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Nata

Client:

LumCAT: 3-2322-M

Luminaire: 92.70.131.00

Report No: GC2019091909

Test No: NATA07

LampCAT: OSRAM OPTO SOLERIQ S13

Lamp flux(lm): 1204.0

Number of Lamps: 1

Length(mm): 78

Phm Type: C

Voltage(V): 220.5000

Current(A): 0.0720

Power (W): 14.6900

PF: 0.9220

Ballast type: AC

Width(mm): 78

Height(mm): 0

Photometric Results

Lumens(lm): 1059.78, Efficiency(%): 88.02% , Luminous Efficacy(lm/W): 72.14

Central intensity(cd): 8485.940, Maximum intensity(cd): 8485.940

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=14.2

[C90/270]Total=14.2

Field angle(10%Imax): [C0/180]Total=29.8

[C90/270]Total=29.8

Maximum s/h(1/2): C0_180=0.24 C90_270=0.24

Maximum s/h(1/4): C0_180=0.25 C90_270=0.25

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 88.02%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 99.604%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	8485.942	0.000	0	.000%	.000%
1.0	8364.017	8.062	8.062	.670%	.761%
2.0	8007.407	23.498	31.56	1.952%	2.978%
3.0	7469.245	37.015	68.575	3.074%	6.471%
4.0	6758.055	47.623	116.199	3.955%	10.964%
5.0	5999.720	54.883	171.082	4.558%	16.143%
6.0	5149.321	58.591	229.673	4.866%	21.672%
7.0	4280.070	58.528	288.201	4.861%	27.194%
8.0	3577.060	56.232	344.433	4.670%	32.500%
9.0	2819.856	51.844	396.277	4.306%	37.392%
10.0	2279.257	46.145	442.422	3.833%	41.747%
11.0	1838.367	41.144	483.565	3.417%	45.629%
12.0	1482.958	36.307	519.872	3.016%	49.055%
13.0	1211.777	31.980	551.852	2.656%	52.072%
14.0	1084.997	29.399	581.25	2.442%	54.846%
15.0	833.242	26.334	607.585	2.187%	57.331%
16.0	748.126	23.171	630.756	1.925%	59.518%
17.0	672.628	22.125	652.881	1.838%	61.605%
18.0	608.934	21.130	674.011	1.755%	63.599%
19.0	561.712	20.367	694.378	1.692%	65.521%
20.0	524.497	19.881	714.259	1.651%	67.397%
21.0	493.737	19.552	733.811	1.624%	69.242%
22.0	469.793	19.363	753.173	1.608%	71.069%
23.0	449.782	19.295	772.469	1.603%	72.889%
24.0	434.469	19.333	791.802	1.606%	74.714%
25.0	422.270	19.480	811.282	1.618%	76.552%
26.0	411.946	19.692	830.974	1.636%	78.410%
27.0	403.570	19.952	850.925	1.657%	80.293%
28.0	395.246	20.224	871.15	1.680%	82.201%
29.0	386.540	20.454	891.604	1.699%	84.131%
30.0	373.152	20.512	912.115	1.704%	86.066%
31.0	356.349	20.301	932.416	1.686%	87.982%
32.0	335.931	19.833	952.249	1.647%	89.853%
33.0	304.655	18.872	971.121	1.567%	91.634%
34.0	277.388	17.614	988.735	1.463%	93.296%
35.0	235.712	15.935	1004.67	1.324%	94.800%
36.0	190.016	13.555	1018.225	1.126%	96.079%
37.0	135.666	10.622	1028.847	.882%	97.081%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	98.114	7.803	1036.651	.648%	97.817%
39.0	69.489	5.721	1042.371	.475%	98.357%
40.0	50.817	4.196	1046.567	.348%	98.753%
41.0	25.696	2.725	1049.292	.226%	99.010%
42.0	14.640	1.465	1050.757	.122%	99.149%
43.0	7.912	0.835	1051.593	.069%	99.227%
44.0	5.041	0.489	1052.082	.041%	99.273%
45.0	4.217	0.356	1052.437	.030%	99.307%
46.0	3.619	0.306	1052.744	.025%	99.336%
47.0	3.242	0.273	1053.017	.023%	99.362%
48.0	2.970	0.251	1053.268	.021%	99.385%
49.0	2.749	0.235	1053.503	.020%	99.408%
50.0	2.610	0.223	1053.726	.019%	99.429%
51.0	2.454	0.214	1053.94	.018%	99.449%
52.0	2.355	0.206	1054.147	.017%	99.468%
53.0	2.251	0.200	1054.347	.017%	99.487%
54.0	2.129	0.193	1054.54	.016%	99.505%
55.0	2.053	0.187	1054.727	.016%	99.523%
56.0	1.955	0.181	1054.908	.015%	99.540%
57.0	1.903	0.176	1055.084	.015%	99.557%
58.0	1.821	0.172	1055.257	.014%	99.573%
59.0	1.740	0.167	1055.423	.014%	99.589%
60.0	1.705	0.163	1055.586	.014%	99.604%
61.0	1.671	0.161	1055.747	.013%	99.619%
62.0	1.589	0.157	1055.904	.013%	99.634%
63.0	1.537	0.152	1056.056	.013%	99.648%
64.0	1.526	0.150	1056.206	.012%	99.663%
65.0	1.491	0.149	1056.356	.012%	99.677%
66.0	1.450	0.147	1056.502	.012%	99.691%
67.0	1.404	0.143	1056.646	.012%	99.704%
68.0	1.398	0.142	1056.788	.012%	99.718%
69.0	1.363	0.141	1056.929	.012%	99.731%
70.0	1.363	0.140	1057.069	.012%	99.744%
71.0	1.328	0.139	1057.208	.012%	99.757%
72.0	1.305	0.137	1057.345	.011%	99.770%
73.0	1.317	0.137	1057.482	.011%	99.783%
74.0	1.293	0.137	1057.619	.011%	99.796%
75.0	1.282	0.136	1057.755	.011%	99.809%

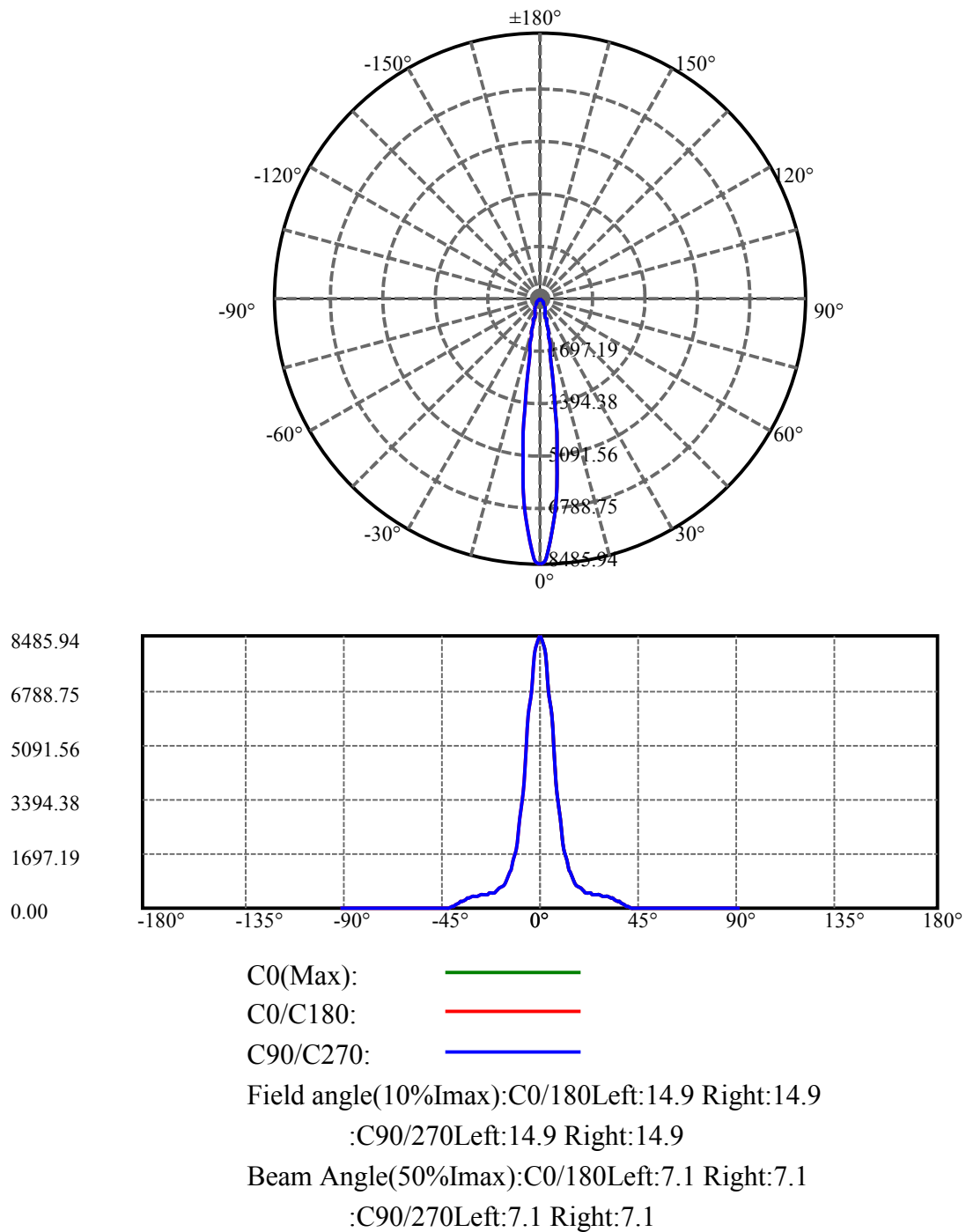
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	1.270	0.135	1057.89	.011%	99.822%
77.0	1.264	0.135	1058.026	.011%	99.834%
78.0	1.259	0.135	1058.161	.011%	99.847%
79.0	1.241	0.134	1058.295	.011%	99.860%
80.0	1.247	0.134	1058.429	.011%	99.872%
81.0	1.247	0.135	1058.564	.011%	99.885%
82.0	1.224	0.134	1058.698	.011%	99.898%
83.0	1.230	0.133	1058.831	.011%	99.910%
84.0	1.241	0.135	1058.966	.011%	99.923%
85.0	1.230	0.135	1059.101	.011%	99.936%
86.0	1.235	0.135	1059.236	.011%	99.949%
87.0	1.241	0.136	1059.371	.011%	99.961%
88.0	1.235	0.136	1059.507	.011%	99.974%
89.0	1.253	0.136	1059.643	.011%	99.987%
90.0	1.264	0.138	1059.781	.011%	100.000%

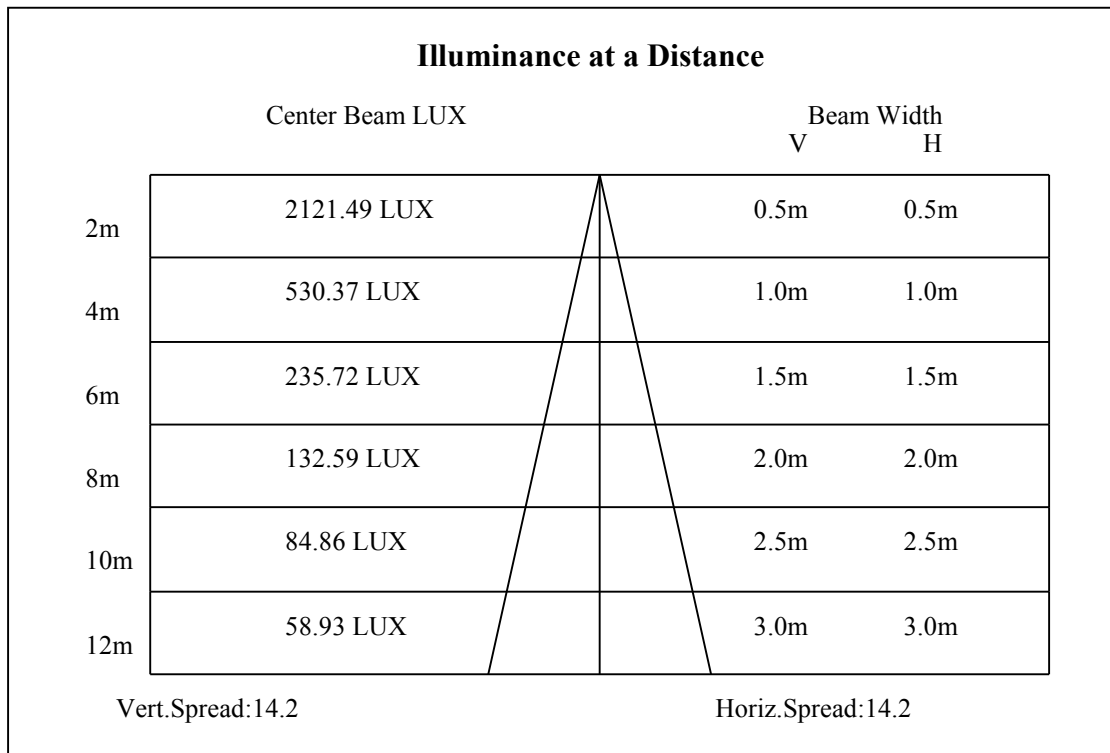
ZONAL LUMEN SUMMARY

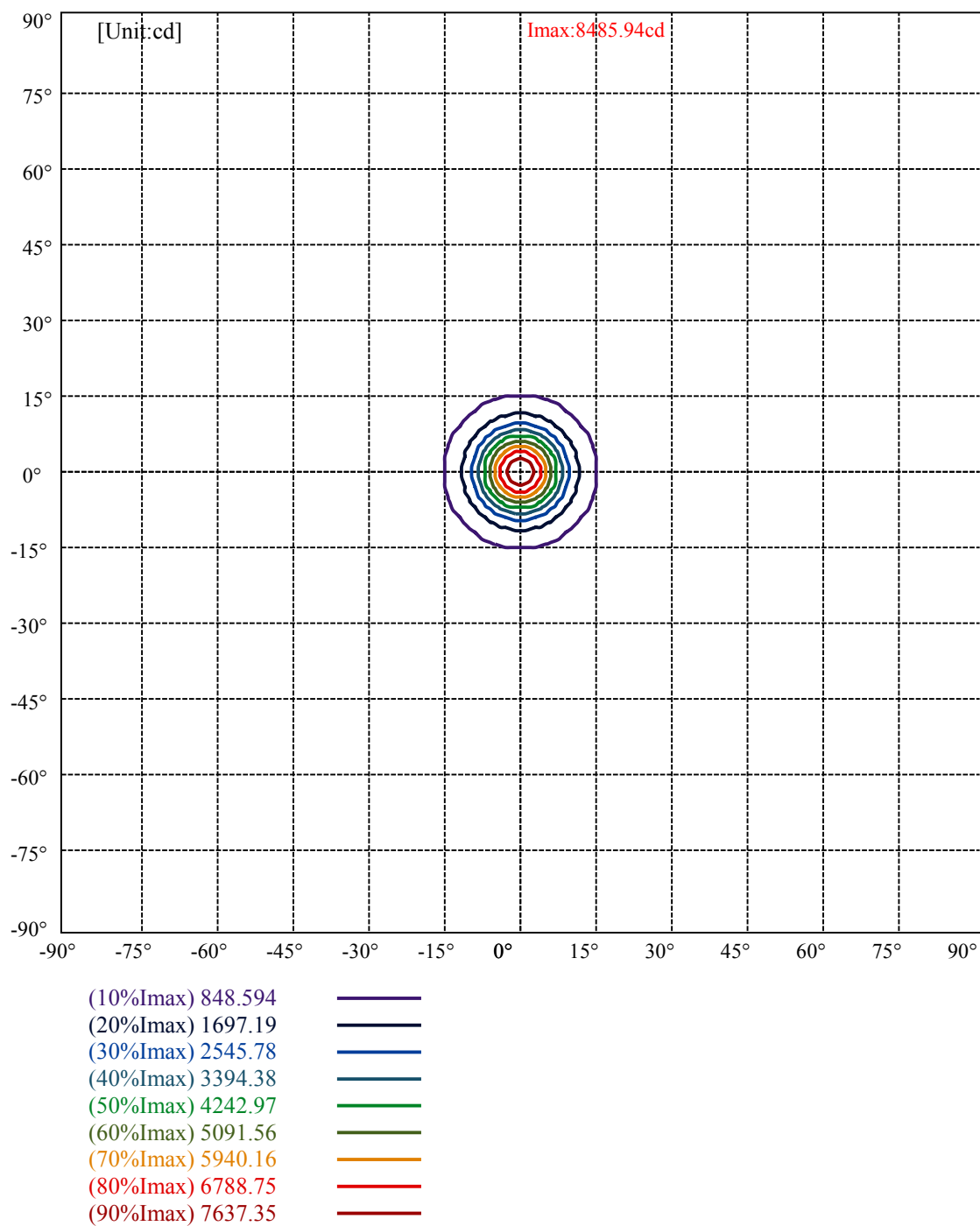
Zone	Lumens	%Lamp	%Fixt
0-30	912.12	75.76%	86.07%
0-40	1046.57	86.92%	98.75%
0-60	1055.59	87.67%	99.60%
0-90	1059.64	88.01%	99.99%
0-120	1059.64	88.01%	99.99%
0-180	1059.78	88.02%	100.00%
60-90	4.22	0.35%	0.40%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-26.84	847.83	70.42%	80.00%

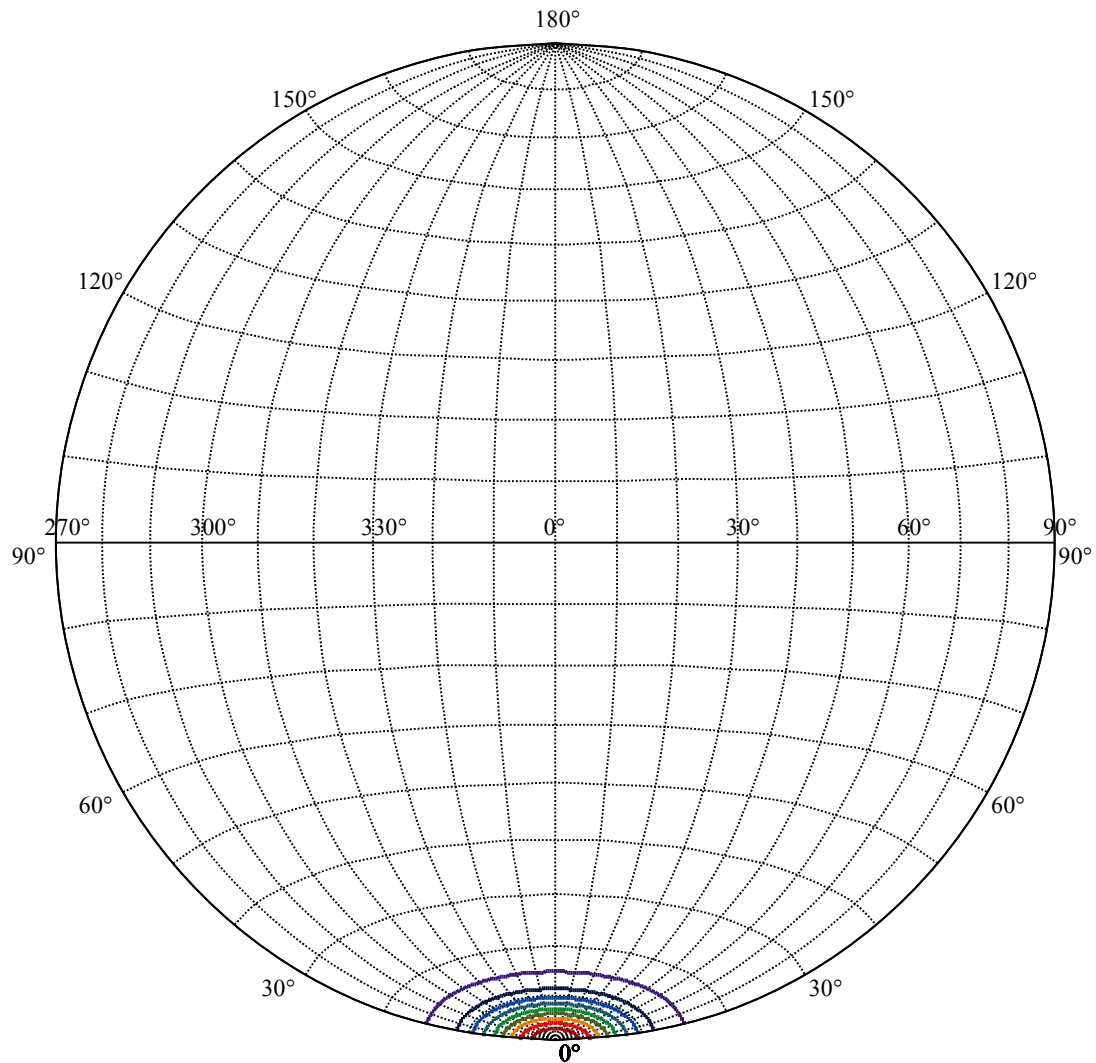
ZONAL LUMEN SUMMARY

0-10	442.42
10-20	271.84
20-30	197.86
30-40	134.45
40-50	7.16
50-60	1.86
60-70	1.48
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









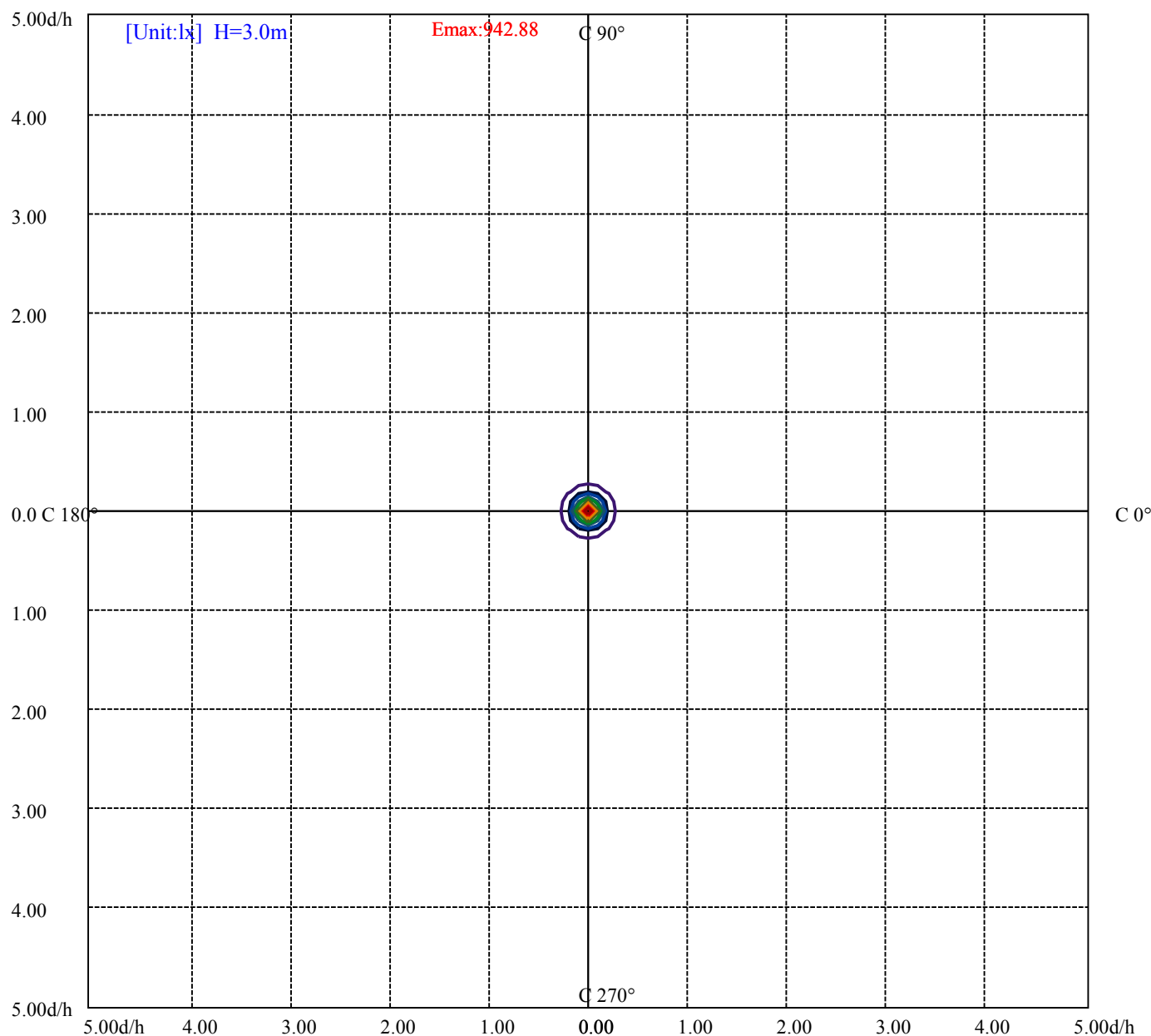
House

[Unit:cd]

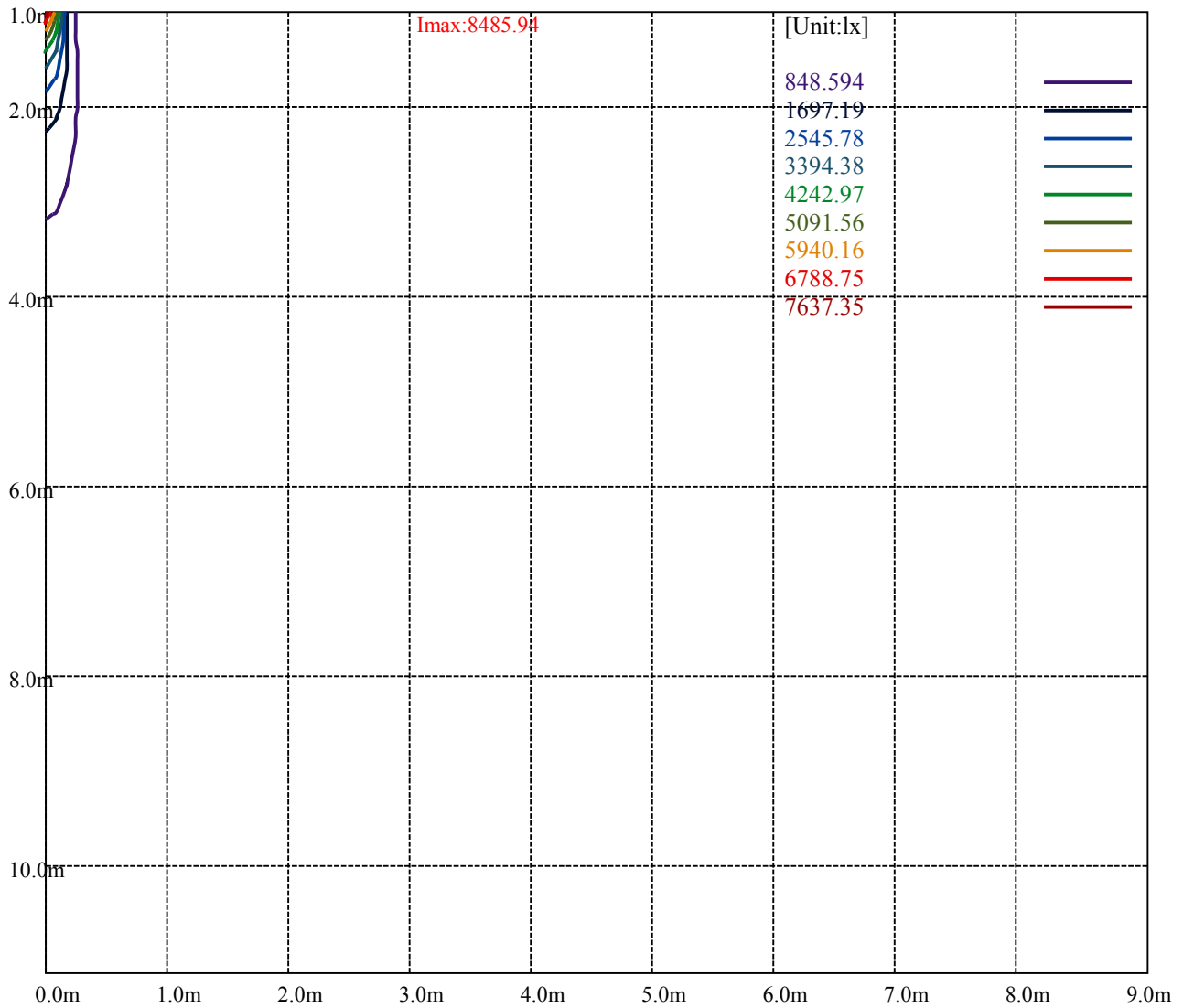
Road

Imax:8485.94

(10%Imax)	848.594	—
(20%Imax)	1697.19	—
(30%Imax)	2545.78	—
(40%Imax)	3394.38	—
(50%Imax)	4242.97	—
(60%Imax)	5091.56	—
(70%Imax)	5940.16	—
(80%Imax)	6788.75	—
(90%Imax)	7637.35	—



(10%Emax)	94.28799	
(20%Emax)	188.5756	
(30%Emax)	282.8644	
(40%Emax)	377.1522	
(50%Emax)	471.44	
(60%Emax)	565.7278	
(70%Emax)	660.0167	
(80%Emax)	754.3044	
(90%Emax)	848.5922	



Luminance Table

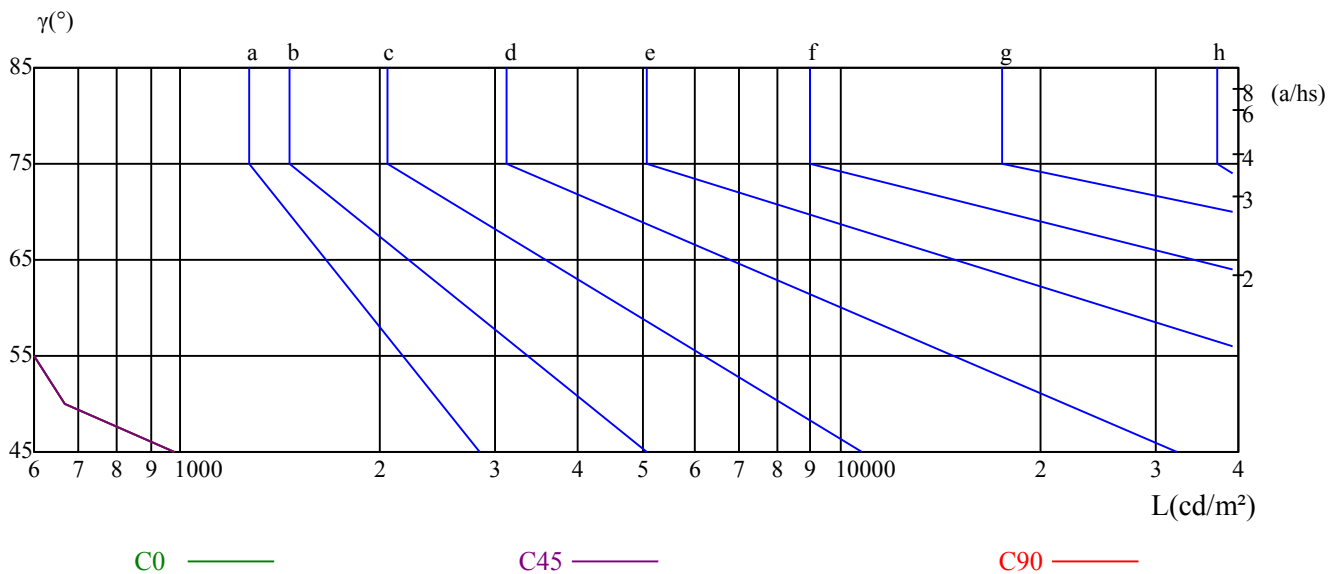
γ	45	50	55	60	65	70	75	80	85
C0	980	667	588	561	580	655	814	1180	2319
C45	980	667	588	561	580	655	814	1180	2319
C90	980	667	588	561	580	655	814	1180	2319

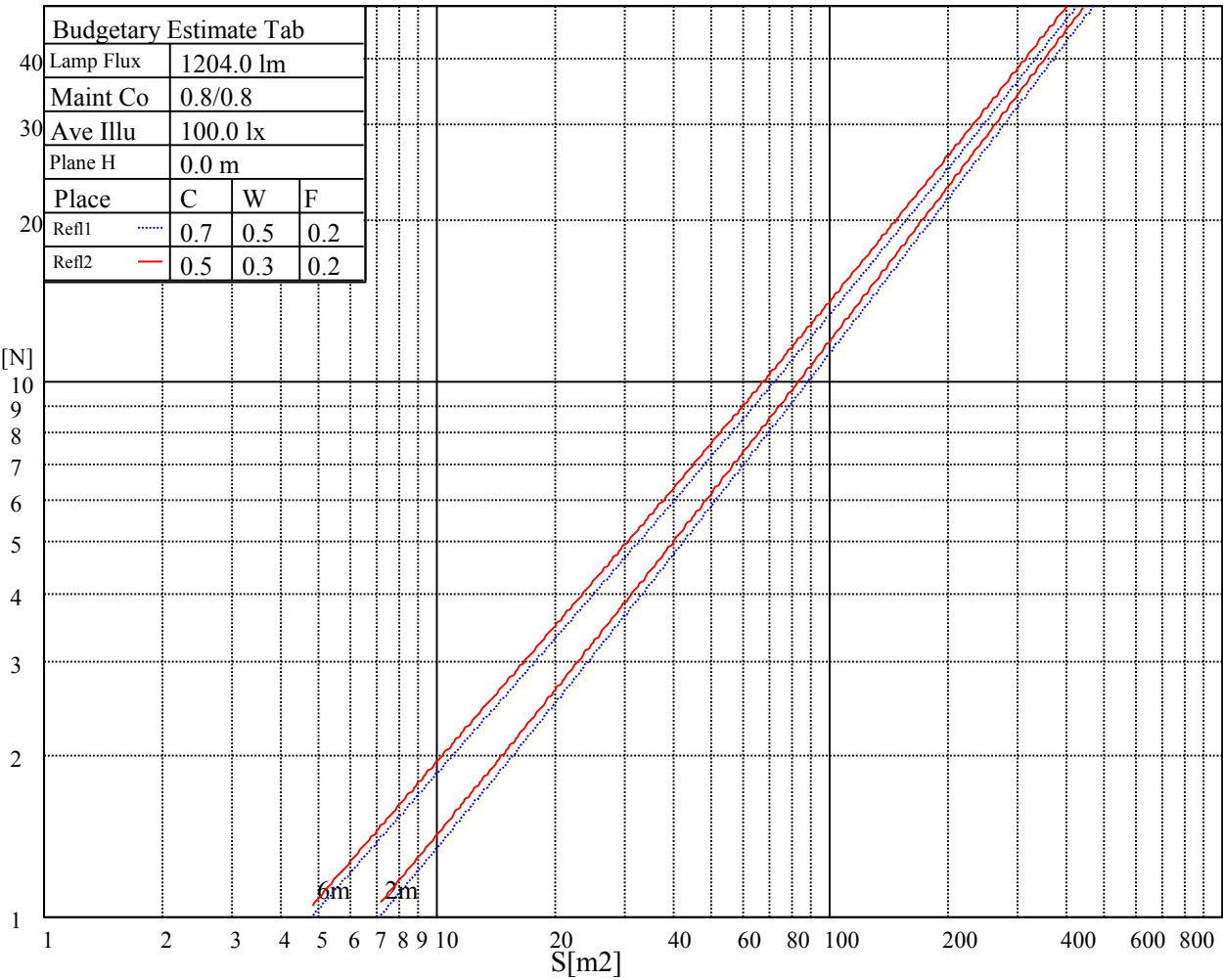
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
580	580	580	814	814	814	2319	2319	2319

Glare Table

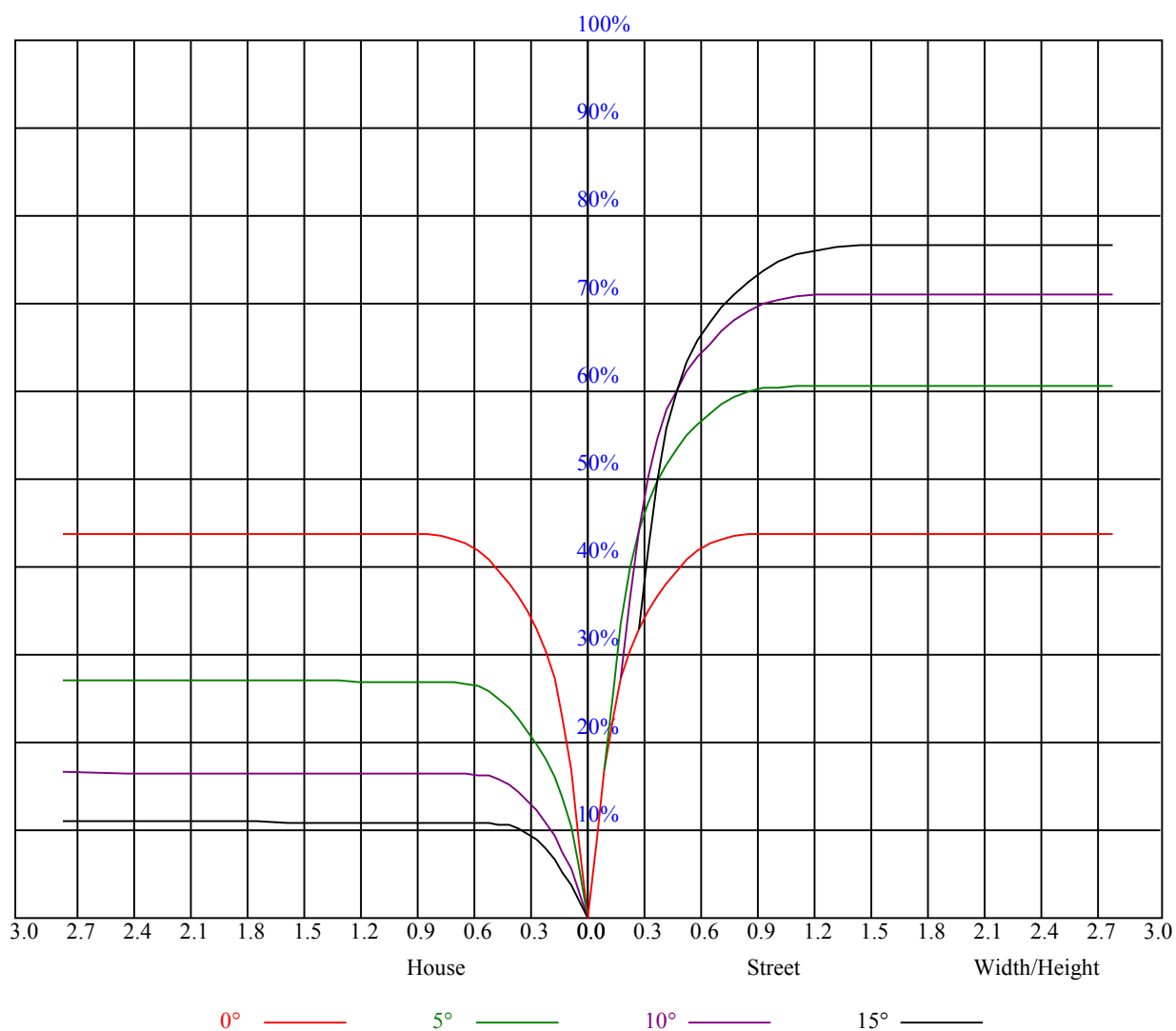
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

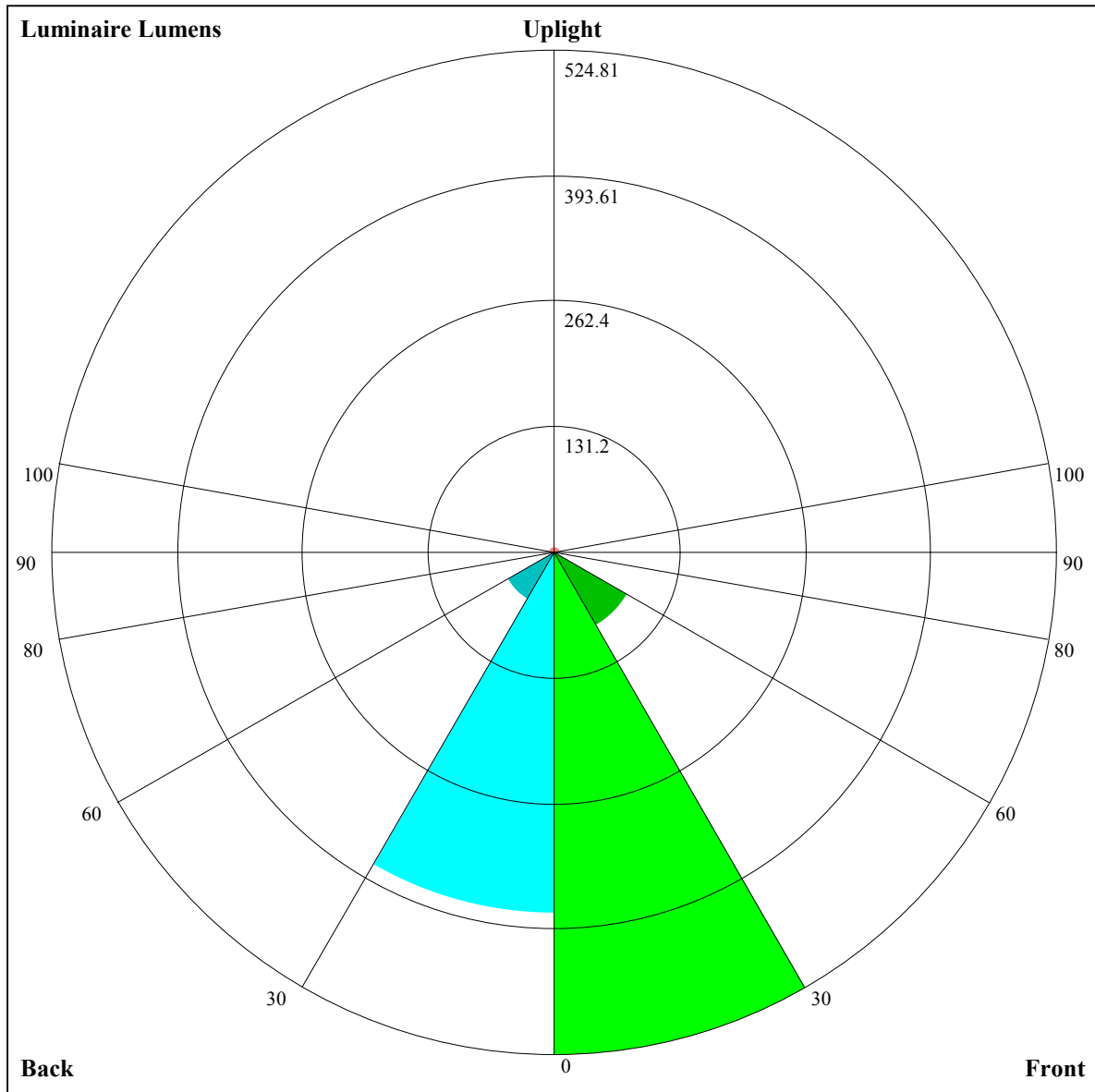
Luminance Limiting Curve





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	1.02	1.02	1.02	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	0.96	0.94	0.94	0.93	0.91	0.90	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	0.83	0.81
3	0.90	0.87	0.84	0.89	0.86	0.83	0.87	0.84	0.82	0.85	0.82	0.81	0.83	0.81	0.80	0.78
4	0.86	0.82	0.80	0.85	0.82	0.79	0.83	0.81	0.78	0.82	0.79	0.77	0.80	0.78	0.77	0.76
5	0.83	0.79	0.76	0.82	0.78	0.76	0.81	0.77	0.75	0.79	0.77	0.75	0.78	0.76	0.74	0.73
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	0.74	0.72	0.70	0.74	0.71	0.69	0.68
8	0.74	0.71	0.68	0.74	0.70	0.68	0.73	0.70	0.68	0.72	0.69	0.67	0.72	0.69	0.67	0.66
9	0.72	0.68	0.66	0.72	0.68	0.66	0.71	0.68	0.66	0.70	0.67	0.65	0.70	0.67	0.65	0.64
10	0.70	0.66	0.64	0.70	0.66	0.64	0.69	0.66	0.64	0.69	0.66	0.64	0.68	0.65	0.63	0.63





Luminaire Lumens:

FL=524.81,FM=87.43,FH=1.46,FVH=0.68

BL=377.63,BM=56.43,BH=1.4,BVH=0.67

UL=1.38,UH=6.57

BUG Rating:B1-U1-G0

Intensity data(cd)

C/ γ (°)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
0.0	8787.91	9096.49	9195.33	9104.85	8815.29	8306.24	7544.30	6543.85	5404.18
45.0	8024.58	8690.93	9094.17	9250.09	9250.09	9095.66	8710.51	8084.07	7202.40
90.0	8619.00	8638.96	8454.74	8033.86	7372.61	6863.10	5458.01	4434.81	3875.19
135.0	8498.82	8392.09	8021.79	7407.88	6554.98	5549.42	4516.02	3598.63	2829.26
180.0	8787.91	8225.04	7381.43	6279.81	5105.81	4030.64	3468.23	2421.37	2077.06
225.0	8024.58	7060.78	5891.41	4717.87	3681.22	2833.90	2189.82	1709.55	1359.66
270.0	8619.00	8367.50	7883.97	7126.21	6144.78	5090.49	4092.82	3226.01	2519.28
315.0	8525.73	8440.35	8136.41	7833.39	7139.66	6228.30	5214.85	4222.29	3349.44
360.0	8787.91	9096.49	9195.33	9104.85	8815.29	8306.24	7544.30	6543.85	5404.18
C/ γ (°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	4318.81	3382.85	2637.61	2063.60	1639.48	1383.79	878.00	878.00	828.30
45.0	6125.84	4970.40	3921.69	3063.22	2636.31	2636.31	1506.30	1273.82	1019.06
90.0	2785.64	2413.02	1907.22	1523.93	1240.41	886.07	886.07	772.06	686.12
135.0	2220.45	1753.63	1402.82	1144.82	958.74	822.31	722.55	647.37	612.11
180.0	1629.27	1200.96	1070.57	902.13	779.16	690.06	622.78	571.74	533.22
225.0	877.39	877.39	851.41	742.69	664.40	604.03	556.93	520.23	491.13
270.0	1974.97	1569.41	1271.50	1090.06	891.92	773.59	701.20	619.07	577.30
315.0	2626.48	2066.39	1644.12	1333.21	883.80	883.80	792.11	702.73	633.78
360.0	4318.81	3382.85	2637.61	2063.60	1639.48	1383.79	878.00	878.00	828.30
C/ γ (°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	727.28	650.11	591.64	545.61	510.30	482.55	460.04	444.17	429.60
45.0	869.18	777.77	688.21	619.07	567.10	526.72	495.17	469.18	451.09
90.0	621.25	571.74	531.41	501.30	480.09	456.01	439.86	429.42	418.70
135.0	548.53	527.19	498.42	474.29	454.80	439.02	426.03	415.36	407.00
180.0	501.67	476.61	457.12	441.81	426.96	416.28	408.40	400.97	394.47
225.0	467.75	449.74	434.01	421.71	412.48	404.27	397.86	391.23	383.80
270.0	535.54	503.52	478.46	458.51	441.34	427.42	416.75	407.93	400.04
315.0	600.27	537.03	516.70	487.61	465.29	445.98	431.64	419.90	410.86
360.0	727.28	650.11	591.64	545.61	510.30	482.55	460.04	444.17	429.60
C/ γ (°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	419.07	410.39	402.64	395.87	392.06	385.05	378.19	371.41	347.89
45.0	434.85	422.32	413.04	404.68	398.19	392.15	384.73	378.23	371.27
90.0	410.58	403.15	396.38	389.00	381.25	374.80	362.09	326.63	279.81
135.0	400.04	393.55	386.59	379.16	372.20	354.10	314.20	265.01	243.66
180.0	390.30	380.09	375.45	365.24	316.98	287.75	244.13	244.13	109.37
225.0	377.31	369.37	348.67	295.40	252.71	197.63	131.74	88.82	42.60
270.0	393.08	386.59	380.09	373.59	361.99	328.12	281.25	249.23	249.23
315.0	403.34	396.52	389.46	382.27	375.40	367.84	340.93	295.64	241.85
360.0	419.07	410.39	402.64	395.87	392.06	385.05	378.19	371.41	347.89
C/ γ (°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	307.14	254.52	198.93	143.29	88.86	43.43	14.48	8.31	7.10
45.0	354.10	314.66	284.96	252.48	252.48	117.45	65.29	25.34	8.86
90.0	224.31	164.64	107.79	59.58	23.16	9.42	8.26	6.64	5.01
135.0	243.66	108.17	60.42	22.83	9.74	8.58	7.19	5.57	4.55
180.0	60.46	24.73	9.23	8.17	7.01	5.52	4.36	3.20	3.02
225.0	13.74	8.40	7.24	6.03	4.78	3.81	3.02	2.88	2.74
270.0	129.65	78.28	37.35	11.97	9.00	7.98	6.36	4.92	4.22
315.0	187.05	131.92	78.98	51.55	11.51	9.37	8.17	6.45	4.83
360.0	307.14	254.52	198.93	143.29	88.86	43.43	14.48	8.31	7.10

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	5.48	4.22	3.39	3.06	2.92	2.78	2.64	2.55	2.37
45.0	7.38	6.03	4.78	3.99	3.16	2.92	2.78	2.69	2.55
90.0	4.18	3.67	3.43	3.11	3.02	2.83	2.69	2.60	2.41
135.0	3.85	3.34	3.16	2.97	2.83	2.69	2.51	2.37	2.27
180.0	2.83	2.64	2.60	2.46	2.37	2.27	2.09	2.00	2.00
225.0	2.60	2.41	2.32	2.23	2.09	2.09	1.90	1.90	1.81
270.0	3.39	3.16	2.97	2.88	2.69	2.51	2.41	2.32	2.27
315.0	4.04	3.48	3.29	3.06	2.92	2.78	2.60	2.41	2.32
360.0	5.48	4.22	3.39	3.06	2.92	2.78	2.64	2.55	2.37
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	2.09	2.00	1.86	1.81	1.81	1.72	1.62
45.0	2.32	2.27	2.18	2.09	2.04	1.90	1.81	1.81	1.72
90.0	2.27	2.18	2.13	2.04	1.90	1.86	1.81	1.76	1.67
135.0	2.18	2.13	1.95	1.95	1.81	1.76	1.76	1.67	1.62
180.0	1.86	1.81	1.72	1.72	1.67	1.58	1.58	1.58	1.44
225.0	1.72	1.67	1.62	1.58	1.58	1.48	1.39	1.44	1.44
270.0	2.13	2.04	1.95	1.90	1.81	1.72	1.72	1.72	1.58
315.0	2.27	2.13	2.00	1.95	1.90	1.81	1.76	1.67	1.62
360.0	2.27	2.18	2.09	2.00	1.86	1.81	1.81	1.72	1.62
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	1.58	1.62	1.58	1.48	1.44	1.48	1.44	1.39	1.30
45.0	1.67	1.58	1.53	1.58	1.53	1.44	1.39	1.39	1.39
90.0	1.62	1.58	1.58	1.53	1.44	1.44	1.44	1.44	1.39
135.0	1.58	1.58	1.53	1.44	1.39	1.44	1.39	1.35	1.30
180.0	1.39	1.44	1.39	1.35	1.30	1.30	1.30	1.35	1.30
225.0	1.35	1.30	1.35	1.35	1.30	1.25	1.25	1.30	1.25
270.0	1.53	1.58	1.53	1.44	1.39	1.44	1.39	1.35	1.35
315.0	1.58	1.53	1.44	1.44	1.44	1.39	1.30	1.35	1.35
360.0	1.58	1.62	1.58	1.48	1.44	1.48	1.44	1.39	1.30
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	1.35	1.39	1.30	1.30	1.30	1.25	1.35	1.30	1.35
45.0	1.30	1.30	1.30	1.35	1.30	1.30	1.25	1.21	1.25
90.0	1.35	1.35	1.35	1.30	1.30	1.30	1.30	1.25	1.21
135.0	1.30	1.35	1.30	1.25	1.25	1.25	1.25	1.25	1.21
180.0	1.21	1.25	1.30	1.25	1.21	1.25	1.25	1.21	1.21
225.0	1.21	1.25	1.21	1.21	1.25	1.21	1.16	1.21	1.25
270.0	1.39	1.35	1.35	1.30	1.30	1.30	1.30	1.25	1.25
315.0	1.35	1.30	1.25	1.30	1.25	1.25	1.21	1.25	1.25
360.0	1.35	1.39	1.30	1.30	1.30	1.25	1.35	1.30	1.35
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	1.25	1.30	1.21	1.30	1.21	1.21	1.25	1.30	1.25
45.0	1.25	1.21	1.25	1.21	1.25	1.25	1.21	1.21	1.21
90.0	1.30	1.25	1.25	1.30	1.30	1.25	1.30	1.21	1.30
135.0	1.21	1.25	1.21	1.25	1.21	1.16	1.21	1.25	1.21
180.0	1.25	1.21	1.21	1.16	1.25	1.21	1.25	1.21	1.16
225.0	1.21	1.21	1.21	1.25	1.16	1.25	1.21	1.16	1.16
270.0	1.30	1.21	1.25	1.25	1.30	1.30	1.25	1.30	1.35
315.0	1.21	1.16	1.25	1.21	1.16	1.25	1.25	1.25	1.39
360.0	1.25	1.30	1.21	1.30	1.21	1.21	1.25	1.30	1.25

Intensity data(cd)

Appendix Page: 19 Total:19

C/ $\gamma(^{\circ})$	90.0
0.0	1.25
45.0	1.21
90.0	1.30
135.0	1.21
180.0	1.21
225.0	1.16
270.0	1.39
315.0	1.39
360.0	1.25