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## Nata

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### Client:

LumCAT: 3-2324-M

Luminaire: 92.70.129.00

Report No: GC2019091909

Test No: NATA07

LampCAT: CREE CXA1830

Lamp flux(lm): 1602.0

Number of Lamps: 1

Length(mm): 78

Phm Type: C

Voltage(V): 220.4000

Current(A): 0.0700

Power (W): 14.2300

PF: 0.9180

Ballast type: AC

Width(mm): 78

Height(mm): 0

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## Photometric Results

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Lumens(lm): 1405.49, Efficiency(%): 87.73% , Luminous Efficacy(lm/W): 98.77

Central intensity(cd): 5842.691, Maximum intensity(cd): 5842.691

Angle of maximum intensity: C=0.0  $\gamma$ =0.0

Beam Angle(50%Imax): [C0/180]Total=23.4

[C90/270]Total=23.4

Field angle(10%Imax): [C0/180]Total=48.6

[C90/270]Total=48.6

Maximum s/h(1/2): C0\_180=0.40 C90\_270=0.40

Maximum s/h(1/4): C0\_180=0.38 C90\_270=0.38

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 87.73%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in  $\pi$  solid angle : 99.629%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	5842.691	0.000	0	.000%	.000%
1.0	5824.826	5.583	5.583	.348%	.397%
2.0	5769.722	16.642	22.224	1.039%	1.581%
3.0	5686.022	27.398	49.623	1.710%	3.531%
4.0	5568.042	37.671	87.294	2.351%	6.211%
5.0	5362.881	47.024	134.318	2.935%	9.557%
6.0	5166.711	55.336	189.654	3.454%	13.494%
7.0	4880.518	62.363	252.017	3.893%	17.931%
8.0	4534.639	67.382	319.399	4.206%	22.725%
9.0	4134.990	70.263	389.662	4.386%	27.724%
10.0	3694.623	70.855	460.517	4.423%	32.765%
11.0	3235.578	69.247	529.764	4.323%	37.692%
12.0	2781.637	65.777	595.541	4.106%	42.372%
13.0	2352.986	60.935	656.476	3.804%	46.708%
14.0	1966.794	55.293	711.768	3.451%	50.642%
15.0	1591.577	48.851	760.619	3.049%	54.118%
16.0	1348.075	43.074	803.693	2.689%	57.182%
17.0	1149.272	38.890	842.584	2.428%	59.949%
18.0	971.930	34.974	877.558	2.183%	62.438%
19.0	864.535	31.951	909.508	1.994%	64.711%
20.0	776.183	30.030	939.538	1.875%	66.848%
21.0	706.955	28.479	968.017	1.778%	68.874%
22.0	656.544	27.400	995.417	1.710%	70.823%
23.0	619.978	26.785	1022.202	1.672%	72.729%
24.0	589.879	26.452	1048.654	1.651%	74.611%
25.0	569.241	26.356	1075.01	1.645%	76.486%
26.0	552.768	26.485	1101.495	1.653%	78.371%
27.0	539.114	26.713	1128.208	1.667%	80.271%
28.0	527.171	26.996	1155.204	1.685%	82.192%
29.0	515.878	27.289	1182.493	1.703%	84.134%
30.0	500.100	27.431	1209.925	1.712%	86.085%
31.0	476.278	27.171	1237.096	1.696%	88.019%
32.0	445.025	26.394	1263.49	1.648%	89.896%
33.0	406.284	25.080	1288.57	1.566%	91.681%
34.0	356.639	23.088	1311.658	1.441%	93.324%
35.0	302.161	20.460	1332.118	1.277%	94.779%
36.0	252.324	17.655	1349.773	1.102%	96.035%
37.0	178.983	14.067	1363.84	.878%	97.036%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	139.396	10.627	1374.467	.663%	97.792%
39.0	108.346	8.456	1382.923	.528%	98.394%
40.0	70.841	6.249	1389.173	.390%	98.839%
41.0	31.920	3.659	1392.832	.228%	99.099%
42.0	15.360	1.718	1394.55	.107%	99.221%
43.0	8.515	0.884	1395.434	.055%	99.284%
44.0	6.148	0.553	1395.987	.035%	99.324%
45.0	4.838	0.422	1396.41	.026%	99.354%
46.0	4.252	0.355	1396.765	.022%	99.379%
47.0	3.857	0.323	1397.088	.020%	99.402%
48.0	3.561	0.300	1397.387	.019%	99.423%
49.0	3.376	0.285	1397.672	.018%	99.443%
50.0	3.219	0.275	1397.947	.017%	99.463%
51.0	3.068	0.266	1398.213	.017%	99.482%
52.0	2.941	0.258	1398.471	.016%	99.500%
53.0	2.796	0.250	1398.721	.016%	99.518%
54.0	2.703	0.242	1398.963	.015%	99.535%
55.0	2.599	0.237	1399.2	.015%	99.552%
56.0	2.494	0.230	1399.43	.014%	99.569%
57.0	2.378	0.223	1399.653	.014%	99.584%
58.0	2.280	0.215	1399.868	.013%	99.600%
59.0	2.210	0.210	1400.078	.013%	99.615%
60.0	2.140	0.206	1400.283	.013%	99.629%
61.0	2.065	0.201	1400.484	.013%	99.644%
62.0	1.990	0.195	1400.679	.012%	99.657%
63.0	1.937	0.191	1400.87	.012%	99.671%
64.0	1.885	0.188	1401.058	.012%	99.684%
65.0	1.845	0.185	1401.243	.012%	99.697%
66.0	1.787	0.181	1401.424	.011%	99.710%
67.0	1.746	0.178	1401.601	.011%	99.723%
68.0	1.671	0.173	1401.774	.011%	99.735%
69.0	1.659	0.170	1401.944	.011%	99.747%
70.0	1.630	0.169	1402.113	.011%	99.759%
71.0	1.595	0.167	1402.28	.010%	99.771%
72.0	1.572	0.165	1402.445	.010%	99.783%
73.0	1.549	0.163	1402.608	.010%	99.795%
74.0	1.514	0.161	1402.769	.010%	99.806%
75.0	1.497	0.159	1402.928	.010%	99.817%

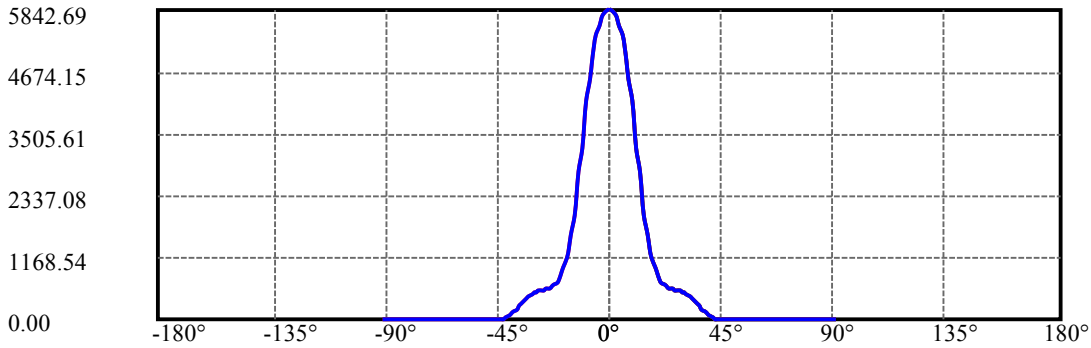
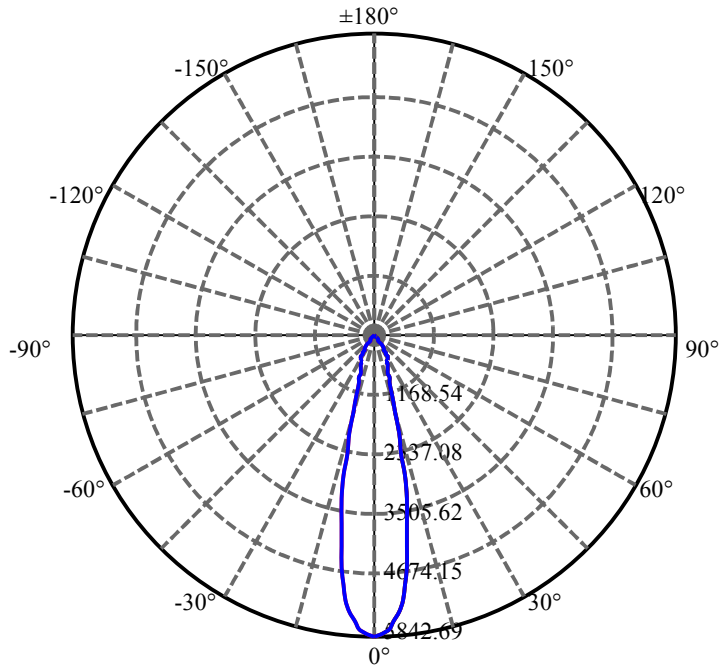
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	1.491	0.159	1403.086	.010%	99.829%
77.0	1.497	0.159	1403.246	.010%	99.840%
78.0	1.485	0.160	1403.405	.010%	99.851%
79.0	1.462	0.158	1403.564	.010%	99.863%
80.0	1.473	0.158	1403.722	.010%	99.874%
81.0	1.485	0.160	1403.882	.010%	99.885%
82.0	1.473	0.160	1404.042	.010%	99.897%
83.0	1.473	0.160	1404.202	.010%	99.908%
84.0	1.473	0.161	1404.363	.010%	99.919%
85.0	1.497	0.162	1404.525	.010%	99.931%
86.0	1.613	0.170	1404.695	.011%	99.943%
87.0	1.769	0.185	1404.88	.012%	99.956%
88.0	1.885	0.200	1405.08	.012%	99.971%
89.0	1.920	0.209	1405.289	.013%	99.985%
90.0	1.833	0.206	1405.495	.013%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	1209.92	75.53%	86.09%
0-40	1389.17	86.71%	98.84%
0-60	1400.28	87.41%	99.63%
0-90	1405.29	87.72%	99.99%
0-120	1405.29	87.72%	99.99%
0-180	1405.49	87.73%	100.00%
60-90	5.21	0.33%	0.37%
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%
0-26.86	1124.40	70.19%	80.00%

ZONAL LUMEN SUMMARY

0-10	460.52
10-20	479.02
20-30	270.39
30-40	179.25
40-50	8.77
50-60	2.34
60-70	1.83
70-80	1.61
80-90	1.57
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: —————

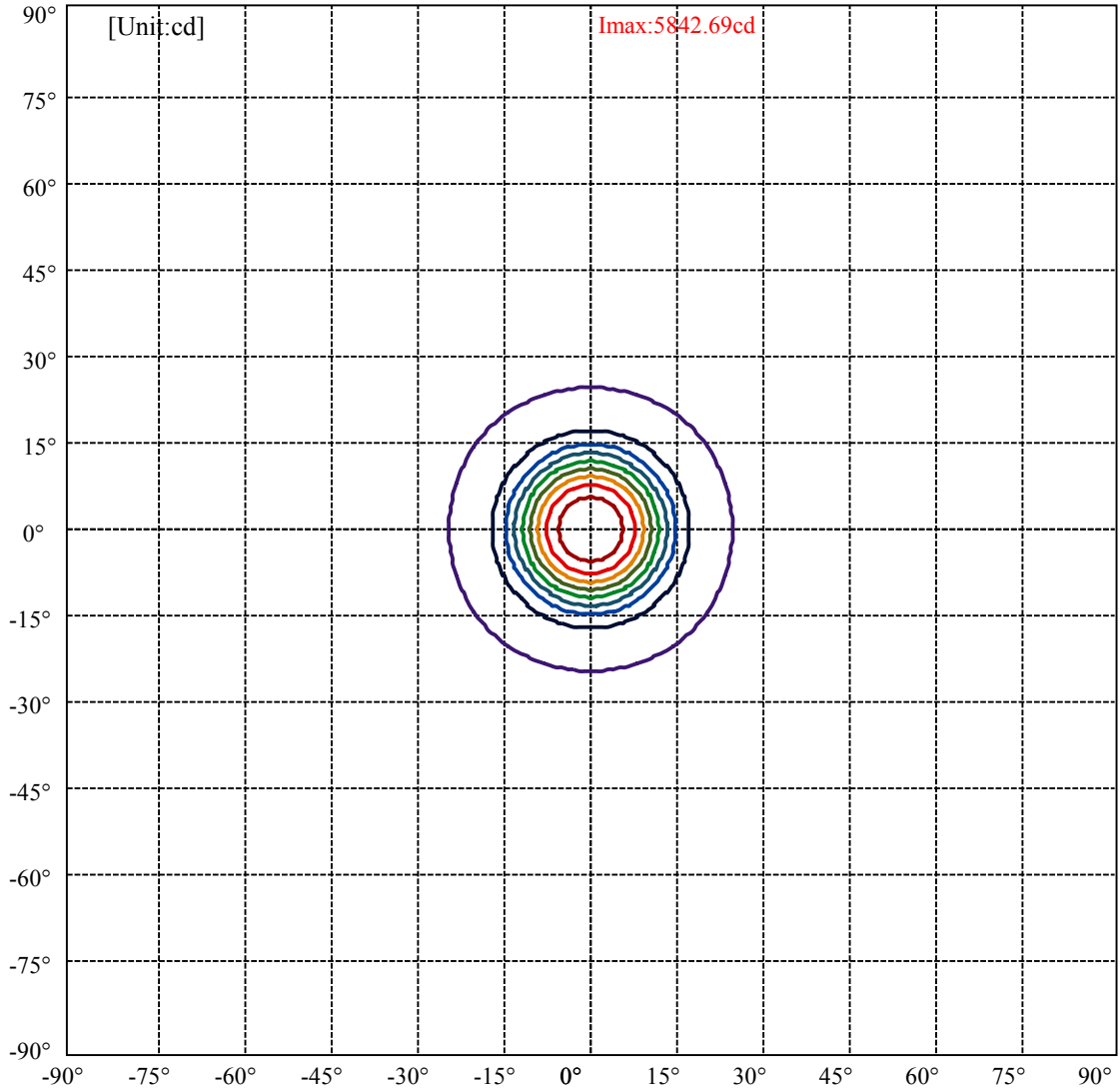
Field angle(10%Imax):C0/180Left:24.3 Right:24.3

:C90/270Left:24.3 Right:24.3

Beam Angle(50%Imax):C0/180Left:11.7 Right:11.7

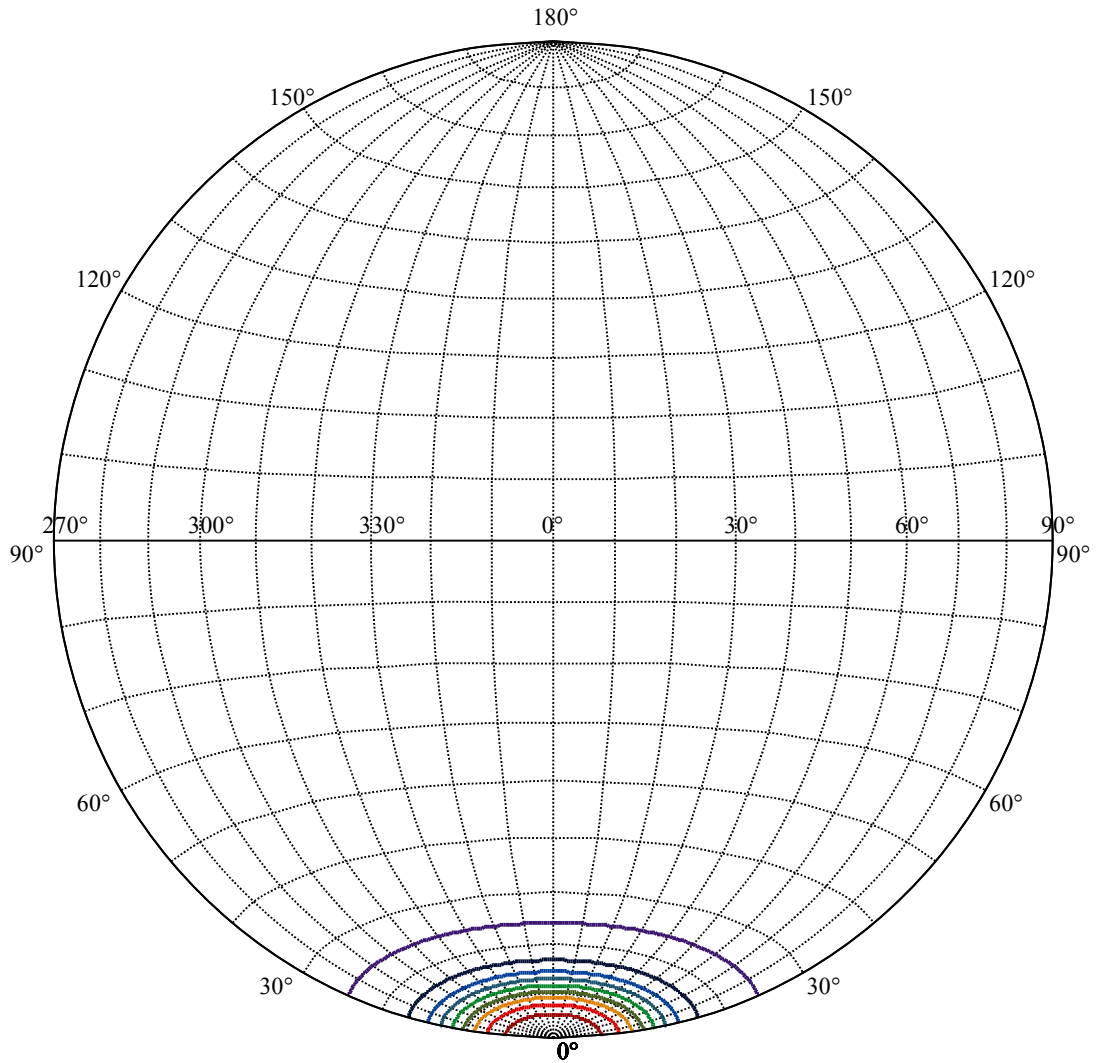
:C90/270Left:11.7 Right:11.7





(10%Imax) 584.269	—
(20%Imax) 1168.54	—
(30%Imax) 1752.81	—
(40%Imax) 2337.08	—
(50%Imax) 2921.35	—
(60%Imax) 3505.61	—
(70%Imax) 4089.88	—
(80%Imax) 4674.15	—
(90%Imax) 5258.42	—





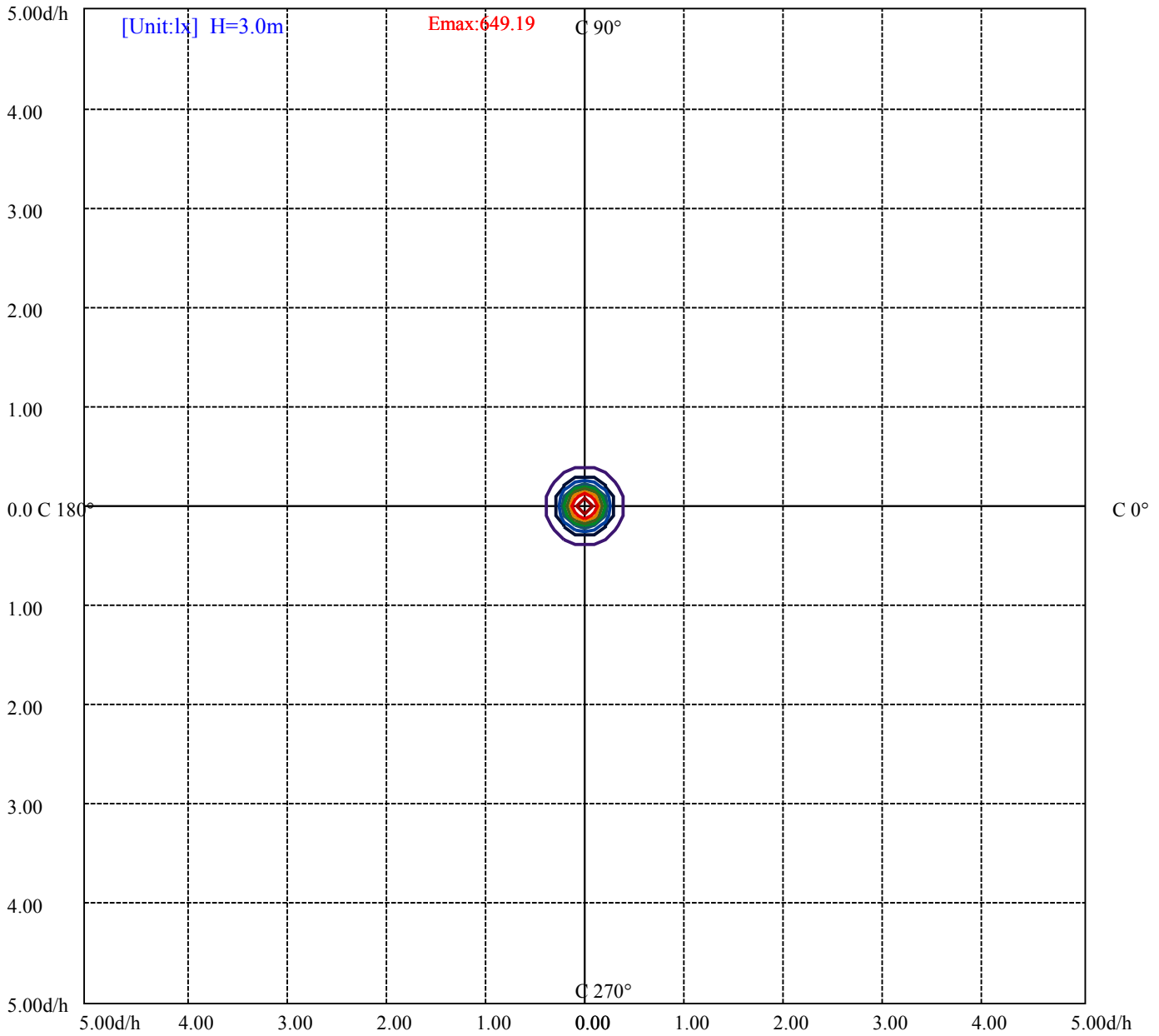
House

[Unit:cd]

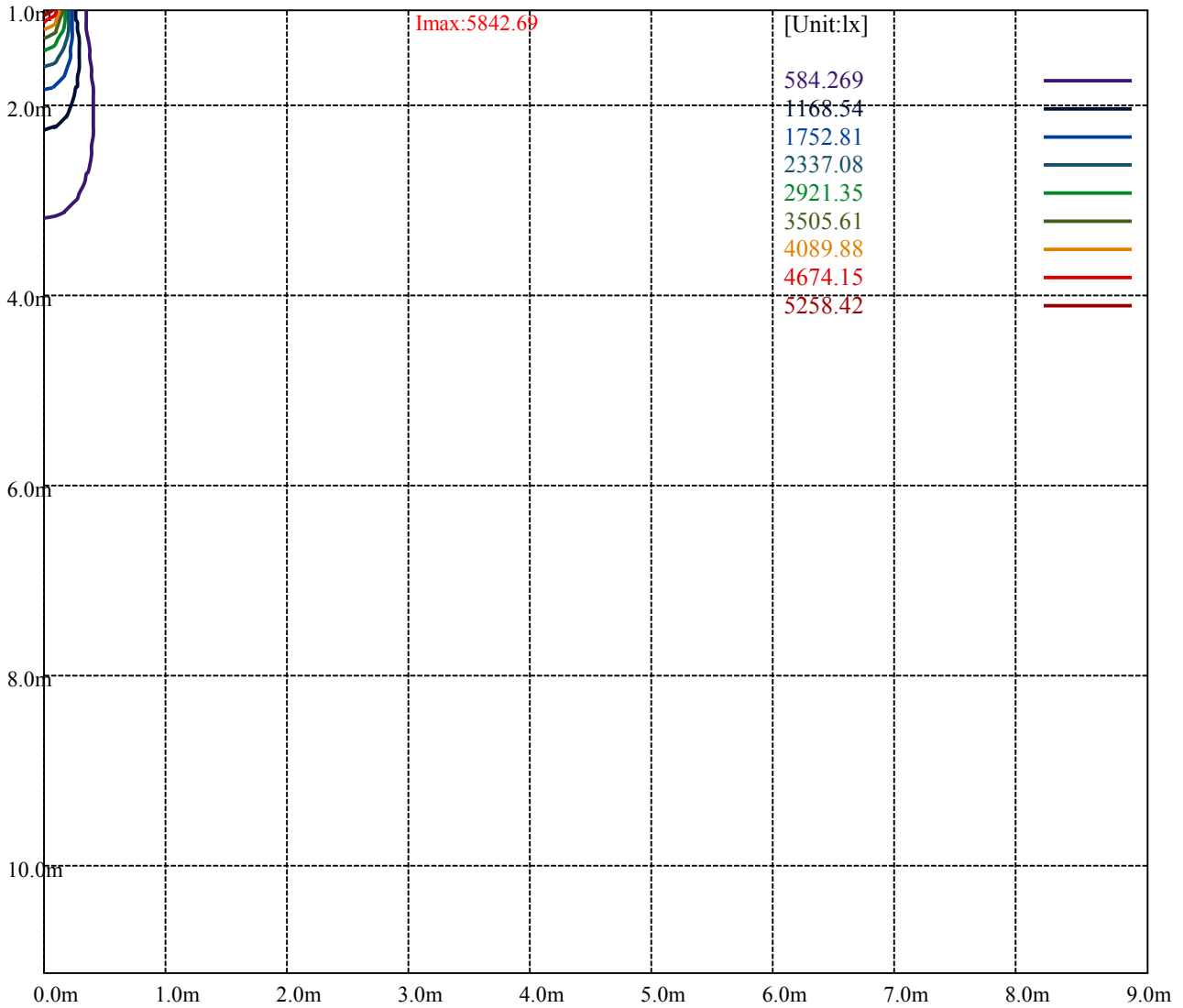
Road

**Imax:5842.69**

(10%Imax) 584.269	—
(20%Imax) 1168.54	—
(30%Imax) 1752.81	—
(40%Imax) 2337.08	—
(50%Imax) 2921.35	—
(60%Imax) 3505.61	—
(70%Imax) 4089.88	—
(80%Imax) 4674.15	—
(90%Imax) 5258.42	—



- (10%Emax) 64.91878
- (20%Emax) 129.8378
- (30%Emax) 194.7567
- (40%Emax) 259.6756
- (50%Emax) 324.5934
- (60%Emax) 389.5122
- (70%Emax) 454.4311
- (80%Emax) 519.35
- (90%Emax) 584.2689



Luminance Table

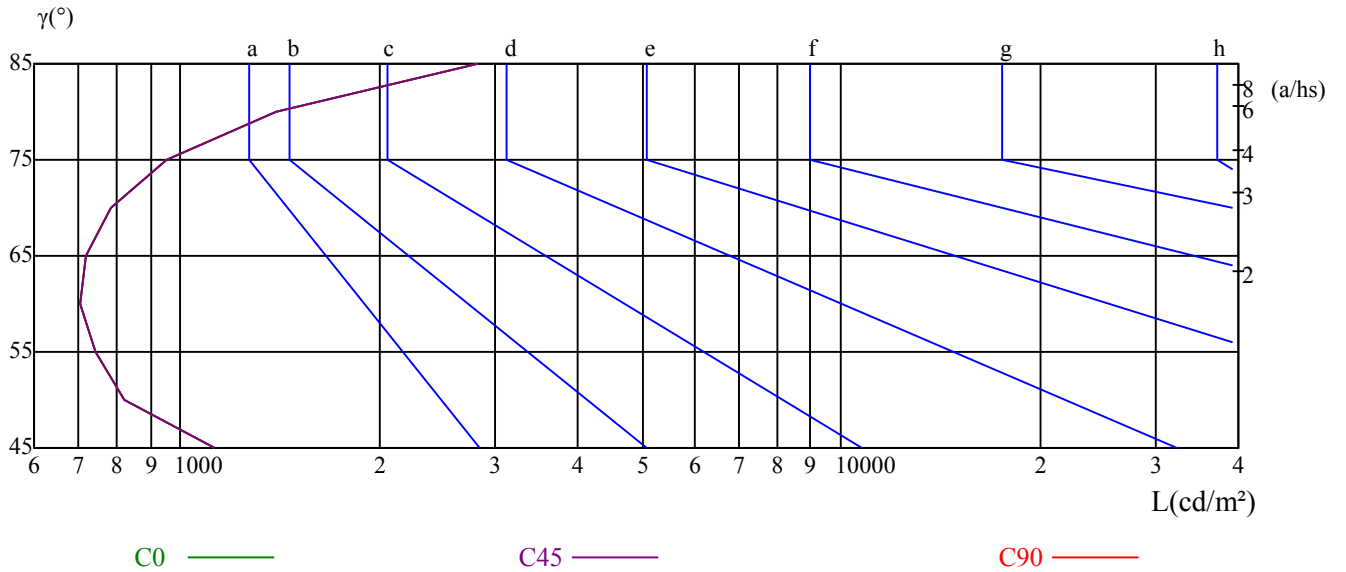
$\gamma$	45	50	55	60	65	70	75	80	85
C0	1124	823	745	704	717	783	950	1395	2822
C45	1124	823	745	704	717	783	950	1395	2822
C90	1124	823	745	704	717	783	950	1395	2822

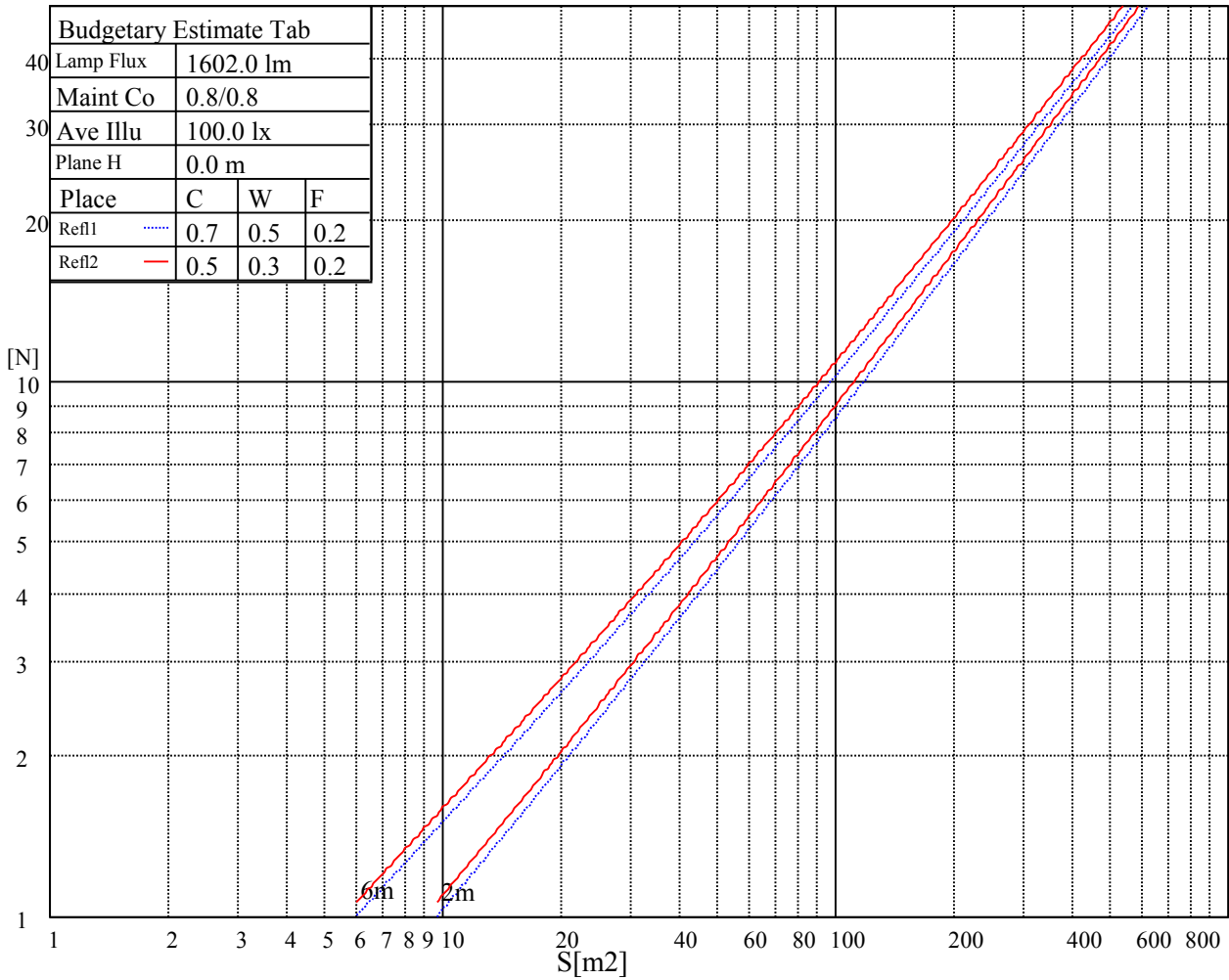
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
717	717	717	950	950	950	2822	2822	2822

Glare Table

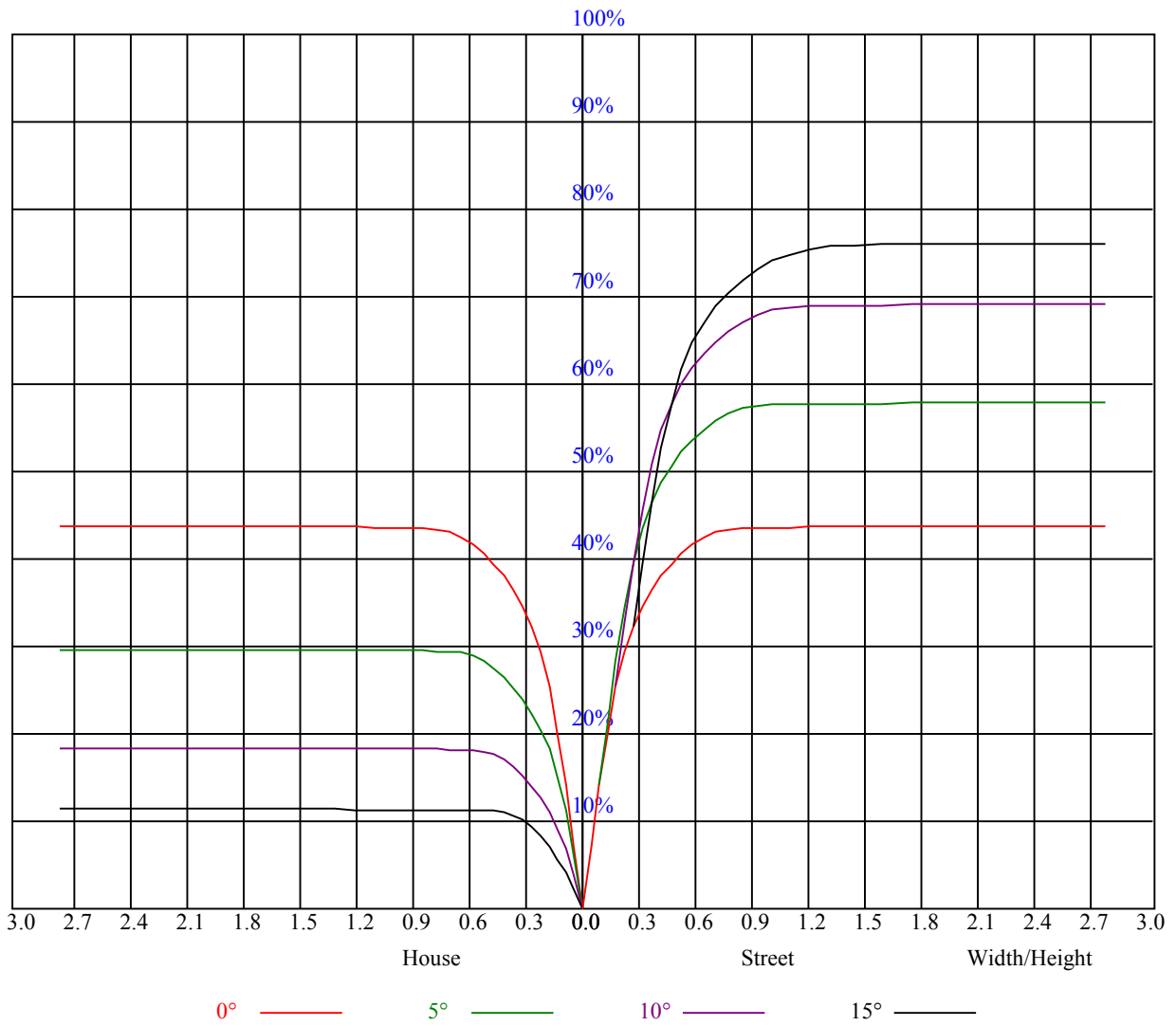
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

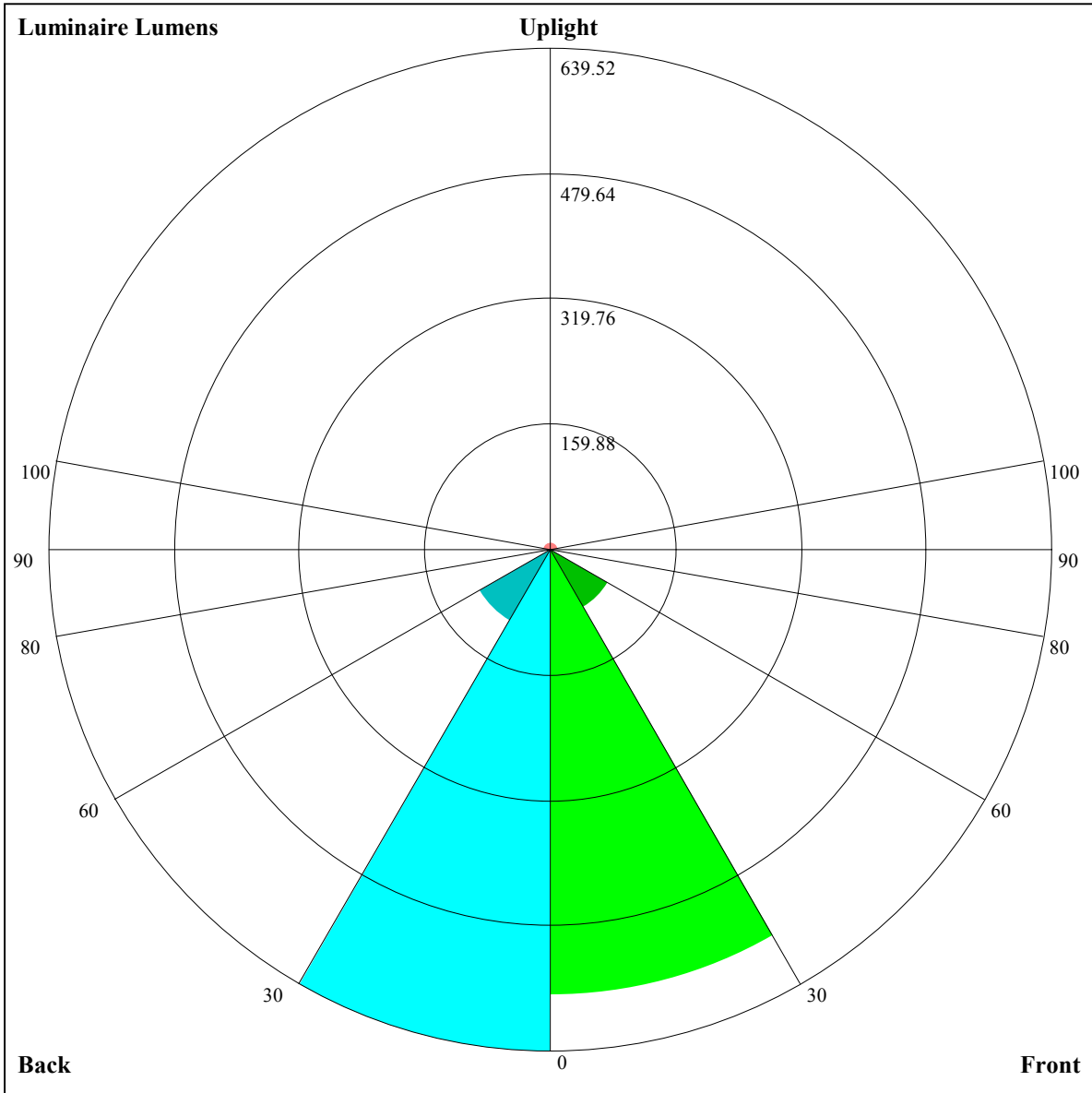
Luminance Limiting Curve





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	1.04	1.04	1.04	1.02	1.02	1.02	0.97	0.97	0.97	0.93	0.93	0.93	0.90	0.90	0.90	0.88
1	0.99	0.97	0.95	0.97	0.95	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.86	0.84
2	0.93	0.91	0.88	0.92	0.89	0.87	0.89	0.87	0.85	0.87	0.85	0.84	0.84	0.83	0.82	0.81
3	0.89	0.85	0.83	0.88	0.85	0.82	0.86	0.83	0.81	0.84	0.81	0.80	0.82	0.80	0.78	0.77
4	0.85	0.81	0.78	0.84	0.80	0.78	0.82	0.79	0.77	0.81	0.78	0.76	0.79	0.77	0.75	0.74
5	0.81	0.77	0.74	0.81	0.77	0.74	0.79	0.76	0.73	0.78	0.75	0.73	0.76	0.74	0.72	0.71
6	0.78	0.74	0.71	0.77	0.74	0.71	0.76	0.73	0.70	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	0.67	0.72	0.69	0.67	0.66
8	0.72	0.68	0.66	0.72	0.68	0.65	0.71	0.68	0.65	0.70	0.67	0.65	0.70	0.67	0.65	0.64
9	0.70	0.66	0.63	0.69	0.66	0.63	0.69	0.65	0.63	0.68	0.65	0.63	0.67	0.65	0.63	0.62
10	0.68	0.64	0.61	0.67	0.64	0.61	0.67	0.63	0.61	0.66	0.63	0.61	0.65	0.63	0.61	0.60





Luminaire Lumens:

FL=567.45,FM=84.72,FH=1.69,FVH=0.96

BL=639.52,BM=105.93,BH=1.76,BVH=0.84

UL=2,UH=9.52

BUG Rating:B2-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	5804.18	5757.31	5586.08	5483.07	5272.39	4885.85	4684.00	4293.28	3840.39
45.0	5822.74	5845.01	5835.27	5790.72	5711.83	5601.39	5444.09	5233.42	4961.03
90.0	5882.60	5894.20	5883.06	5843.62	5789.33	5687.24	5535.04	5322.51	5050.59
135.0	5861.25	5891.88	5922.04	5909.51	5890.02	5837.12	5752.67	5618.10	5425.53
180.0	5804.18	5848.72	5862.64	5848.26	5802.32	5719.72	5591.65	5410.68	5170.31
225.0	5822.74	5791.18	5664.50	5520.19	5406.50	5052.91	4864.51	4500.24	4078.44
270.0	5882.60	5839.91	5758.24	5632.02	5449.66	5211.14	4913.23	4545.25	4108.60
315.0	5861.25	5730.40	5645.94	5460.79	5222.28	4907.66	4548.50	4120.66	3642.24
360.0	5804.18	5757.31	5586.08	5483.07	5272.39	4885.85	4684.00	4293.28	3840.39

C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	3348.05	2846.89	2376.36	1966.16	1626.48	1354.10	922.68	874.33	851.92
45.0	4621.82	4219.50	3755.93	3257.10	2753.62	2285.41	1881.24	1671.03	1275.67
90.0	4715.55	4312.77	3850.13	3342.48	2832.97	2357.80	1942.49	1596.32	1315.12
135.0	5169.38	4850.12	4461.73	4018.11	3528.09	3022.30	2535.06	2097.94	1735.07
180.0	4866.37	4497.92	4063.59	3575.42	3062.20	2565.69	2124.86	1754.09	1453.86
225.0	3602.80	3092.83	2594.46	2145.74	1765.69	1454.79	1207.93	862.31	862.31
270.0	3622.29	3106.75	2601.42	2148.99	1767.09	1457.11	1213.03	1023.24	882.64
315.0	3133.66	2630.19	2181.00	1799.10	1487.74	1237.16	905.33	905.33	817.58
360.0	3348.05	2846.89	2376.36	1966.16	1626.48	1354.10	922.68	874.33	851.92

C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	776.75	693.64	653.59	617.30	591.41	572.71	556.00	542.97	532.48
45.0	1141.10	961.52	831.59	740.18	676.14	632.06	601.43	579.62	563.38
90.0	884.22	884.22	816.70	762.08	691.97	643.01	607.42	583.43	565.29
135.0	1438.09	1203.29	1051.08	880.32	780.09	720.69	653.87	623.24	592.15
180.0	1217.21	1067.32	923.01	798.18	736.00	676.61	632.99	601.43	577.77
225.0	765.79	696.19	646.40	624.12	595.26	574.52	558.09	542.78	531.13
270.0	816.75	733.68	654.33	630.67	599.58	577.30	561.06	544.36	532.29
315.0	735.54	676.42	632.76	602.78	581.90	562.92	548.16	536.10	527.65
360.0	776.75	693.64	653.59	617.30	591.41	572.71	556.00	542.97	532.48

C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	523.06	514.43	504.40	477.86	432.90	376.10	312.53	246.68	181.48
45.0	548.53	536.01	526.72	517.44	510.02	500.74	478.00	433.45	375.91
90.0	549.74	536.79	526.96	517.72	509.04	500.51	481.76	440.00	384.78
135.0	571.27	553.64	538.33	525.80	516.52	508.16	498.88	482.18	440.88
180.0	558.74	542.50	529.51	519.30	510.02	500.74	489.14	456.66	407.93
225.0	521.34	511.78	503.52	493.64	464.87	415.50	356.56	292.48	227.47
270.0	522.55	513.73	505.38	494.71	466.86	420.46	360.60	293.78	253.87
315.0	517.68	508.49	492.20	454.34	400.00	338.00	272.81	207.89	144.96
360.0	523.06	514.43	504.40	477.86	432.90	376.10	312.53	246.68	181.48

C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	120.56	68.12	28.91	12.06	8.82	5.61	4.83	4.13	3.90
45.0	312.80	248.77	248.77	175.36	76.57	33.36	12.67	8.63	6.17
90.0	320.65	256.19	192.20	127.89	83.39	32.34	15.08	10.02	5.94
135.0	387.05	324.87	260.83	247.84	247.84	96.75	46.77	19.16	11.55
180.0	349.93	284.96	245.06	245.06	116.98	65.34	27.47	12.62	9.28
225.0	163.85	104.50	53.18	20.51	12.53	7.84	5.94	4.73	4.08
270.0	253.87	103.06	62.60	26.08	12.34	8.72	5.38	4.59	4.27
315.0	109.88	41.39	23.62	11.97	8.26	5.38	4.73	4.22	3.99
360.0	120.56	68.12	28.91	12.06	8.82	5.61	4.83	4.13	3.90

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	3.71	3.57	3.39	3.20	3.02	2.92	2.83	2.69	2.55
45.0	4.83	4.27	3.67	3.53	3.39	3.20	3.02	2.92	2.83
90.0	4.78	4.32	3.85	3.67	3.48	3.25	3.11	3.02	2.88
135.0	7.93	5.89	5.38	4.41	4.13	3.94	3.76	3.53	3.29
180.0	6.22	5.38	4.45	3.99	3.76	3.62	3.43	3.25	3.06
225.0	3.76	3.57	3.39	3.20	3.06	3.02	2.83	2.69	2.60
270.0	3.71	3.48	3.29	3.20	3.06	2.88	2.78	2.69	2.55
315.0	3.76	3.53	3.43	3.29	3.11	2.92	2.78	2.74	2.60
360.0	3.71	3.57	3.39	3.20	3.02	2.92	2.83	2.69	2.55
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	2.46	2.41	2.32	2.18	2.09	2.09	2.00	1.90	1.81
45.0	2.74	2.64	2.51	2.41	2.32	2.27	2.18	2.09	2.04
90.0	2.74	2.60	2.55	2.46	2.32	2.18	2.18	2.13	2.00
135.0	3.20	3.11	2.92	2.74	2.64	2.51	2.46	2.37	2.23
180.0	2.97	2.88	2.74	2.55	2.51	2.41	2.37	2.23	2.09
225.0	2.55	2.41	2.32	2.27	2.23	2.09	2.04	2.00	2.00
270.0	2.41	2.37	2.32	2.23	2.04	2.04	1.95	1.95	1.90
315.0	2.55	2.37	2.27	2.18	2.09	2.09	1.95	1.86	1.86
360.0	2.46	2.41	2.32	2.18	2.09	2.09	2.00	1.90	1.81
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	1.76	1.72	1.76	1.67	1.58	1.53	1.58	1.53	1.44
45.0	2.00	1.95	1.86	1.81	1.81	1.76	1.72	1.67	1.67
90.0	1.95	1.95	1.90	1.86	1.86	1.76	1.72	1.67	1.72
135.0	2.18	2.09	2.04	1.95	1.86	1.76	1.76	1.72	1.62
180.0	2.09	2.04	1.95	1.90	1.86	1.81	1.72	1.67	1.67
225.0	1.95	1.86	1.86	1.81	1.76	1.67	1.72	1.72	1.67
270.0	1.76	1.76	1.76	1.67	1.62	1.58	1.62	1.58	1.53
315.0	1.81	1.72	1.62	1.62	1.62	1.48	1.44	1.48	1.44
360.0	1.76	1.72	1.76	1.67	1.58	1.53	1.58	1.53	1.44
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	1.44	1.48	1.44	1.35	1.35	1.39	1.35	1.30	1.30
45.0	1.67	1.62	1.58	1.62	1.62	1.72	1.76	1.76	1.72
90.0	1.72	1.62	1.62	1.67	1.67	1.62	1.58	1.62	1.72
135.0	1.58	1.58	1.53	1.44	1.44	1.44	1.44	1.39	1.39
180.0	1.62	1.58	1.48	1.53	1.53	1.44	1.44	1.39	1.44
225.0	1.62	1.62	1.62	1.58	1.53	1.58	1.58	1.53	1.53
270.0	1.53	1.53	1.48	1.44	1.48	1.48	1.48	1.39	1.39
315.0	1.39	1.35	1.35	1.35	1.30	1.30	1.25	1.30	1.30
360.0	1.44	1.48	1.44	1.35	1.35	1.39	1.35	1.30	1.30
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	1.35	1.35	1.35	1.35	1.35	1.53	2.00	2.37	1.81
45.0	1.81	1.76	1.67	1.81	2.00	2.27	2.55	2.69	2.83
90.0	1.67	1.67	1.76	1.81	1.86	1.95	2.00	2.69	3.34
135.0	1.35	1.39	1.30	1.30	1.30	1.25	1.25	1.25	1.30
180.0	1.44	1.35	1.39	1.30	1.35	1.35	1.30	1.30	1.35
225.0	1.58	1.58	1.53	1.48	1.44	1.44	1.48	1.58	1.44
270.0	1.48	1.39	1.48	1.48	1.44	1.44	1.39	1.44	1.58
315.0	1.21	1.30	1.30	1.25	1.25	1.67	2.18	1.76	1.72
360.0	1.35	1.35	1.35	1.35	1.35	1.53	2.00	2.37	1.81

Intensity data(cd)

C/γ(°)	90.0
0.0	1.76
45.0	2.64
90.0	3.02
135.0	1.25
180.0	1.35
225.0	1.35
270.0	1.58
315.0	1.72
360.0	1.76