.760%
29.0	389.916	20.621	848.953	1.706%	80.720%
30.0	381.789	20.836	869.789	1.723%	82.702%
31.0	372.178	20.982	890.77	1.735%	84.697%
32.0	360.096	20.979	911.749	1.735%	86.691%
33.0	341.378	20.666	932.415	1.709%	88.656%
34.0	315.844	19.889	952.304	1.645%	90.547%
35.0	286.929	18.720	971.024	1.548%	92.327%
36.0	254.006	17.223	988.248	1.425%	93.965%
37.0	205.990	15.003	1003.25	1.241%	95.391%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	160.445	12.231	1015.481	1.012%	96.554%
39.0	118.195	9.511	1024.992	.787%	97.459%
40.0	84.292	7.062	1032.054	.584%	98.130%
41.0	59.402	5.117	1037.171	.423%	98.617%
42.0	30.307	3.259	1040.43	.270%	98.927%
43.0	16.607	1.738	1042.168	.144%	99.092%
44.0	10.174	1.011	1043.179	.084%	99.188%
45.0	6.670	0.647	1043.826	.054%	99.249%
46.0	5.365	0.471	1044.297	.039%	99.294%
47.0	4.437	0.390	1044.687	.032%	99.331%
48.0	3.747	0.331	1045.018	.027%	99.363%
49.0	3.196	0.285	1045.303	.024%	99.390%
50.0	2.900	0.254	1045.557	.021%	99.414%
51.0	2.639	0.234	1045.791	.019%	99.436%
52.0	2.512	0.221	1046.012	.018%	99.457%
53.0	2.372	0.212	1046.225	.018%	99.478%
54.0	2.227	0.203	1046.428	.017%	99.497%
55.0	2.117	0.194	1046.622	.016%	99.515%
56.0	2.053	0.188	1046.81	.016%	99.533%
57.0	1.978	0.184	1046.994	.015%	99.551%
58.0	1.868	0.178	1047.172	.015%	99.568%
59.0	1.798	0.171	1047.344	.014%	99.584%
60.0	1.734	0.167	1047.51	.014%	99.600%
61.0	1.682	0.163	1047.673	.013%	99.615%
62.0	1.636	0.160	1047.833	.013%	99.630%
63.0	1.566	0.156	1047.989	.013%	99.645%
64.0	1.537	0.152	1048.141	.013%	99.660%
65.0	1.514	0.151	1048.292	.012%	99.674%
66.0	1.485	0.150	1048.442	.012%	99.688%
67.0	1.433	0.147	1048.589	.012%	99.702%
68.0	1.404	0.144	1048.732	.012%	99.716%
69.0	1.386	0.142	1048.875	.012%	99.729%
70.0	1.363	0.141	1049.016	.012%	99.743%
71.0	1.346	0.140	1049.156	.012%	99.756%
72.0	1.311	0.138	1049.294	.011%	99.769%
73.0	1.322	0.138	1049.432	.011%	99.782%
74.0	1.299	0.138	1049.57	.011%	99.796%
75.0	1.270	0.136	1049.705	.011%	99.808%

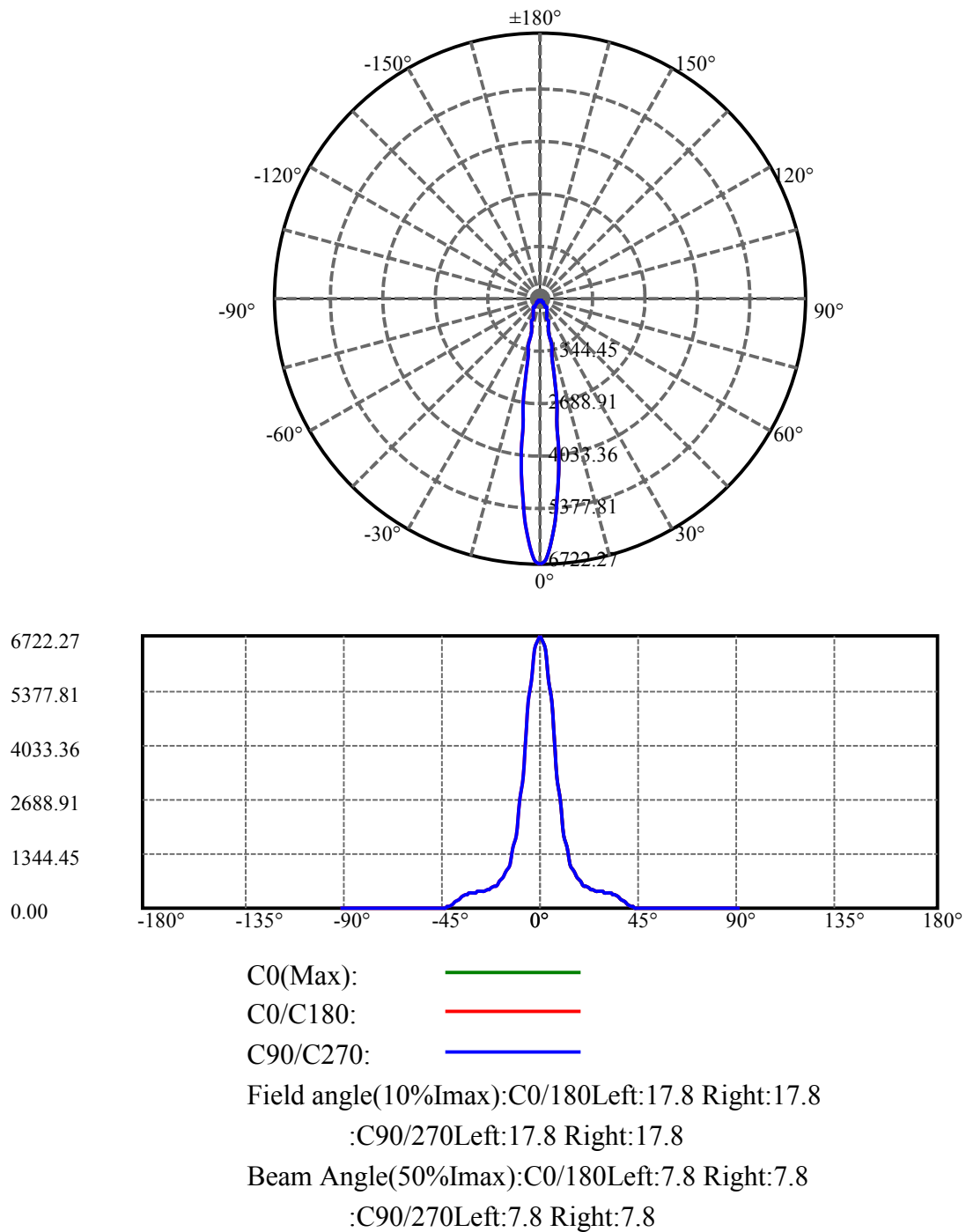
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	1.247	0.134	1049.839	.011%	99.821%
77.0	1.259	0.134	1049.973	.011%	99.834%
78.0	1.247	0.134	1050.107	.011%	99.847%
79.0	1.230	0.133	1050.24	.011%	99.859%
80.0	1.218	0.132	1050.372	.011%	99.872%
81.0	1.235	0.133	1050.504	.011%	99.884%
82.0	1.230	0.134	1050.638	.011%	99.897%
83.0	1.235	0.134	1050.772	.011%	99.910%
84.0	1.206	0.133	1050.905	.011%	99.923%
85.0	1.212	0.132	1051.037	.011%	99.935%
86.0	1.247	0.134	1051.172	.011%	99.948%
87.0	1.235	0.136	1051.307	.011%	99.961%
88.0	1.235	0.135	1051.443	.011%	99.974%
89.0	1.253	0.136	1051.579	.011%	99.987%
90.0	1.317	0.141	1051.72	.012%	100.000%

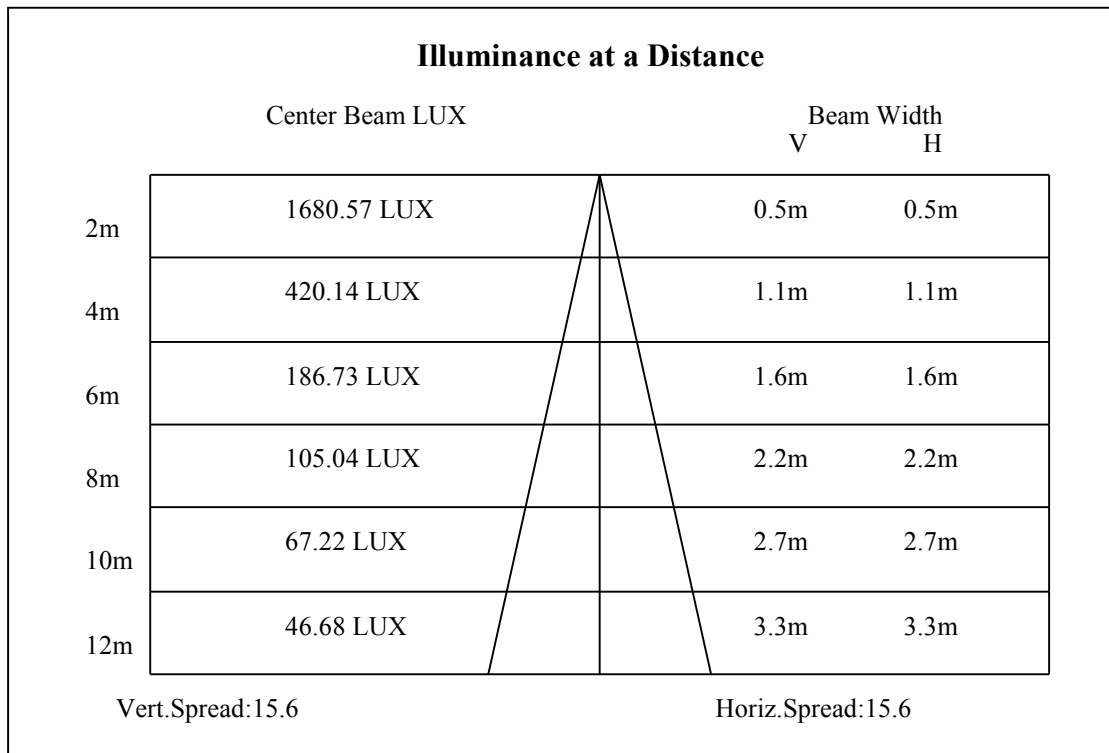
ZONAL LUMEN SUMMARY

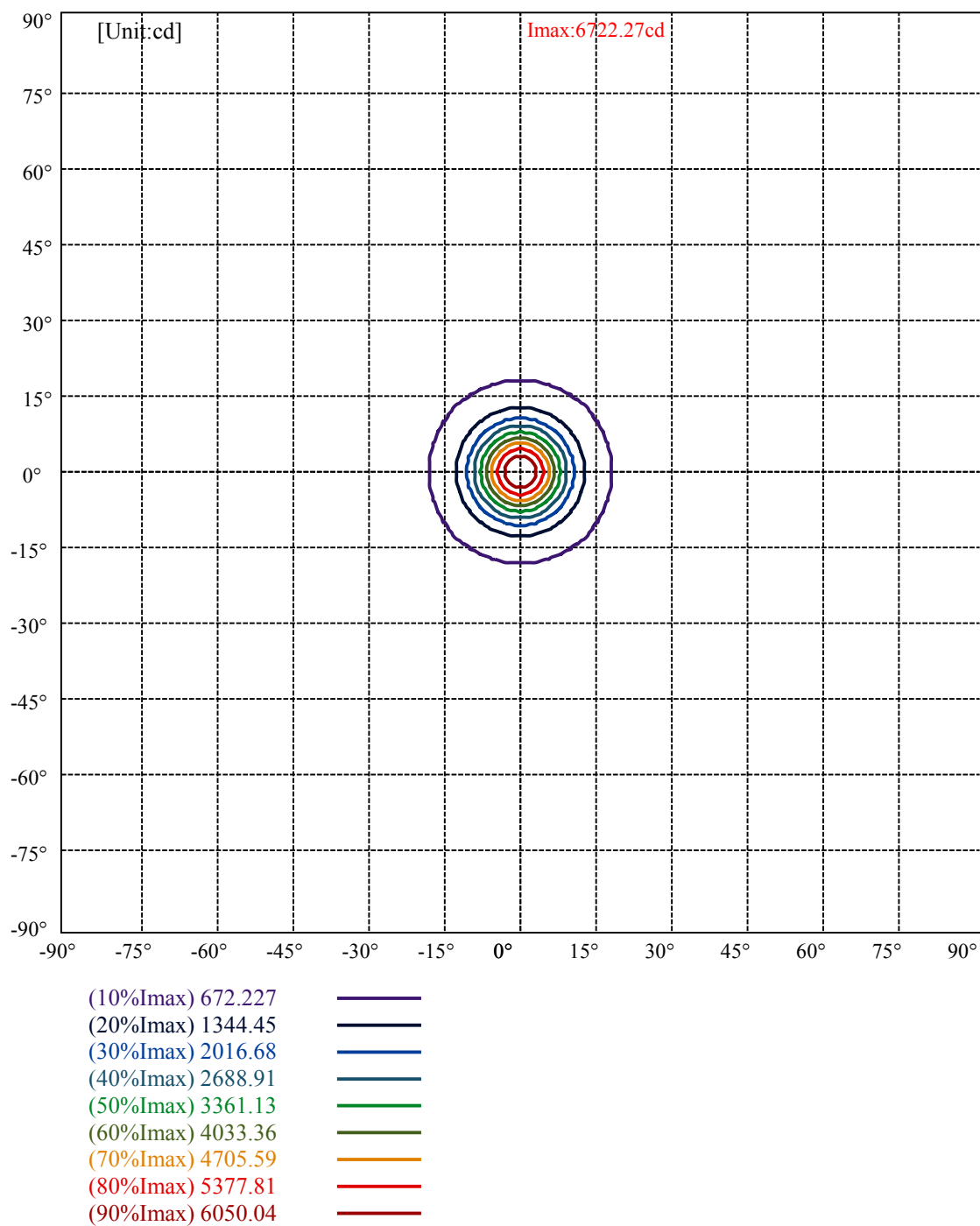
Zone	Lumens	%Lamp	%Fixt
0-30	869.79	71.94%	82.70%
0-40	1032.05	85.36%	98.13%
0-60	1047.51	86.64%	99.60%
0-90	1051.58	86.98%	99.99%
0-120	1051.58	86.98%	99.99%
0-180	1051.72	86.99%	100.00%
60-90	4.24	0.35%	0.40%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-28.63	841.38	69.59%	80.00%

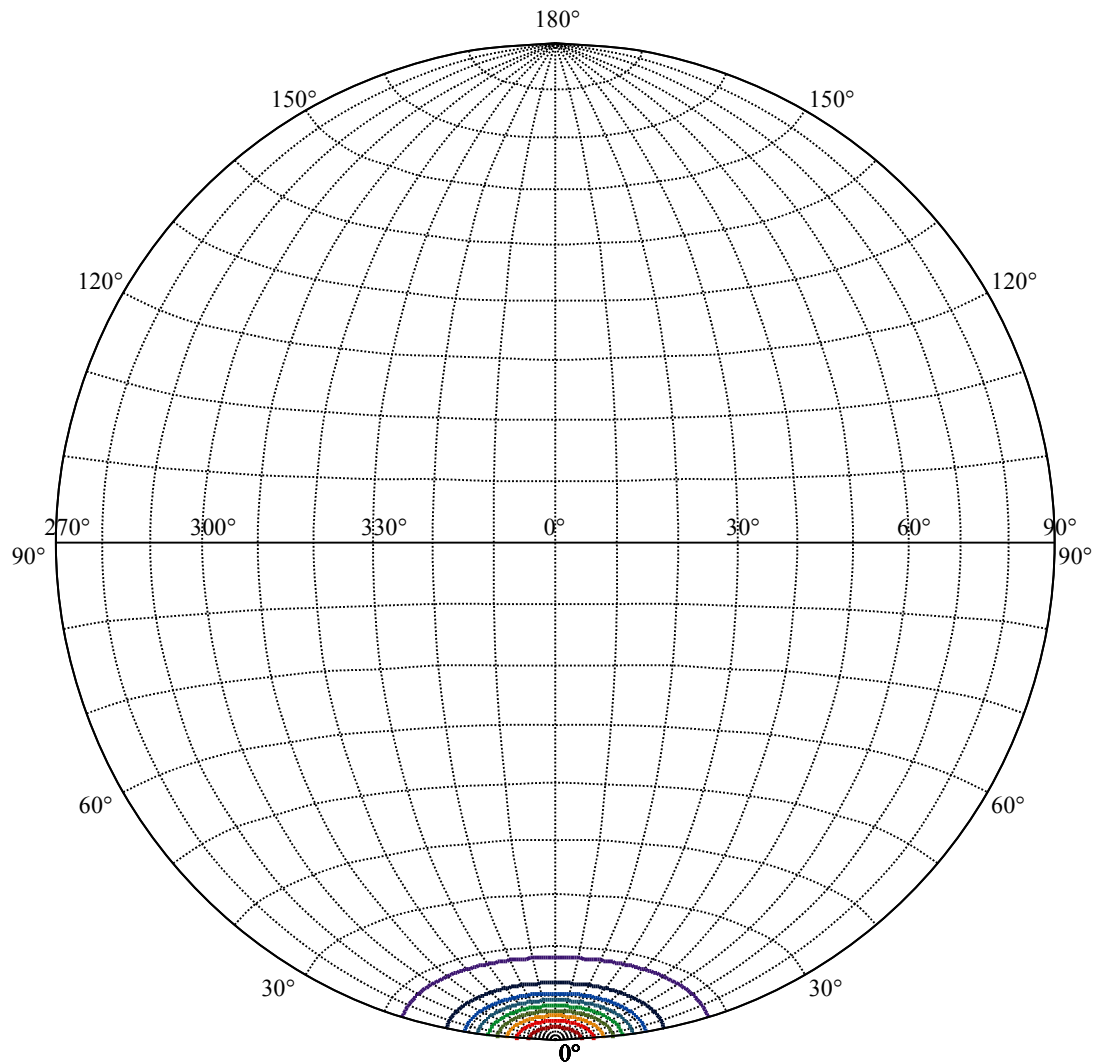
ZONAL LUMEN SUMMARY

0-10	385.07
10-20	280.88
20-30	203.84
30-40	162.27
40-50	13.50
50-60	1.95
60-70	1.51
70-80	1.36
80-90	1.21
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









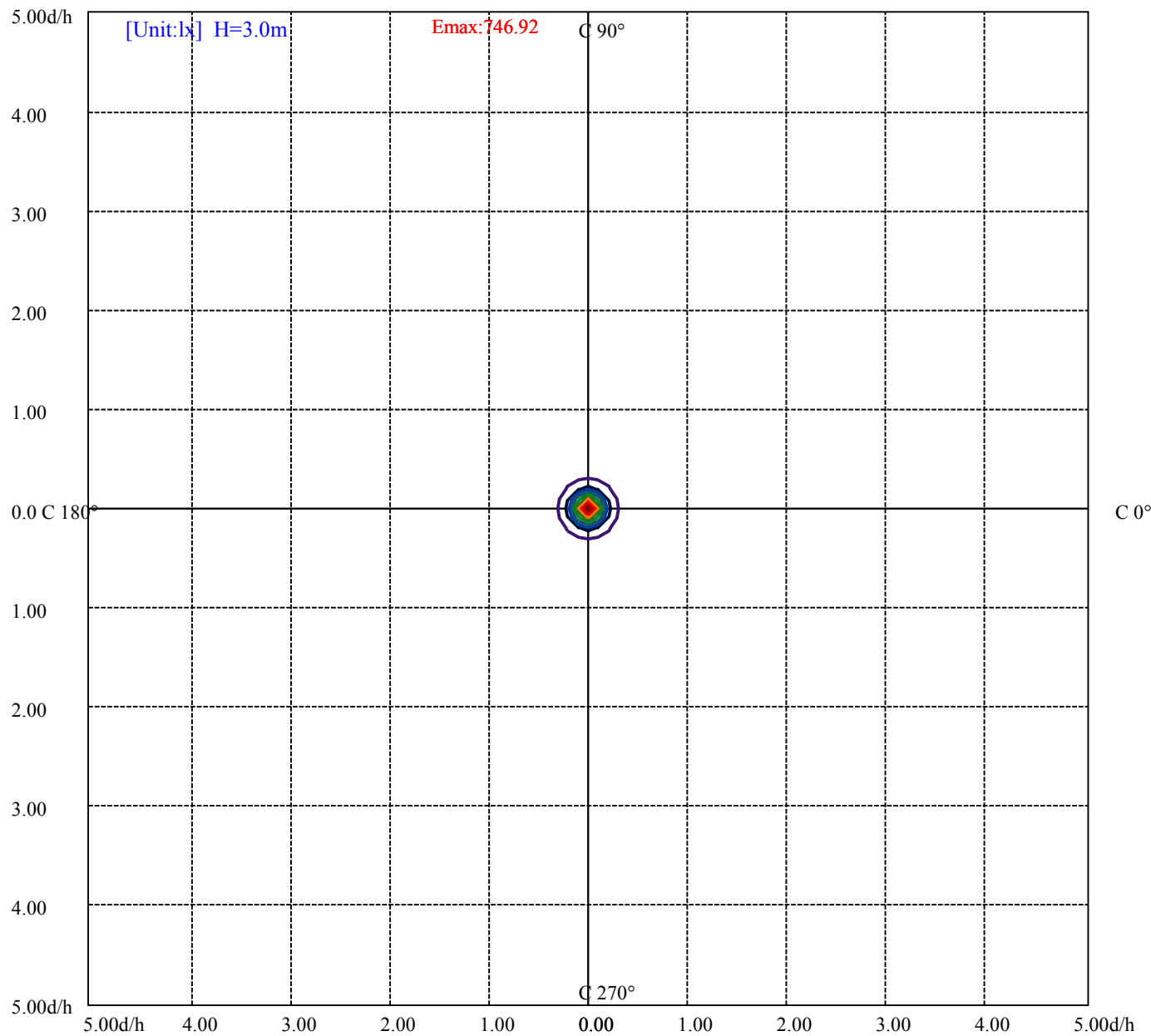
House

[Unit:cd]

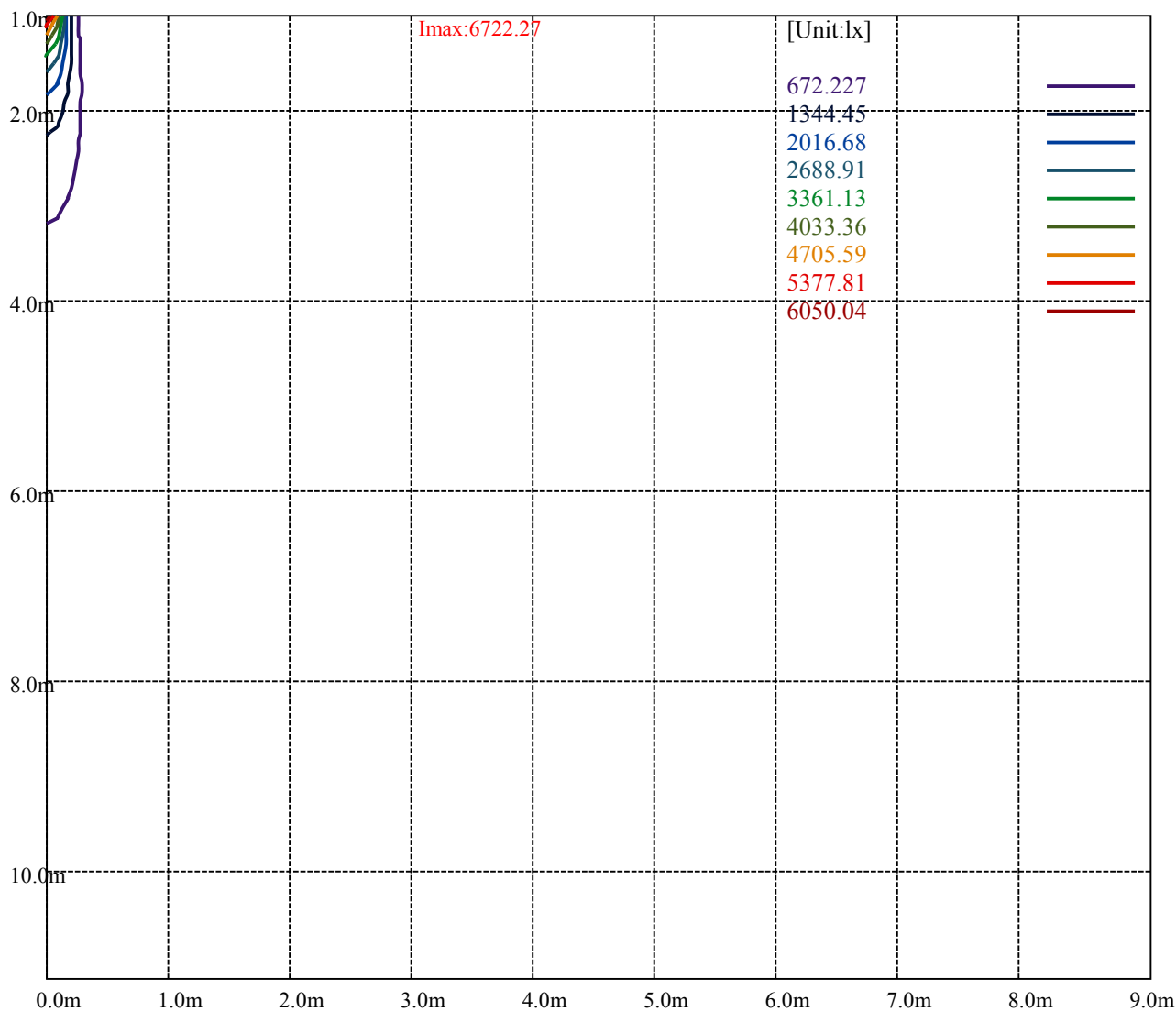
Road

Imax:6722.27

(10%Imax)	672.227	—
(20%Imax)	1344.45	—
(30%Imax)	2016.68	—
(40%Imax)	2688.91	—
(50%Imax)	3361.13	—
(60%Imax)	4033.36	—
(70%Imax)	4705.59	—
(80%Imax)	5377.81	—
(90%Imax)	6050.04	—



(10%Emax)	74.69167	
(20%Emax)	149.3833	
(30%Emax)	224.0756	
(40%Emax)	298.7667	
(50%Emax)	373.4589	
(60%Emax)	448.15	
(70%Emax)	522.8422	
(80%Emax)	597.5333	
(90%Emax)	672.2255	



Luminance Table

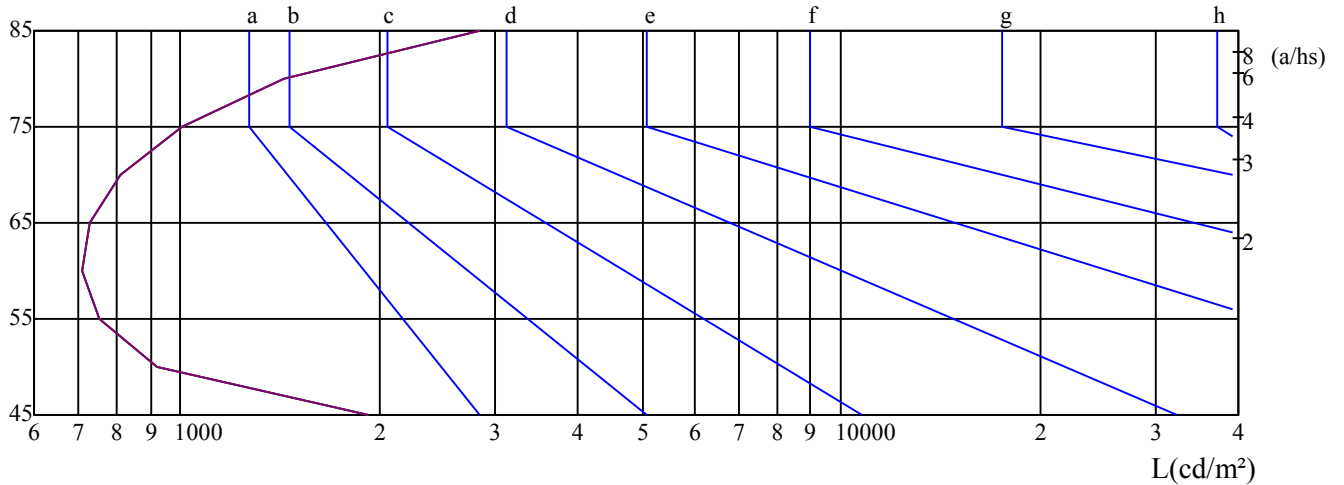
γ	45	50	55	60	65	70	75	80	85
C0	1925	921	753	708	731	813	1002	1432	2839
C45	1925	921	753	708	731	813	1002	1432	2839
C90	1925	921	753	708	731	813	1002	1432	2839

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
731	731	731	1002	1002	1002	2839	2839	2839

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

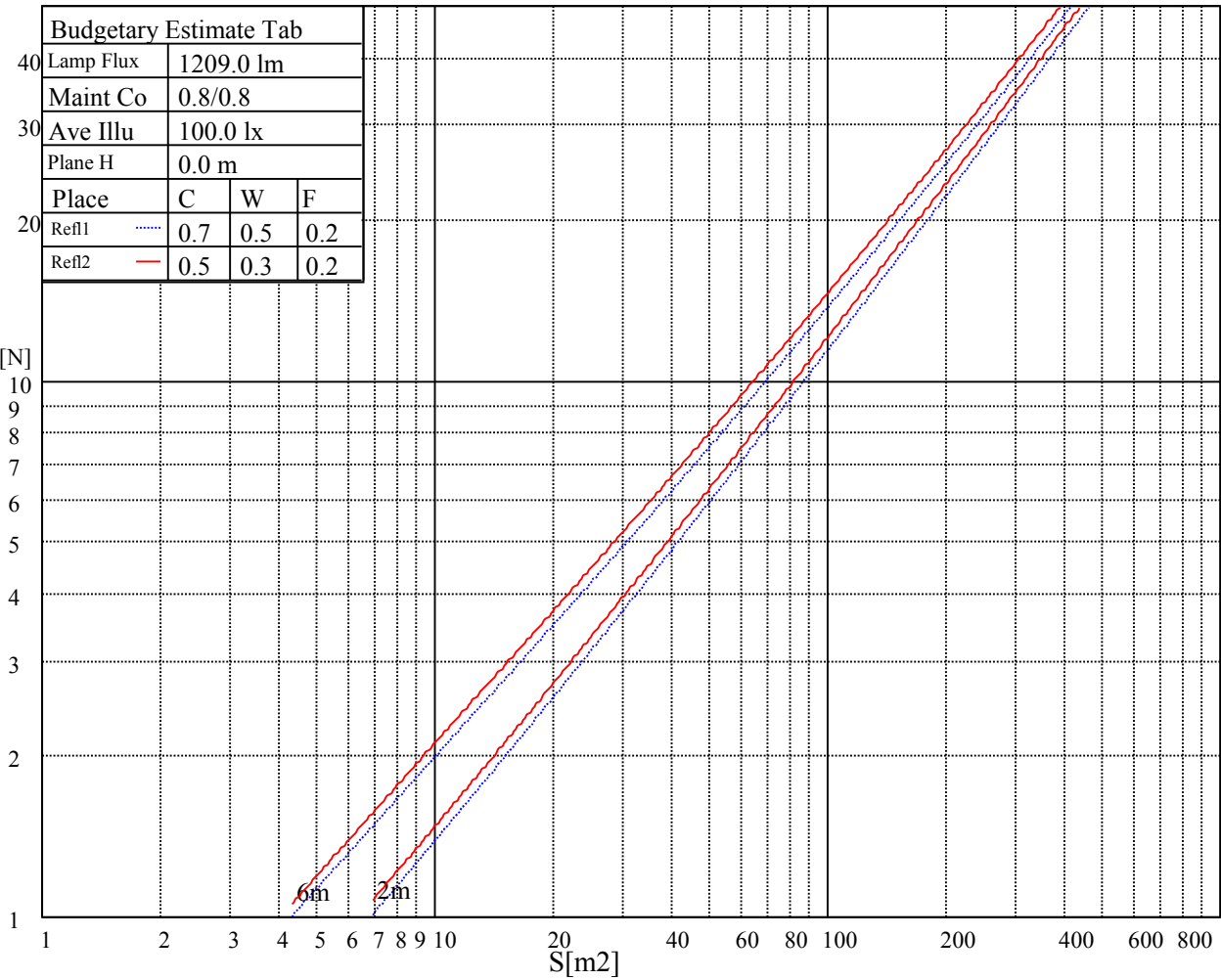
Luminance Limiting Curve

 $\gamma(^{\circ})$ 

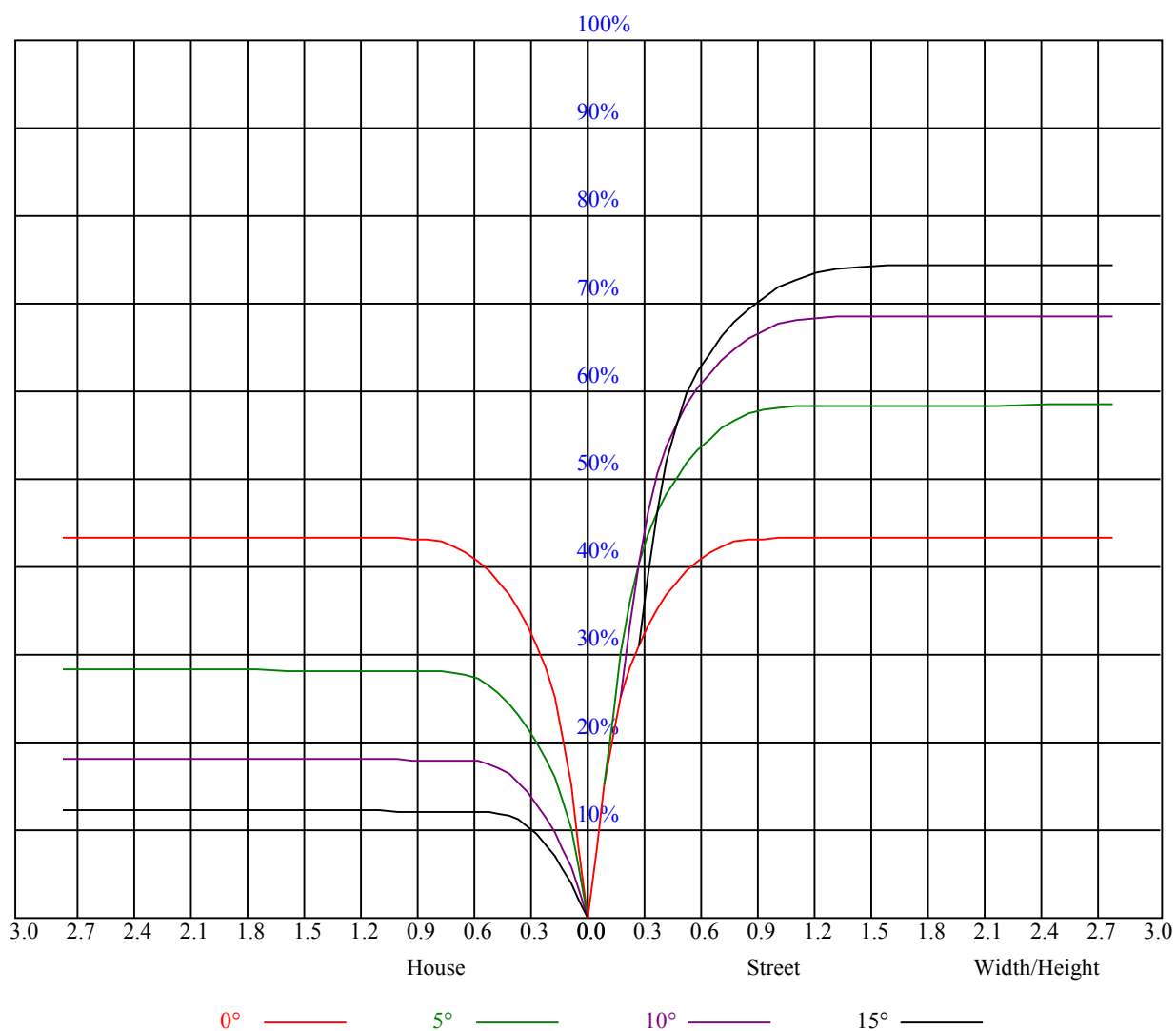
C0 ———

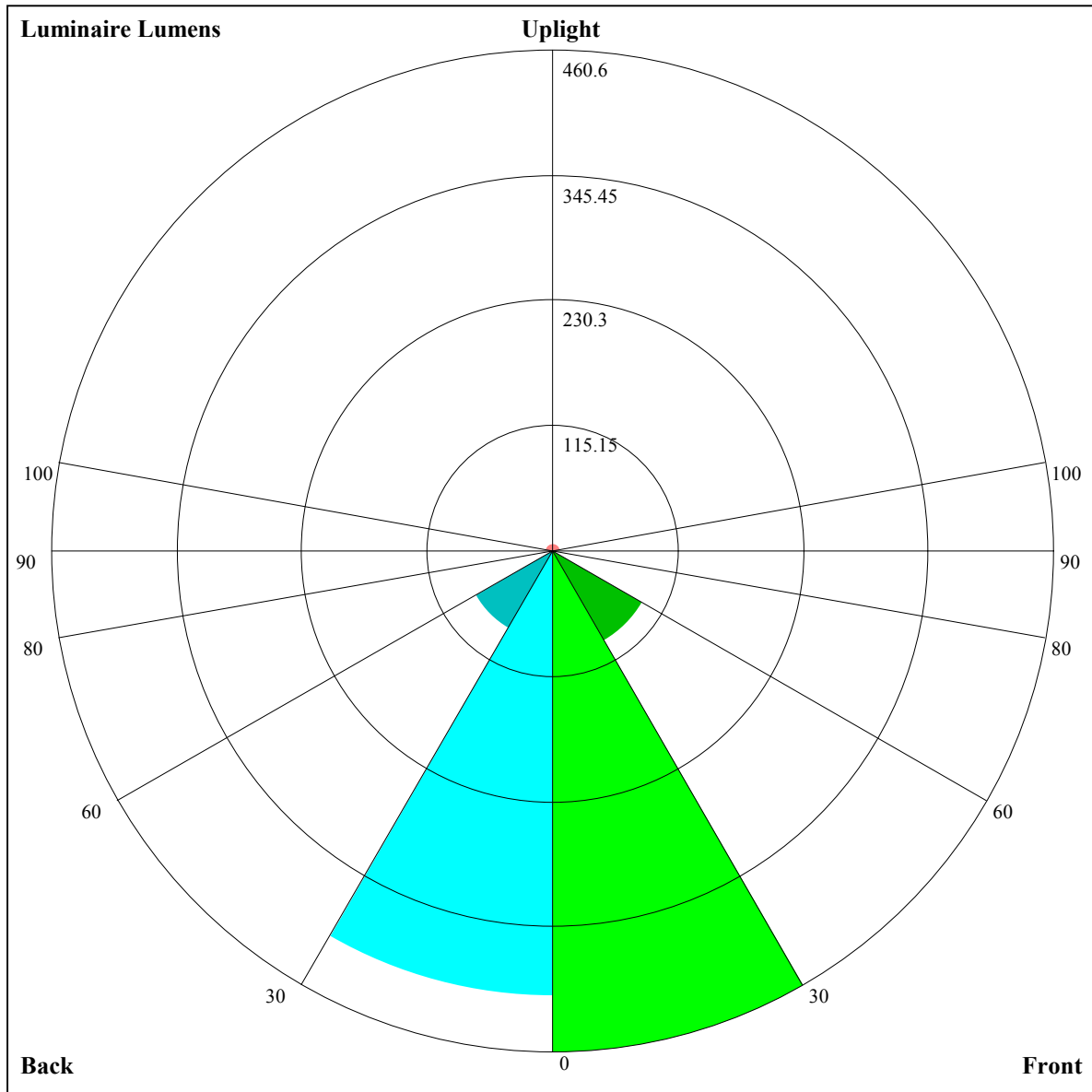
C45 ———

C90 ———



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	1.04	1.04	1.04	1.01	1.01	1.01	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.87
1	0.98	0.96	0.94	0.96	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.85	0.85	0.83
2	0.93	0.90	0.87	0.91	0.89	0.86	0.88	0.86	0.84	0.86	0.84	0.83	0.83	0.82	0.81	0.80
3	0.88	0.85	0.82	0.87	0.84	0.81	0.85	0.82	0.80	0.83	0.80	0.79	0.81	0.79	0.77	0.76
4	0.84	0.80	0.77	0.83	0.80	0.77	0.81	0.78	0.76	0.80	0.77	0.75	0.78	0.76	0.74	0.73
5	0.80	0.76	0.73	0.80	0.76	0.73	0.78	0.75	0.73	0.77	0.74	0.72	0.76	0.73	0.71	0.70
6	0.77	0.73	0.70	0.76	0.73	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.73	0.71	0.69	0.68
7	0.74	0.70	0.67	0.74	0.70	0.67	0.73	0.69	0.67	0.72	0.69	0.66	0.71	0.68	0.66	0.65
8	0.71	0.67	0.65	0.71	0.67	0.65	0.70	0.67	0.64	0.69	0.66	0.64	0.69	0.66	0.64	0.63
9	0.69	0.65	0.62	0.69	0.65	0.62	0.68	0.65	0.62	0.67	0.64	0.62	0.67	0.64	0.62	0.61
10	0.67	0.63	0.60	0.66	0.63	0.60	0.66	0.62	0.60	0.65	0.62	0.60	0.65	0.62	0.60	0.59





Luminaire Lumens:

FL=460.6,FM=95.76,FH=1.45,FVH=0.68

BL=408.86,BM=81.48,BH=1.42,BVH=0.68

UL=1.44,UH=6.84

BUG Rating:B1-U1-G0

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	6810.67	6822.73	6688.62	6415.77	6012.06	5490.03	4878.43	4200.01	3497.93		
45.0	6557.30	6874.70	6988.39	7058.92	6977.72	6749.41	6379.58	5883.06	5277.50		
90.0	6839.44	6963.33	6930.39	6742.45	6413.92	5957.77	5384.69	4720.66	4006.51		
135.0	6681.66	6760.55	6692.34	6478.88	6104.41	5610.21	5133.18	4332.73	3777.28		
180.0	6810.67	6649.18	6412.99	5887.70	5302.09	4762.89	4053.38	3350.37	2719.28		
225.0	6557.30	5887.24	5520.19	4818.11	4064.52	3320.67	2679.38	2173.12	1779.61		
270.0	6839.44	6570.30	6165.66	5616.24	5233.88	4536.44	3519.28	3103.04	2297.01		
315.0	6681.66	6457.54	6098.84	5610.21	5012.07	4344.33	3651.53	2993.99	2430.65		
360.0	6810.67	6822.73	6688.62	6415.77	6012.06	5490.03	4878.43	4200.01	3497.93		
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0		
0.0	2843.64	2309.54	1890.98	1562.91	1307.23	904.96	880.83	880.83	777.86		
45.0	4598.15	3871.01	3141.09	2527.64	2055.25	1692.84	1410.24	1183.80	1007.93		
90.0	3294.22	2661.74	2162.44	1774.97	1477.99	1244.58	896.74	896.74	829.41		
135.0	3103.04	2420.91	2062.21	1701.19	1419.99	1196.79	1016.74	876.14	772.20		
180.0	2209.31	1813.03	1504.91	1261.29	1066.40	914.19	798.65	711.41	642.73		
225.0	1475.21	1231.59	898.97	898.97	787.74	718.79	637.81	596.70	554.47		
270.0	2030.19	1671.96	1389.36	1164.77	988.90	854.33	753.64	678.46	618.60		
315.0	1986.11	1638.08	1468.71	1067.79	912.94	912.94	801.48	720.18	655.54		
360.0	2843.64	2309.54	1890.98	1562.91	1307.23	904.96	880.83	880.83	777.86		
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0		
0.0	698.28	637.12	588.67	548.58	514.57	486.59	462.73	443.43	427.89		
45.0	874.29	771.73	691.92	640.41	580.55	547.14	513.27	479.39	459.90		
90.0	737.81	664.36	608.67	563.38	526.86	496.24	470.16	448.63	432.15		
135.0	690.53	628.35	580.55	540.65	508.63	481.25	459.90	442.27	424.64		
180.0	590.76	549.46	514.66	486.82	463.15	443.20	427.89	413.96	407.47		
225.0	518.79	489.97	465.15	445.15	429.65	415.63	404.36	396.24	388.91		
270.0	572.20	534.15	502.13	477.07	455.26	437.63	422.78	414.43	404.22		
315.0	603.57	561.53	525.94	497.26	471.04	451.23	433.87	418.23	408.26		
360.0	698.28	637.12	588.67	548.58	514.57	486.59	462.73	443.43	427.89		
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0		
0.0	414.61	404.59	396.66	388.86	381.20	374.52	367.61	352.15	329.09		
45.0	439.95	424.64	412.57	401.44	394.01	386.59	378.70	372.20	366.17		
90.0	417.77	406.49	397.82	389.83	383.01	375.50	371.64	360.09	348.12		
135.0	415.82	401.90	394.01	390.76	382.41	375.45	368.95	359.67	332.29		
180.0	398.19	391.23	383.80	376.38	370.35	362.46	339.25	303.52	259.44		
225.0	381.95	375.08	368.21	356.98	327.89	287.00	239.81	191.83	163.43		
270.0	393.08	388.44	380.55	373.59	367.10	356.89	326.26	287.28	242.74		
315.0	399.49	393.69	385.70	376.47	371.46	362.36	338.79	300.00	254.15		
360.0	414.61	404.59	396.66	388.86	381.20	374.52	367.61	352.15	329.09		
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0		
0.0	281.53	243.71	195.82	148.26	100.97	58.51	27.01	10.44	9.10		
45.0	353.64	325.33	284.96	239.02	239.02	229.74	113.46	68.58	32.02		
90.0	314.89	255.40	226.17	174.75	124.78	79.72	42.04	15.50	9.14		
135.0	293.32	248.77	230.21	185.24	104.69	62.60	28.49	10.90	9.10		
180.0	240.88	231.14	115.87	72.11	36.66	17.12	8.26	7.38	6.54		
225.0	98.42	56.10	35.31	12.25	7.66	6.68	5.57	4.55	3.57		
270.0	242.74	128.95	83.94	46.54	28.54	8.86	8.21	7.29	5.29		
315.0	206.63	158.51	111.28	67.38	32.02	11.97	9.42	8.21	6.64		
360.0	281.53	243.71	195.82	148.26	100.97	58.51	27.01	10.44	9.10		

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	7.89	6.31	5.06	3.94	3.16	2.92	2.74	2.60	2.46
45.0	11.18	8.40	7.29	6.08	4.69	3.90	3.02	2.83	2.64
90.0	8.12	6.82	5.29	4.13	3.16	2.92	2.78	2.60	2.41
135.0	8.21	6.50	5.43	4.55	3.81	3.20	3.06	2.88	2.69
180.0	5.34	4.32	3.29	2.88	2.78	2.64	2.46	2.32	2.23
225.0	2.92	2.64	2.51	2.41	2.32	2.13	2.00	2.04	1.90
270.0	4.59	3.76	3.25	2.78	2.64	2.51	2.37	2.27	2.18
315.0	5.10	4.18	3.39	3.20	3.02	2.97	2.69	2.55	2.46
360.0	7.89	6.31	5.06	3.94	3.16	2.92	2.74	2.60	2.46
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	2.27	2.18	2.13	2.04	1.90	1.86	1.76	1.72	1.72
45.0	2.51	2.32	2.27	2.18	2.00	1.90	1.90	1.81	1.76
90.0	2.32	2.23	2.18	2.04	1.90	1.86	1.81	1.76	1.67
135.0	2.55	2.41	2.32	2.18	2.04	2.00	1.95	1.81	1.72
180.0	2.13	2.00	1.90	1.86	1.81	1.72	1.58	1.62	1.53
225.0	1.76	1.72	1.67	1.62	1.62	1.58	1.44	1.44	1.48
270.0	2.04	1.90	1.90	1.86	1.76	1.67	1.67	1.58	1.58
315.0	2.23	2.18	2.04	2.04	1.90	1.81	1.76	1.72	1.62
360.0	2.27	2.18	2.13	2.04	1.90	1.86	1.76	1.72	1.72
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	1.58	1.53	1.53	1.53	1.44	1.39	1.39	1.39	1.35
45.0	1.72	1.62	1.62	1.58	1.53	1.44	1.44	1.44	1.39
90.0	1.62	1.58	1.58	1.53	1.44	1.44	1.44	1.44	1.35
135.0	1.72	1.72	1.58	1.58	1.53	1.44	1.48	1.39	1.39
180.0	1.48	1.44	1.44	1.44	1.39	1.39	1.35	1.30	1.30
225.0	1.39	1.35	1.35	1.35	1.30	1.25	1.25	1.30	1.25
270.0	1.48	1.53	1.48	1.44	1.44	1.44	1.35	1.35	1.35
315.0	1.53	1.53	1.53	1.44	1.39	1.44	1.39	1.30	1.39
360.0	1.58	1.53	1.53	1.53	1.44	1.39	1.39	1.39	1.35
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	1.30	1.35	1.30	1.25	1.25	1.25	1.25	1.21	1.25
45.0	1.30	1.30	1.30	1.30	1.25	1.25	1.25	1.30	1.21
90.0	1.35	1.39	1.39	1.30	1.25	1.30	1.21	1.25	1.25
135.0	1.35	1.39	1.35	1.25	1.25	1.30	1.30	1.21	1.25
180.0	1.35	1.30	1.25	1.25	1.25	1.25	1.21	1.16	1.21
225.0	1.16	1.25	1.25	1.21	1.16	1.21	1.21	1.21	1.16
270.0	1.35	1.30	1.25	1.30	1.30	1.30	1.25	1.25	1.25
315.0	1.35	1.30	1.30	1.30	1.25	1.21	1.30	1.25	1.16
360.0	1.30	1.35	1.30	1.25	1.25	1.25	1.25	1.21	1.25
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	1.25	1.25	1.21	1.21	1.21	1.25	1.21	1.25	1.25
45.0	1.16	1.21	1.25	1.21	1.21	1.25	1.16	1.16	1.21
90.0	1.25	1.30	1.25	1.25	1.25	1.30	1.30	1.30	1.30
135.0	1.25	1.25	1.25	1.16	1.21	1.21	1.16	1.16	1.16
180.0	1.25	1.21	1.25	1.21	1.16	1.25	1.25	1.25	1.30
225.0	1.21	1.21	1.21	1.21	1.21	1.25	1.30	1.16	1.16
270.0	1.30	1.25	1.30	1.25	1.25	1.30	1.30	1.30	1.35
315.0	1.21	1.16	1.16	1.16	1.21	1.16	1.21	1.30	1.30
360.0	1.25	1.25	1.21	1.21	1.21	1.25	1.21	1.25	1.25

Intensity data(cd)

Appendix Page: 19 Total:19

C/ $\gamma(^{\circ})$	90.0
0.0	1.30
45.0	1.21
90.0	1.30
135.0	1.25
180.0	1.58
225.0	1.21
270.0	1.44
315.0	1.25
360.0	1.30