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## NATA

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Client:

LumCAT: 1689-M

Luminaire: 92.70.124.00

Report No: nt0100

Test No: GC2019122316

LampCAT: LUMINUS CXM-9-AC40

Lamp flux(lm): 1036.0

Number of Lamps: 1

Length(mm): 0

Phm Type: C

Voltage(V): 33.5400

Current(A): 0.2970

Power (W): 9.9600

PF: 1.0000

Ballast type: DC

Width(mm): 0

Height(mm): 0

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## Photometric Results

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Lumens(lm): 988.06, Efficiency(%): 95.37% , Luminous Efficacy(lm/W): 99.20

Central intensity(cd): 846.464, Maximum intensity(cd): 846.464

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

Beam Angle(50%Imax): [C0/180]Total=71.6

[C90/270]Total=71.6

Field angle(10%Imax): [C0/180]Total=95.0

[C90/270]Total=95.0

Maximum s/h(1/2): C0\_180=0.99 C90\_270=0.99

Maximum s/h(1/4): C0\_180=1.05 C90\_270=1.05

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 95.37%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in  $\pi$  solid angle : 98.457%

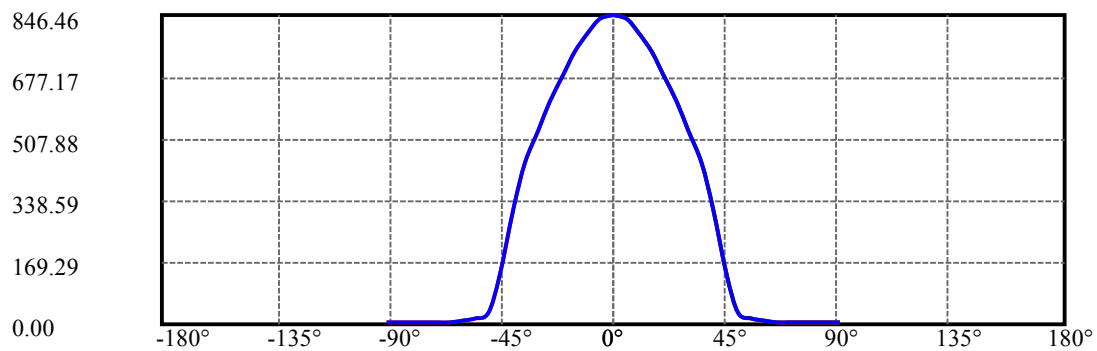
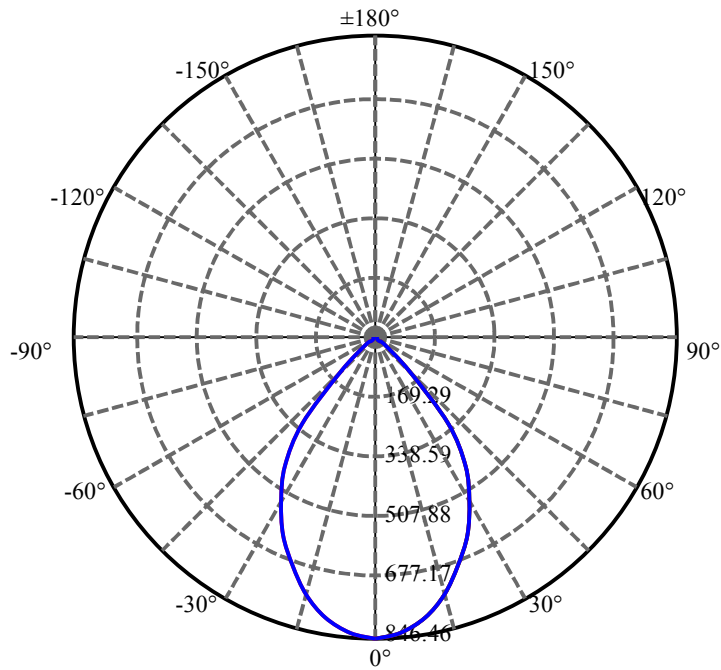
| $\gamma(^{\circ})$ | Average I(cd) | Zonal F(lm) | Sum F(lm) | Eff Flux(%) | Eff Sum(%) |
|--------------------|---------------|-------------|-----------|-------------|------------|
| 0.0                | 846.464       | 0.000       | 0         | .000%       | .000%      |
| 5.0                | 835.052       | 20.102      | 20.102    | 1.940%      | 2.034%     |
| 10.0               | 799.854       | 58.486      | 78.588    | 5.645%      | 7.954%     |
| 15.0               | 747.689       | 91.799      | 170.387   | 8.861%      | 17.245%    |
| 20.0               | 685.484       | 118.114     | 288.501   | 11.401%     | 29.199%    |
| 25.0               | 610.636       | 135.939     | 424.44    | 13.122%     | 42.957%    |
| 30.0               | 529.404       | 144.273     | 568.713   | 13.926%     | 57.558%    |
| 35.0               | 443.391       | 143.251     | 711.963   | 13.827%     | 72.056%    |
| 40.0               | 317.974       | 127.028     | 838.991   | 12.261%     | 84.913%    |
| 45.0               | 135.267       | 83.921      | 922.913   | 8.101%      | 93.406%    |
| 50.0               | 33.623        | 34.127      | 957.039   | 3.294%      | 96.860%    |
| 55.0               | 14.386        | 10.439      | 967.478   | 1.008%      | 97.917%    |
| 60.0               | 8.698         | 5.336       | 972.814   | .515%       | 98.457%    |
| 65.0               | 6.089         | 3.595       | 976.409   | .347%       | 98.820%    |
| 70.0               | 4.915         | 2.786       | 979.195   | .269%       | 99.102%    |
| 75.0               | 4.289         | 2.406       | 981.601   | .232%       | 99.346%    |
| 80.0               | 3.987         | 2.214       | 983.815   | .214%       | 99.570%    |
| 85.0               | 3.874         | 2.136       | 985.951   | .206%       | 99.786%    |
| 90.0               | 3.839         | 2.112       | 988.063   | .204%       | 100.000%   |

## ZONAL LUMEN SUMMARY

| Zone    | Lumens | %Lamp  | %Fixt   |
|---------|--------|--------|---------|
| 0-30    | 568.71 | 54.90% | 57.56%  |
| 0-40    | 838.99 | 80.98% | 84.91%  |
| 0-60    | 972.81 | 93.90% | 98.46%  |
| 0-90    | 985.95 | 95.17% | 99.79%  |
| 0-120   | 985.95 | 95.17% | 99.79%  |
| 0-180   | 988.06 | 95.37% | 100.00% |
| 60-90   | 18.47  | 1.78%  | 1.87%   |
| 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%   |
| 0-38.09 | 790.45 | 76.30% | 80.00%  |

## ZONAL LUMEN SUMMARY

|         |        |
|---------|--------|
| 0-10    | 78.59  |
| 10-20   | 209.91 |
| 20-30   | 280.21 |
| 30-40   | 270.28 |
| 40-50   | 118.05 |
| 50-60   | 15.77  |
| 60-70   | 6.38   |
| 70-80   | 4.62   |
| 80-90   | 2.14   |
| 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   |

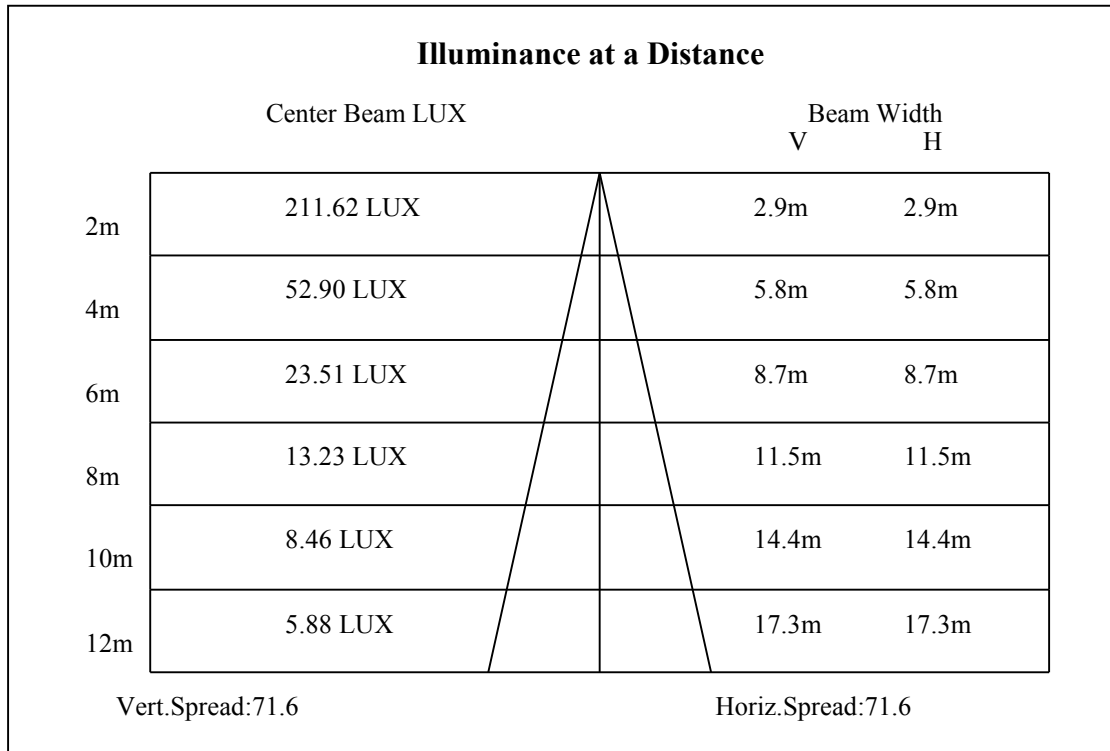
C0(Max): —————C0/C180: —————C90/C270: —————

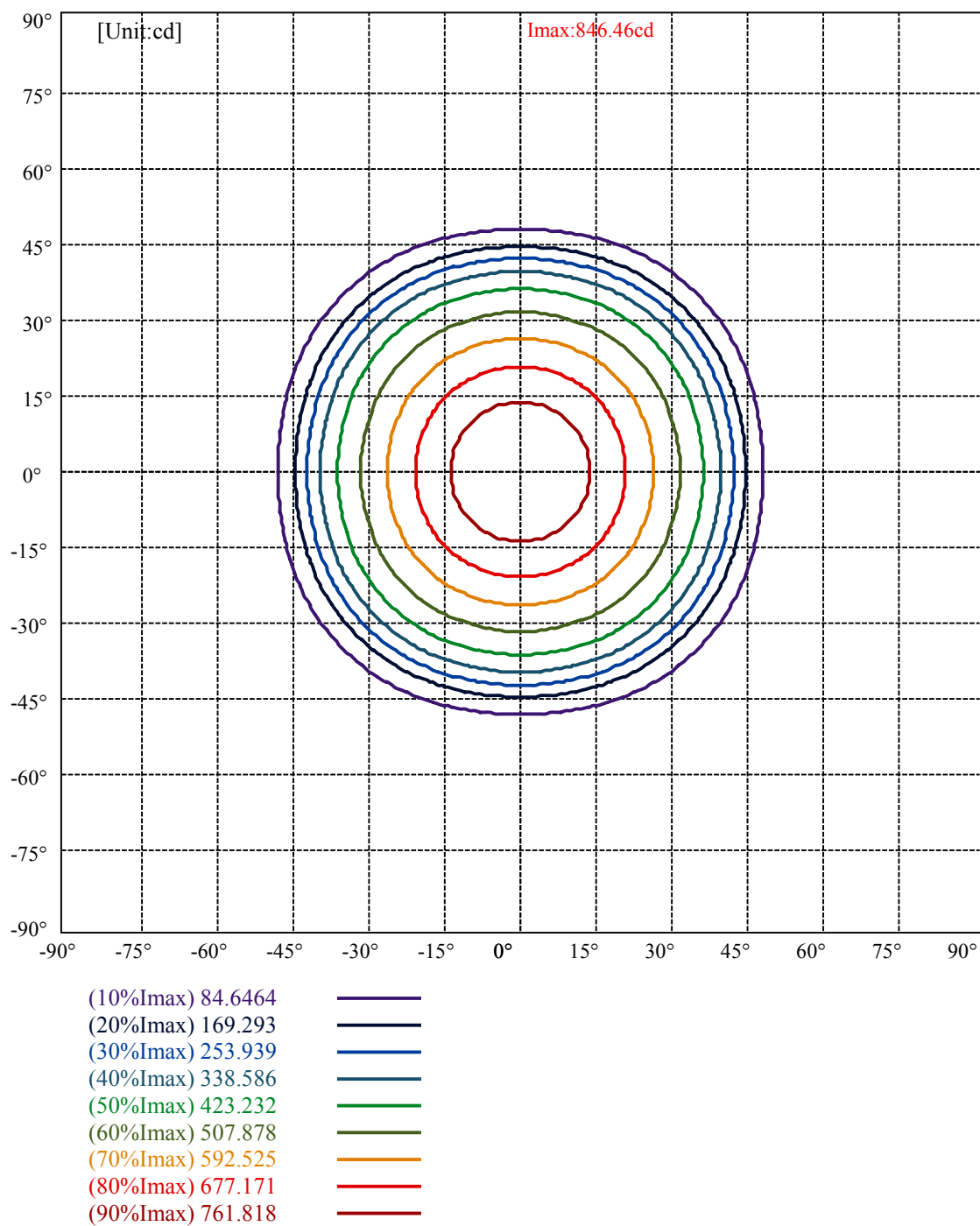
Field angle(10%Imax):C0/180Left:47.5 Right:47.5

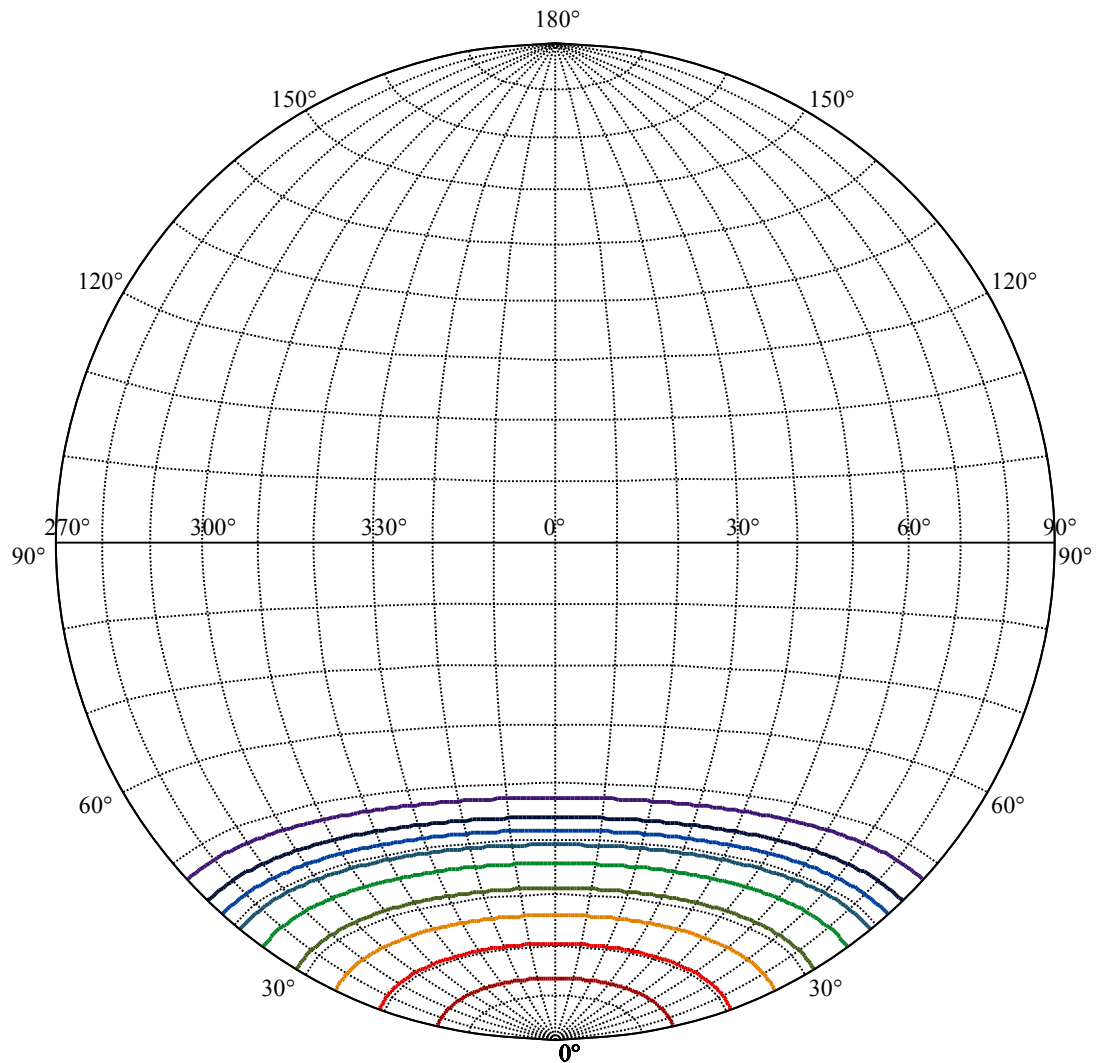
:C90/270Left:47.5 Right:47.5

Beam Angle(50%Imax):C0/180Left:35.8 Right:35.8

:C90/270Left:35.8 Right:35.8







House

[Unit:cd]

Road

Imax:846.46

(10%Imax) 84.6464

(20%Imax) 169.293

(30%Imax) 253.939

(40%Imax) 338.586

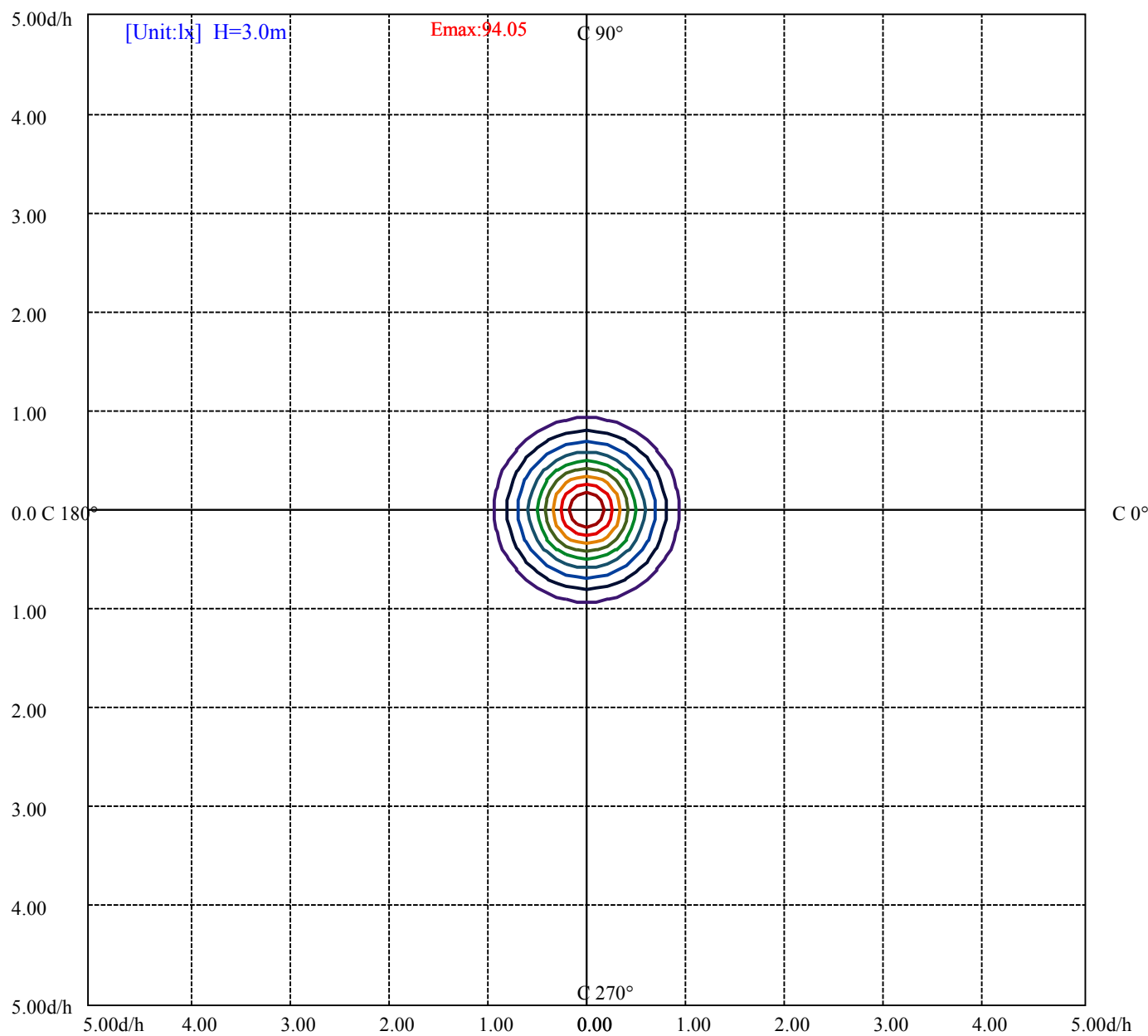
(50%Imax) 423.232

(60%Imax) 507.878

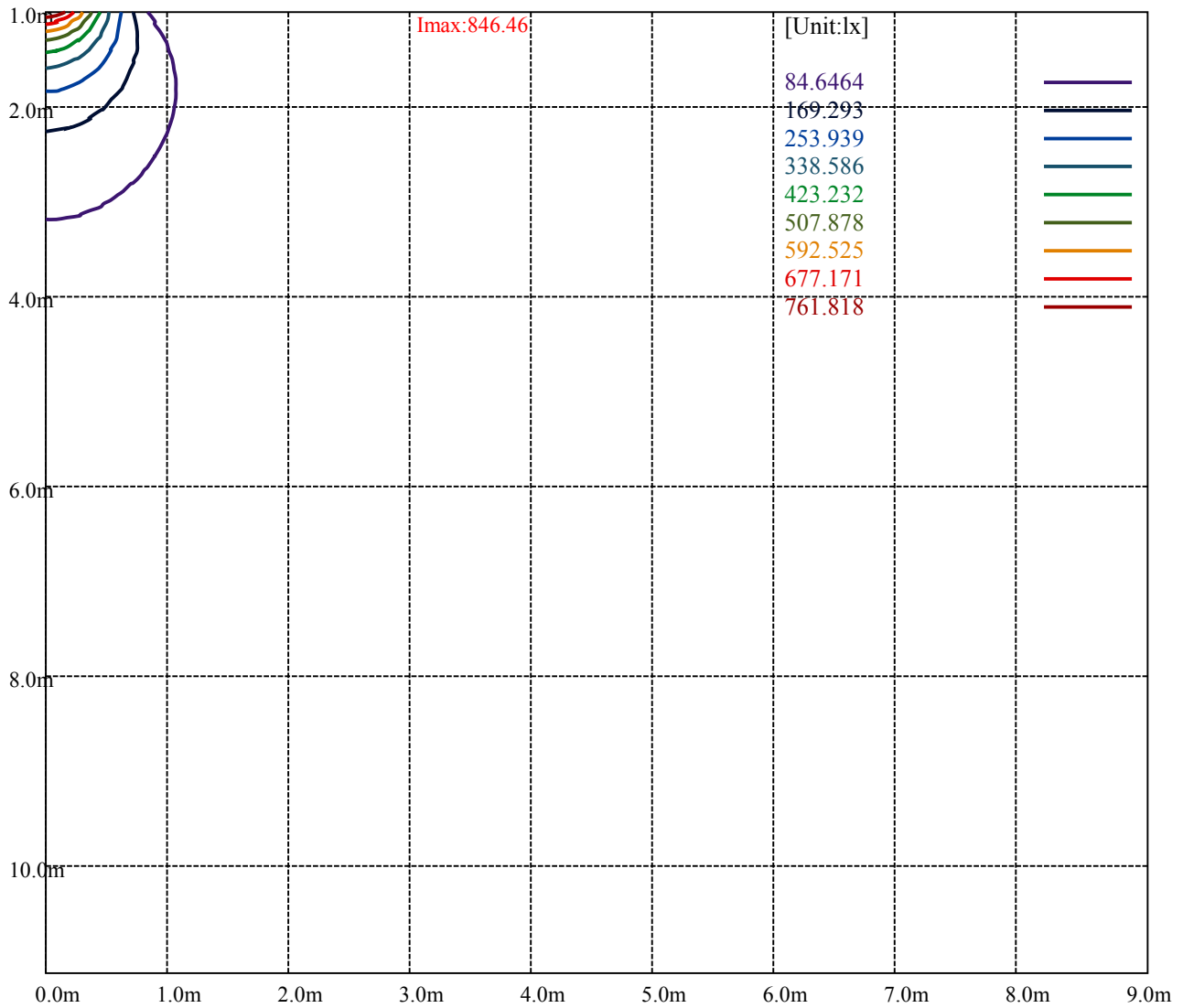
(70%Imax) 592.525

(80%Imax) 677.171

(90%Imax) 761.818



|                                 |   |
|---------------------------------|---|
| (10%E <sub>max</sub> ) 9.405155 | — |
| (20%E <sub>max</sub> ) 18.81033 | — |
| (30%E <sub>max</sub> ) 28.21544 | — |
| (40%E <sub>max</sub> ) 37.62056 | — |
| (50%E <sub>max</sub> ) 47.02578 | — |
| (60%E <sub>max</sub> ) 56.43089 | — |
| (70%E <sub>max</sub> ) 65.83611 | — |
| (80%E <sub>max</sub> ) 75.24123 | — |
| (90%E <sub>max</sub> ) 84.64633 | — |



Luminance Table

| $\gamma$ | 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  |

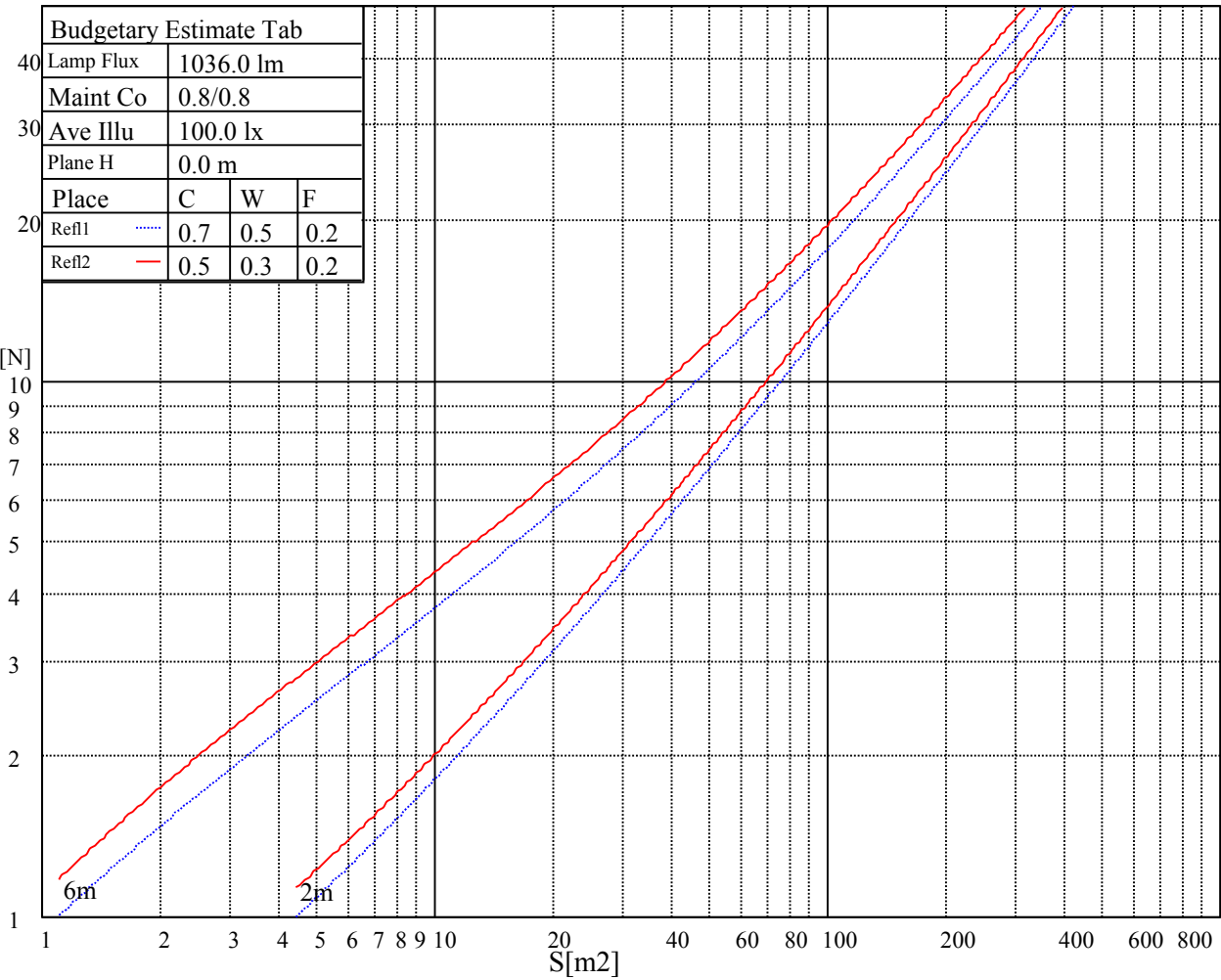
| L(Hor)(65) | L(Ver)(65) | L45(65) | L(Hor)(75) | L(Ver)(75) | L45(75) | L(Hor)(85) | L(Ver)(85) | L45(85) |
|------------|------------|---------|------------|------------|---------|------------|------------|---------|
| 0          | 0          | 0       | 0          | 0          | 0       | 0     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

Glare Table

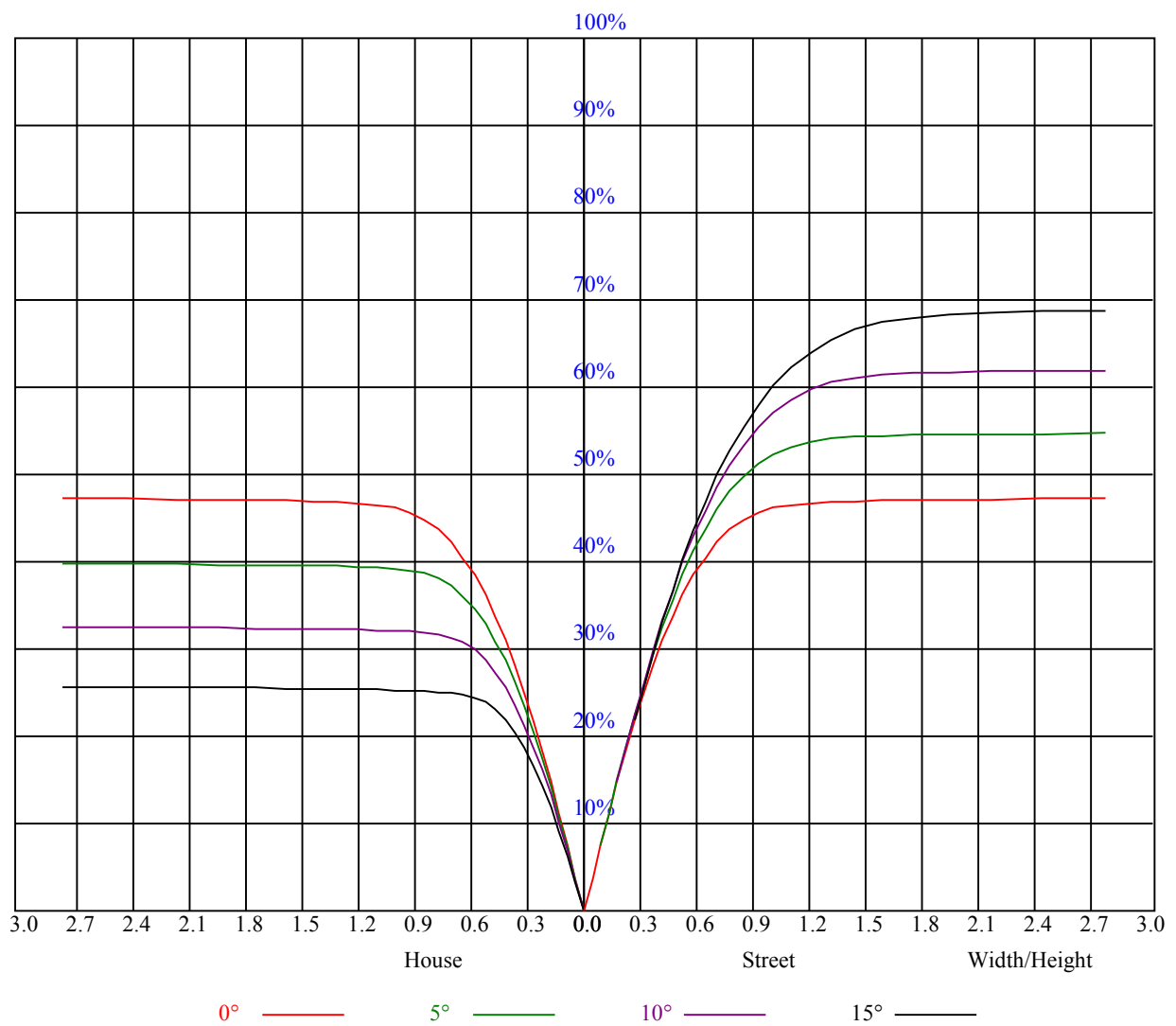
| Glare | Quality | Service Values Illuminance(lx) |      |      |            |            |            |            |            |
|-------|---------|--------------------------------|------|------|------------|------------|------------|------------|------------|
| 1.15  | A       | 2000            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

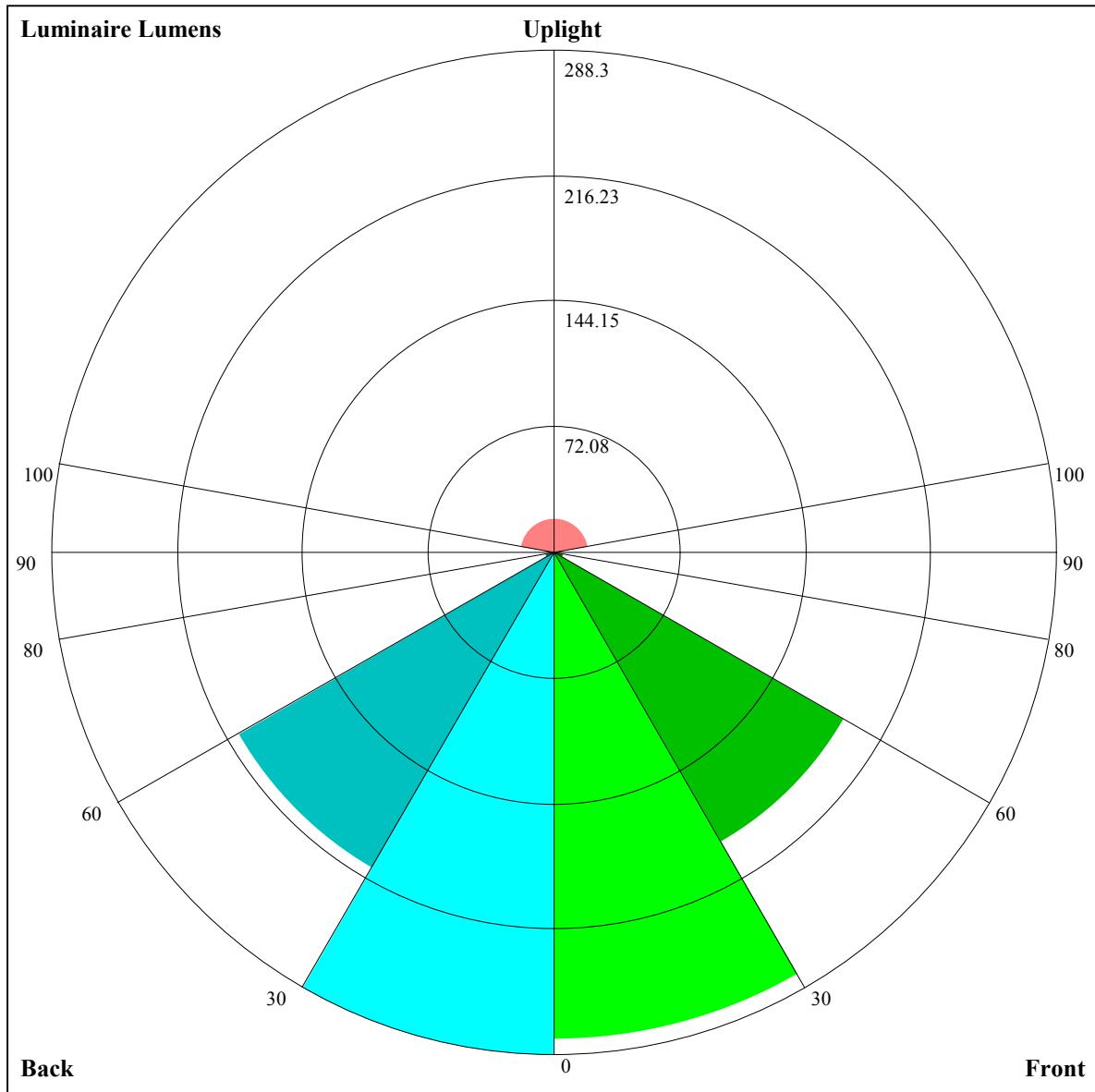
Luminance Limiting Curve





| 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    | 1.14                                    | 1.14 | 1.14 | 1.11 | 1.11 | 1.11 | 1.06 | 1.06 | 1.06 | 1.01 | 1.01 | 1.01 | 0.97 | 0.97 | 0.97 | 0.95 |
| 1    | 1.05                                    | 1.02 | 1.00 | 1.03 | 1.00 | 0.98 | 0.99 | 0.97 | 0.95 | 0.95 | 0.94 | 0.92 | 0.92 | 0.91 | 0.90 | 0.88 |
| 2    | 0.96                                    | 0.92 | 0.89 | 0.95 | 0.91 | 0.88 | 0.92 | 0.88 | 0.86 | 0.89 | 0.86 | 0.84 | 0.86 | 0.84 | 0.82 | 0.80 |
| 3    | 0.89                                    | 0.84 | 0.80 | 0.88 | 0.83 | 0.79 | 0.85 | 0.81 | 0.78 | 0.83 | 0.79 | 0.76 | 0.81 | 0.78 | 0.75 | 0.74 |
| 4    | 0.82                                    | 0.77 | 0.72 | 0.81 | 0.76 | 0.72 | 0.79 | 0.74 | 0.71 | 0.77 | 0.73 | 0.70 | 0.75 | 0.72 | 0.69 | 0.68 |
| 5    | 0.76                                    | 0.70 | 0.66 | 0.75 | 0.70 | 0.65 | 0.74 | 0.69 | 0.65 | 0.72 | 0.68 | 0.64 | 0.70 | 0.67 | 0.64 | 0.62 |
| 6    | 0.71                                    | 0.65 | 0.60 | 0.70 | 0.64 | 0.60 | 0.69 | 0.63 | 0.60 | 0.67 | 0.63 | 0.59 | 0.66 | 0.62 | 0.59 | 0.57 |
| 7    | 0.66                                    | 0.60 | 0.55 | 0.65 | 0.59 | 0.55 | 0.64 | 0.59 | 0.55 | 0.63 | 0.58 | 0.55 | 0.62 | 0.58 | 0.54 | 0.53 |
| 8    | 0.62                                    | 0.55 | 0.51 | 0.61 | 0.55 | 0.51 | 0.60 | 0.55 | 0.51 | 0.59 | 0.54 | 0.51 | 0.58 | 0.54 | 0.50 | 0.49 |
| 9    | 0.58                                    | 0.52 | 0.47 | 0.57 | 0.51 | 0.47 | 0.56 | 0.51 | 0.47 | 0.55 | 0.50 | 0.47 | 0.55 | 0.50 | 0.47 | 0.45 |
| 10   | 0.54                                    | 0.48 | 0.44 | 0.54 | 0.48 | 0.44 | 0.53 | 0.48 | 0.44 | 0.52 | 0.47 | 0.44 | 0.51 | 0.47 | 0.44 | 0.42 |





Luminaire Lumens:

FL=279.46,FM=192.3,FH=5.5,FVH=2.12

BL=288.3,BM=209.78,BH=5.51,BVH=2.13

UL=4.19,UH=19.93

BUG Rating:B1-U2-G0

# NATA 1689-M

| Intensity data(cd) |        |        |        |        |        |        |        |        |        | Appendix Page: 15 Total:15 |  |
|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------------------------|--|
| C/γ(°)             | 0.0    | 5.0    | 10.0   | 15.0   | 20.0   | 25.0   | 30.0   | 35.0   | 40.0   |                            |  |
| 0.0                | 843.30 | 822.09 | 778.61 | 729.17 | 664.37 | 590.51 | 515.42 | 432.51 | 289.52 |                            |  |
| 45.0               | 845.72 | 830.19 | 790.31 | 733.39 | 668.08 | 591.86 | 511.65 | 433.24 | 297.00 |                            |  |
| 90.0               | 849.04 | 836.94 | 795.94 | 741.15 | 675.79 | 597.88 | 513.00 | 424.58 | 286.31 |                            |  |
| 135.0              | 847.80 | 843.41 | 815.40 | 767.14 | 705.94 | 633.49 | 556.14 | 464.51 | 353.76 |                            |  |
| 180.0              | 843.30 | 839.93 | 816.30 | 766.01 | 701.83 | 628.20 | 544.05 | 453.83 | 353.87 |                            |  |
| 225.0              | 845.72 | 839.93 | 810.23 | 757.74 | 704.19 | 627.19 | 541.69 | 453.43 | 336.99 |                            |  |
| 270.0              | 849.04 | 838.07 | 807.75 | 760.11 | 701.89 | 628.43 | 545.06 | 461.19 | 343.80 |                            |  |
| 315.0              | 847.80 | 829.86 | 784.29 | 726.81 | 661.78 | 587.53 | 508.22 | 423.84 | 282.54 |                            |  |
| 360.0              | 843.30 | 822.09 | 778.61 | 729.17 | 664.37 | 590.51 | 515.42 | 432.51 | 289.52 |                            |  |
| C/γ(°)             | 45.0   | 50.0   | 55.0   | 60.0   | 65.0   | 70.0   | 75.0   | 80.0   | 85.0   |                            |  |
| 0.0                | 110.64 | 30.04  | 14.51  | 9.17   | 6.30   | 4.89   | 4.22   | 3.94   | 3.88   |                            |  |
| 45.0               | 116.55 | 31.39  | 13.84  | 8.55   | 5.96   | 4.89   | 4.28   | 3.99   | 3.88   |                            |  |
| 90.0               | 108.06 | 26.21  | 12.32  | 7.59   | 5.46   | 4.61   | 4.16   | 3.99   | 3.88   |                            |  |
| 135.0              | 165.60 | 39.60  | 14.34  | 8.16   | 5.91   | 4.84   | 4.28   | 3.99   | 3.83   |                            |  |
| 180.0              | 165.43 | 37.58  | 13.61  | 8.21   | 5.79   | 4.84   | 4.28   | 3.99   | 3.83   |                            |  |
| 225.0              | 154.35 | 36.39  | 15.24  | 9.17   | 6.41   | 5.18   | 4.44   | 4.05   | 3.94   |                            |  |
| 270.0              | 162.17 | 39.66  | 17.21  | 10.13  | 6.92   | 5.29   | 4.44   | 4.05   | 3.94   |                            |  |
| 315.0              | 99.34  | 28.13  | 14.01  | 8.61   | 5.96   | 4.78   | 4.22   | 3.88   | 3.83   |                            |  |
| 360.0              | 110.64 | 30.04  | 14.51  | 9.17   | 6.30   | 4.89   | 4.22   | 3.94   | 3.88   |                            |  |
| C/γ(°)             | 90.0   |        |        |        |        |        |        |        |        |                            |  |
| 0.0                | 3.83   |        |        |        |        |        |        |        |        |                            |  |
| 45.0               | 3.88   |        |        |        |        |        |        |        |        |                            |  |
| 90.0               | 3.83   |        |        |        |        |        |        |        |        |                            |  |
| 135.0              | 3.83   |        |        |        |        |        |        |        |        |                            |  |
| 180.0              | 3.83   |        |        |        |        |        |        |        |        |                            |  |
| 225.0              | 3.88   |        |        |        |        |        |        |        |        |                            |  |
| 270.0              | 3.83   |        |        |        |        |        |        |        |        |                            |  |
| 315.0              | 3.83   |        |        |        |        |        |        |        |        |                            |  |
| 360.0              | 3.83   |        |        |        |        |        |        |        |        |                            |  |