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## NATA

LumCAT: 3-2035-M  
Luminaire: 92.70.134.00  
Report No: NATA0100  
Test No: GC2019010908  
LampCAT: OSRAM SOLERIQ S19  
Lamp flux(lm): 3440.0  
Number of Lamps: 1  
Length(mm): 79  
Phm Type: C  
Voltage(V): 34.9000  
Current(A): 0.7000  
Power (W): 24.4300  
PF: 0.0000  
Ballast type: DC  
Width(mm): 79  
Height(mm): 0

## Photometric Results

Lumens(lm): 2921.80  
Efficiency(%): 84.94%  
Lumens(lm)/Power(W): 119.64  
Central intensity(cd): 4932.844  
Maximum intensity(cd): 4932.844  
Angle of maximum intensity: C=0.0  $\gamma$ =0.0  
Beam Angle(50%Imax): [C0/180]Total=43.6  
[C90/270]Total=43.6  
Field angle(10%Imax): [C0/180]Total=73.9  
[C90/270]Total=73.9  
Maximum s/h(1/2): C0\_180=0.70 C90\_270=0.70  
Maximum s/h(1/4): C0\_180=0.73 C90\_270=0.73  
Up flux rate of lamp(%): 0.00%  
Down flux rate of lamp(%): 84.97%  
Up flux rate of LUM(%): - -  
Down flux rate of LUM(%): 100.00%  
CIE Type : Direct lighting  
Output flux ratio in  $\pi$  solid angle : 98.565%

| $\gamma(^{\circ})$ | Average I(cd) | Zonal F(lm) | Sum F(lm) | Eff Flux(%) | Eff Sum(%) |
|--------------------|---------------|-------------|-----------|-------------|------------|
| 0.0                | 4932.844      | 1.180       | 1.18      | .034%       | .040%      |
| 1.0                | 4926.727      | 9.429       | 10.609    | .274%       | .363%      |
| 2.0                | 4908.445      | 18.785      | 29.394    | .546%       | 1.006%     |
| 3.0                | 4878.281      | 27.997      | 57.392    | .814%       | 1.964%     |
| 4.0                | 4836.375      | 36.996      | 94.388    | 1.075%      | 3.230%     |
| 5.0                | 4778.438      | 45.670      | 140.058   | 1.328%      | 4.794%     |
| 6.0                | 4712.344      | 54.016      | 194.074   | 1.570%      | 6.642%     |
| 7.0                | 4628.320      | 61.854      | 255.929   | 1.798%      | 8.759%     |
| 8.0                | 4531.430      | 69.158      | 325.087   | 2.010%      | 11.126%    |
| 9.0                | 4421.180      | 75.844      | 400.931   | 2.205%      | 13.722%    |
| 10.0               | 4304.531      | 81.969      | 482.899   | 2.383%      | 16.527%    |
| 11.0               | 4176.070      | 87.381      | 570.281   | 2.540%      | 19.518%    |
| 12.0               | 4039.031      | 92.089      | 662.37    | 2.677%      | 22.670%    |
| 13.0               | 3905.367      | 96.339      | 758.709   | 2.801%      | 25.967%    |
| 14.0               | 3761.297      | 99.785      | 858.493   | 2.901%      | 29.382%    |
| 15.0               | 3612.516      | 102.532     | 961.025   | 2.981%      | 32.892%    |
| 16.0               | 3462.398      | 104.657     | 1065.682  | 3.042%      | 36.474%    |
| 17.0               | 3310.523      | 106.141     | 1171.823  | 3.085%      | 40.106%    |
| 18.0               | 3133.898      | 106.199     | 1278.021  | 3.087%      | 43.741%    |
| 19.0               | 2963.039      | 105.787     | 1383.808  | 3.075%      | 47.362%    |
| 20.0               | 2787.117      | 104.534     | 1488.342  | 3.039%      | 50.939%    |
| 21.0               | 2601.422      | 102.233     | 1590.575  | 2.972%      | 54.438%    |
| 22.0               | 2431.195      | 99.873      | 1690.448  | 2.903%      | 57.856%    |
| 23.0               | 2271.797      | 97.342      | 1787.79   | 2.830%      | 61.188%    |
| 24.0               | 2132.648      | 95.123      | 1882.913  | 2.765%      | 64.444%    |
| 25.0               | 2009.109      | 93.112      | 1976.024  | 2.707%      | 67.630%    |
| 26.0               | 1888.945      | 90.806      | 2066.83   | 2.640%      | 70.738%    |
| 27.0               | 1778.203      | 88.528      | 2155.358  | 2.573%      | 73.768%    |
| 28.0               | 1675.266      | 86.247      | 2241.605  | 2.507%      | 76.720%    |
| 29.0               | 1575.703      | 83.772      | 2325.377  | 2.435%      | 79.587%    |
| 30.0               | 1473.961      | 80.818      | 2406.195  | 2.349%      | 82.353%    |
| 31.0               | 1318.402      | 74.463      | 2480.657  | 2.165%      | 84.902%    |
| 32.0               | 1197.338      | 69.579      | 2550.236  | 2.023%      | 87.283%    |
| 33.0               | 1058.337      | 63.210      | 2613.446  | 1.837%      | 89.447%    |
| 34.0               | 910.048       | 55.806      | 2669.252  | 1.622%      | 91.357%    |
| 35.0               | 761.175       | 47.877      | 2717.129  | 1.392%      | 92.995%    |
| 36.0               | 613.673       | 39.556      | 2756.684  | 1.150%      | 94.349%    |
| 37.0               | 483.623       | 31.917      | 2788.601  | .928%       | 95.441%    |

| $\gamma(^{\circ})$ | Average I(cd) | Zonal F(lm) | Sum F(lm) | Eff Flux(%) | Eff Sum(%) |
|--------------------|---------------|-------------|-----------|-------------|------------|
| 38.0               | 356.070       | 24.040      | 2812.641  | .699%       | 96.264%    |
| 39.0               | 252.816       | 17.447      | 2830.088  | .507%       | 96.861%    |
| 40.0               | 167.934       | 11.837      | 2841.926  | .344%       | 97.266%    |
| 41.0               | 84.213        | 6.059       | 2847.984  | .176%       | 97.474%    |
| 42.0               | 50.618        | 3.714       | 2851.699  | .108%       | 97.601%    |
| 43.0               | 38.053        | 2.846       | 2854.544  | .083%       | 97.698%    |
| 44.0               | 29.770        | 2.268       | 2856.812  | .066%       | 97.776%    |
| 45.0               | 23.977        | 1.859       | 2858.671  | .054%       | 97.840%    |
| 46.0               | 21.199        | 1.672       | 2860.344  | .049%       | 97.897%    |
| 47.0               | 19.744        | 1.583       | 2861.927  | .046%       | 97.951%    |
| 48.0               | 18.900        | 1.540       | 2863.467  | .045%       | 98.004%    |
| 49.0               | 18.281        | 1.513       | 2864.98   | .044%       | 98.055%    |
| 50.0               | 17.761        | 1.492       | 2866.472  | .043%       | 98.107%    |
| 51.0               | 17.367        | 1.480       | 2867.952  | .043%       | 98.157%    |
| 52.0               | 17.016        | 1.470       | 2869.423  | .043%       | 98.207%    |
| 53.0               | 16.678        | 1.461       | 2870.884  | .042%       | 98.257%    |
| 54.0               | 16.348        | 1.450       | 2872.334  | .042%       | 98.307%    |
| 55.0               | 16.102        | 1.446       | 2873.78   | .042%       | 98.357%    |
| 56.0               | 15.827        | 1.439       | 2875.219  | .042%       | 98.406%    |
| 57.0               | 15.588        | 1.434       | 2876.653  | .042%       | 98.455%    |
| 58.0               | 15.349        | 1.427       | 2878.08   | .041%       | 98.504%    |
| 59.0               | 15.152        | 1.424       | 2879.505  | .041%       | 98.553%    |
| 60.0               | 14.963        | 1.421       | 2880.926  | .041%       | 98.601%    |
| 61.0               | 14.780        | 1.418       | 2882.343  | .041%       | 98.650%    |
| 62.0               | 14.611        | 1.415       | 2883.758  | .041%       | 98.698%    |
| 63.0               | 14.428        | 1.410       | 2885.168  | .041%       | 98.746%    |
| 64.0               | 14.288        | 1.408       | 2886.576  | .041%       | 98.795%    |
| 65.0               | 14.126        | 1.404       | 2887.98   | .041%       | 98.843%    |
| 66.0               | 13.950        | 1.398       | 2889.377  | .041%       | 98.890%    |
| 67.0               | 13.816        | 1.395       | 2890.772  | .041%       | 98.938%    |
| 68.0               | 13.683        | 1.391       | 2892.163  | .040%       | 98.986%    |
| 69.0               | 13.570        | 1.389       | 2893.552  | .040%       | 99.033%    |
| 70.0               | 13.444        | 1.385       | 2894.938  | .040%       | 99.081%    |
| 71.0               | 13.352        | 1.384       | 2896.322  | .040%       | 99.128%    |
| 72.0               | 13.233        | 1.380       | 2897.702  | .040%       | 99.175%    |
| 73.0               | 13.148        | 1.379       | 2899.081  | .040%       | 99.223%    |
| 74.0               | 13.071        | 1.378       | 2900.459  | .040%       | 99.270%    |
| 75.0               | 12.980        | 1.375       | 2901.834  | .040%       | 99.317%    |

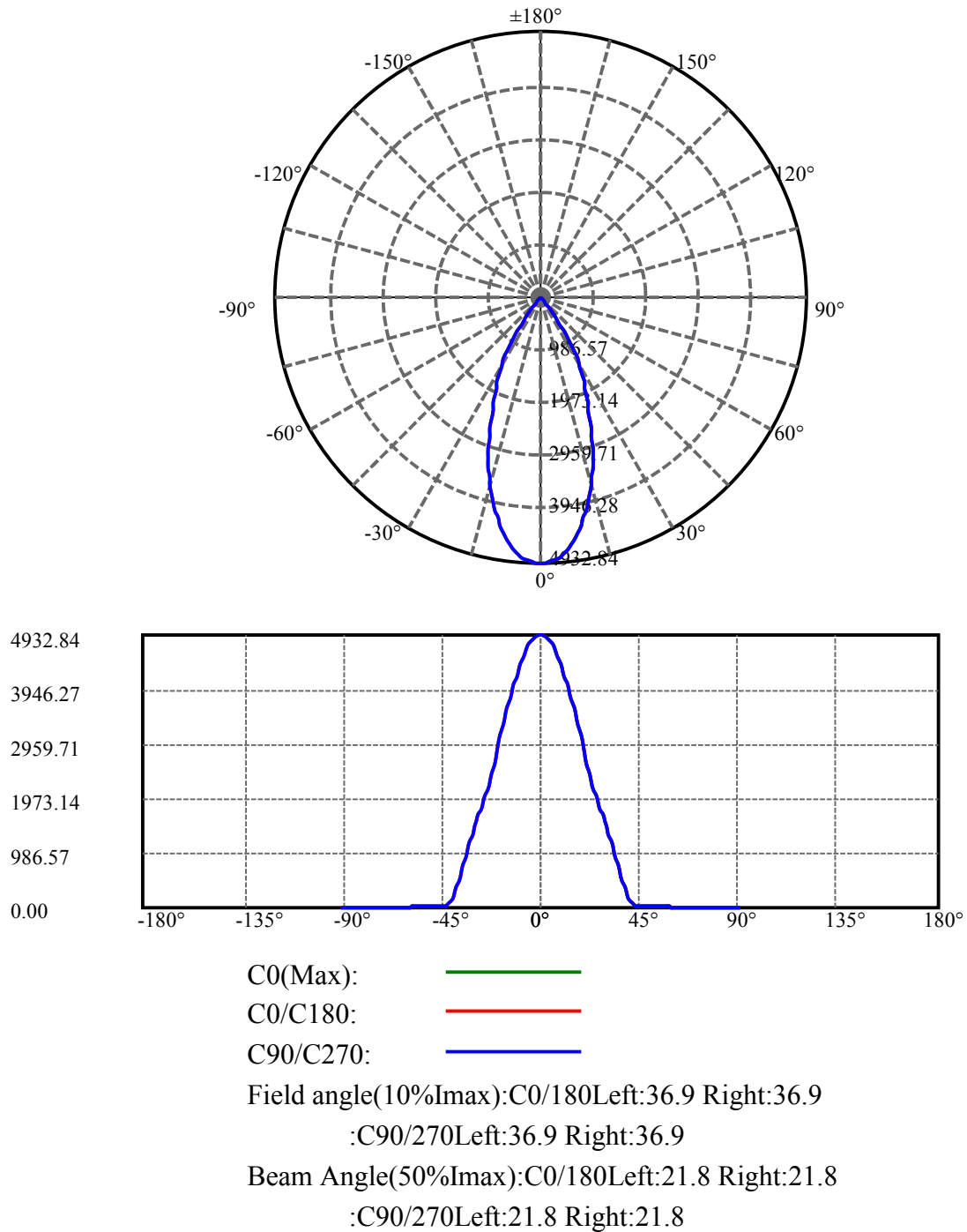
| $\gamma(^{\circ})$ | Average I(cd) | Zonal F(lm) | Sum F(lm) | Eff Flux(%) | Eff Sum(%) |
|--------------------|---------------|-------------|-----------|-------------|------------|
| 76.0               | 12.952        | 1.378       | 2903.212  | .040%       | 99.364%    |
| 77.0               | 12.874        | 1.376       | 2904.588  | .040%       | 99.411%    |
| 78.0               | 12.804        | 1.373       | 2905.961  | .040%       | 99.458%    |
| 79.0               | 12.769        | 1.375       | 2907.335  | .040%       | 99.505%    |
| 80.0               | 12.748        | 1.377       | 2908.712  | .040%       | 99.552%    |
| 81.0               | 12.691        | 1.375       | 2910.087  | .040%       | 99.599%    |
| 82.0               | 12.649        | 1.374       | 2911.46   | .040%       | 99.646%    |
| 83.0               | 12.649        | 1.377       | 2912.837  | .040%       | 99.693%    |
| 84.0               | 12.628        | 1.377       | 2914.214  | .040%       | 99.740%    |
| 85.0               | 12.614        | 1.378       | 2915.592  | .040%       | 99.788%    |
| 86.0               | 12.593        | 1.378       | 2916.97   | .040%       | 99.835%    |
| 87.0               | 12.621        | 1.382       | 2918.352  | .040%       | 99.882%    |
| 88.0               | 12.628        | 1.384       | 2919.736  | .040%       | 99.929%    |
| 89.0               | 12.544        | 1.375       | 2921.111  | .040%       | 99.977%    |
| 90.0               | 12.495        | 0.685       | 2921.796  | .020%       | 100.000%   |

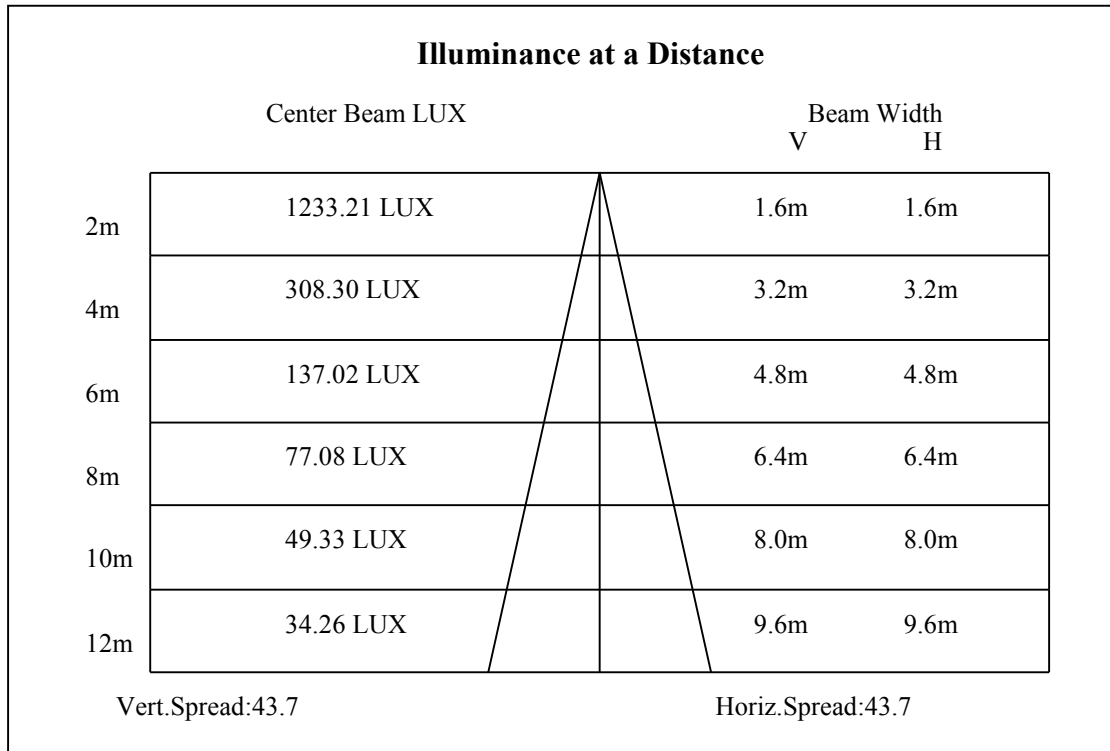
## ZONAL LUMEN SUMMARY

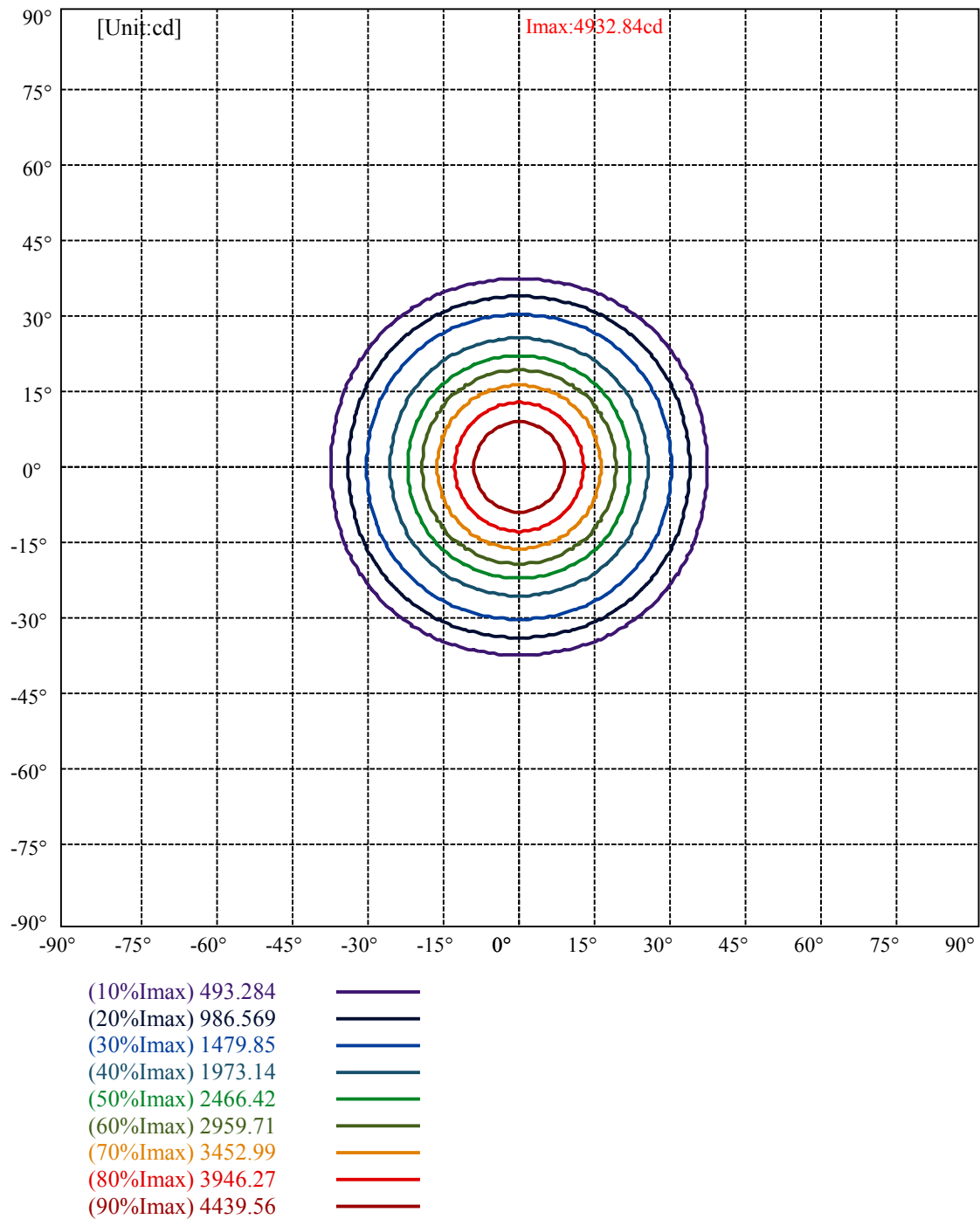
| Zone    | Lumens  | %Lamp  | %Fixt   |
|---------|---------|--------|---------|
| 0-30    | 2406.19 | 69.95% | 82.35%  |
| 0-40    | 2841.93 | 82.61% | 97.27%  |
| 0-60    | 2880.93 | 83.75% | 98.60%  |
| 0-90    | 2921.11 | 84.92% | 99.98%  |
| 0-120   | 2921.11 | 84.92% | 99.98%  |
| 0-180   | 2921.80 | 84.94% | 100.00% |
| 60-90   | 41.61   | 1.21%  | 1.42%   |
| 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%   |
| 0-29.15 | 2337.44 | 67.95% | 80.00%  |

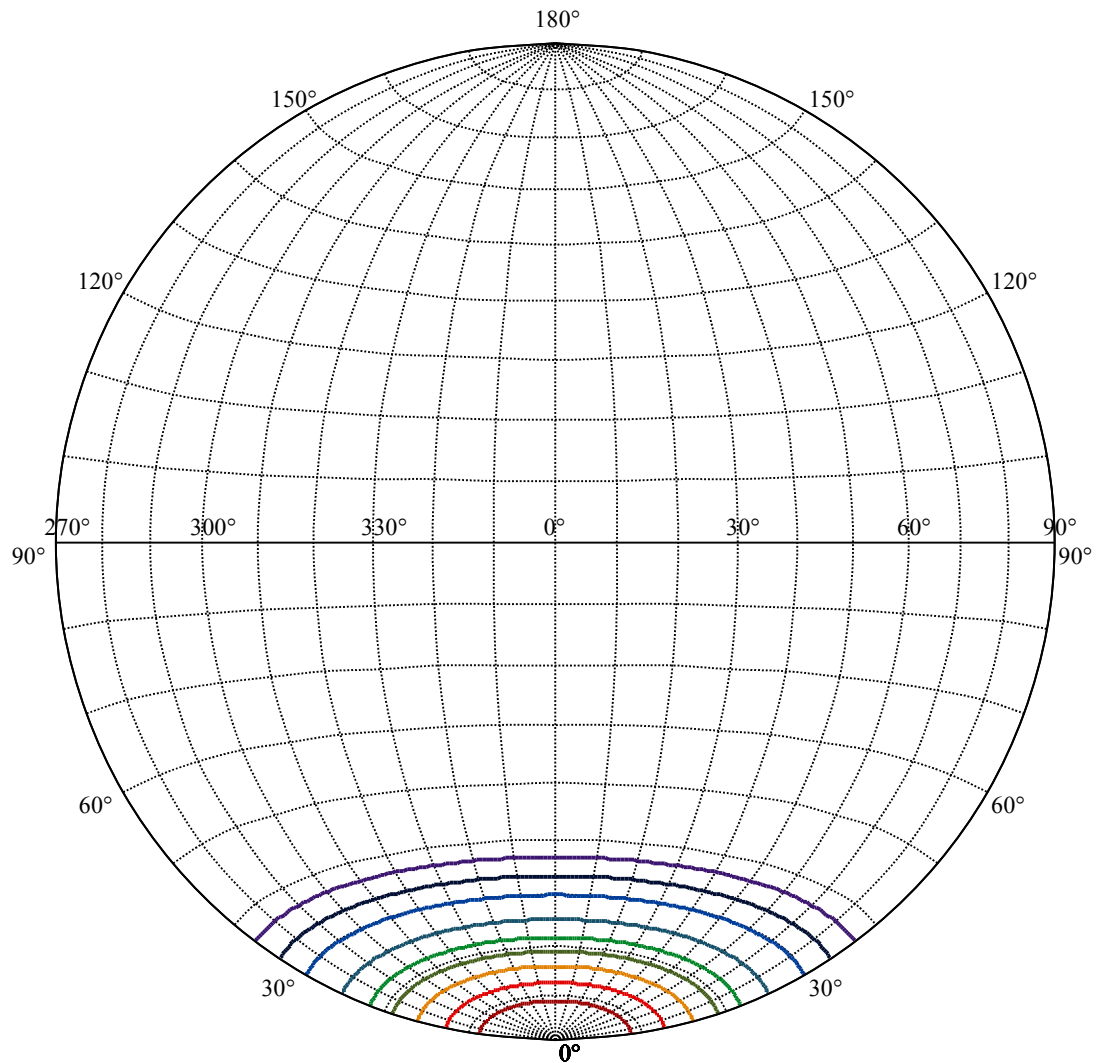
## ZONAL LUMEN SUMMARY

|         |         |
|---------|---------|
| 0-10    | 482.90  |
| 10-20   | 1005.44 |
| 20-30   | 917.85  |
| 30-40   | 435.73  |
| 40-50   | 24.55   |
| 50-60   | 14.45   |
| 60-70   | 14.01   |
| 70-80   | 13.77   |
| 80-90   | 12.40   |
| 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:4932.84

(10%Imax) 493.284

(20%Imax) 986.569

(30%Imax) 1479.85

(40%Imax) 1973.14

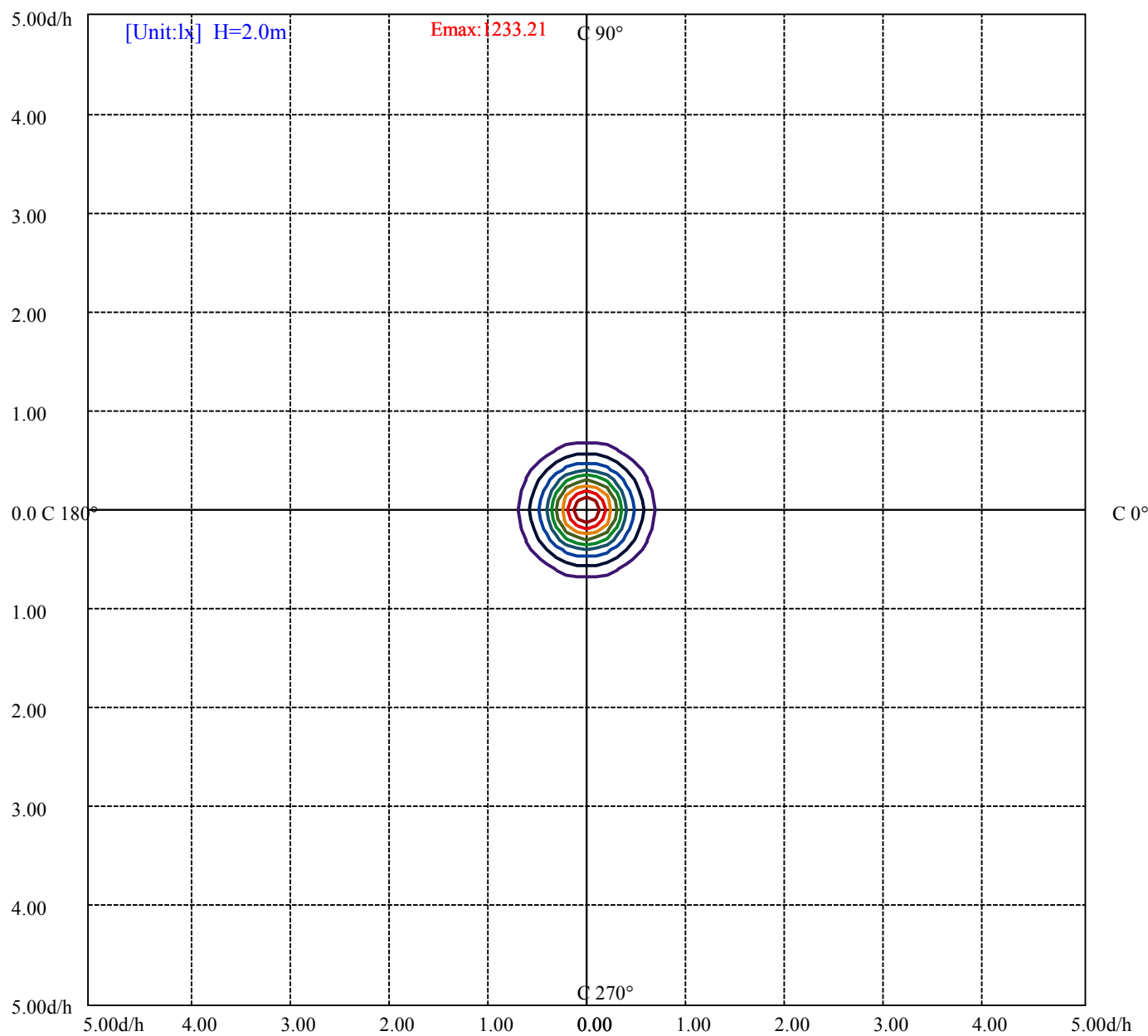
(50%Imax) 2466.42

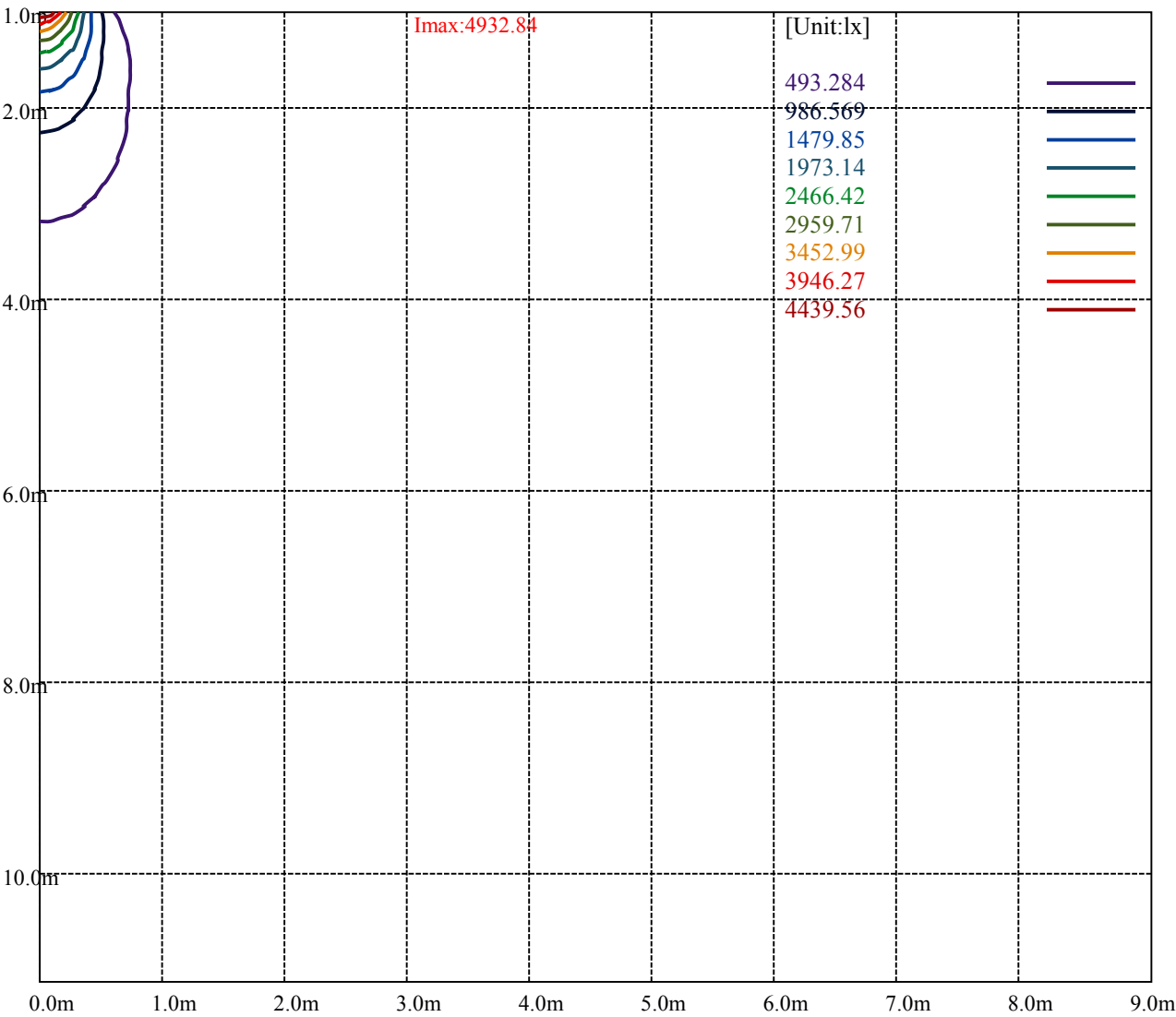
(60%Imax) 2959.71

(70%Imax) 3452.99

(80%Imax) 3946.27

(90%Imax) 4439.56





Luminance Table

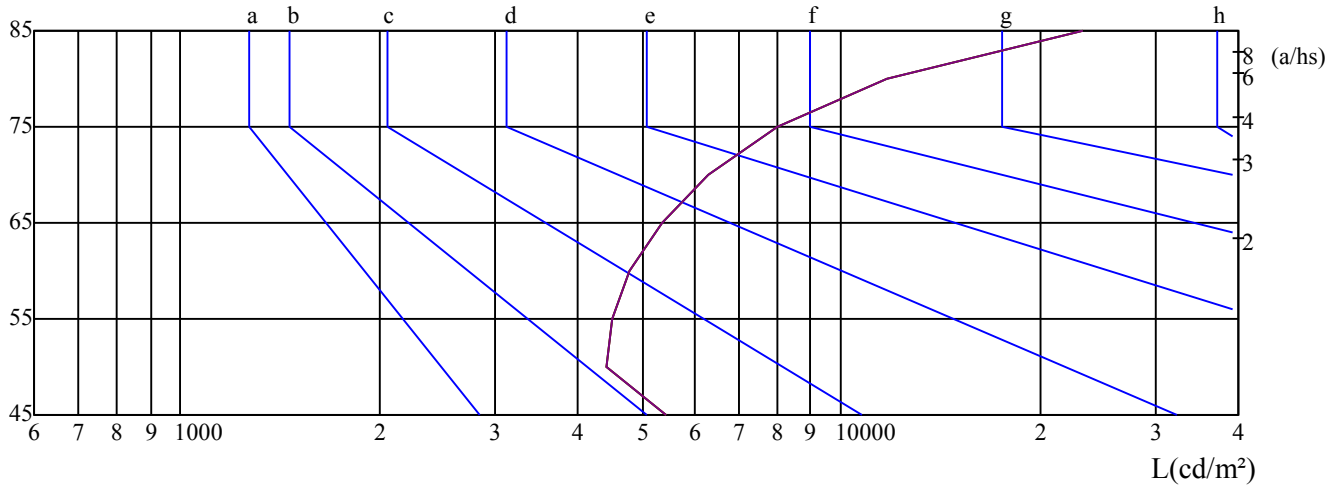
| $\gamma$ | 45   | 50   | 55   | 60   | 65   | 70   | 75   | 80    | 85    |
|----------|------|------|------|------|------|------|------|-------|-------|
| C0       | 5433 | 4427 | 4498 | 4795 | 5356 | 6298 | 8036 | 11763 | 23190 |
| C45      | 5433 | 4427 | 4498 | 4795 | 5356 | 6298 | 8036 | 11763 | 23190 |
| C90      | 5433 | 4427 | 4498 | 4795 | 5356 | 6298 | 8036 | 11763 | 23190 |

| L(Hor)(65) | L(Ver)(65) | L45(65) | L(Hor)(75) | L(Ver)(75) | L45(75) | L(Hor)(85) | L(Ver)(85) | L45(85) |
|------------|------------|---------|------------|------------|---------|------------|------------|---------|
| 5356       | 5356       | 5356    | 8036       | 8036       | 8036    | 23190      | 23190      | 23190   |

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

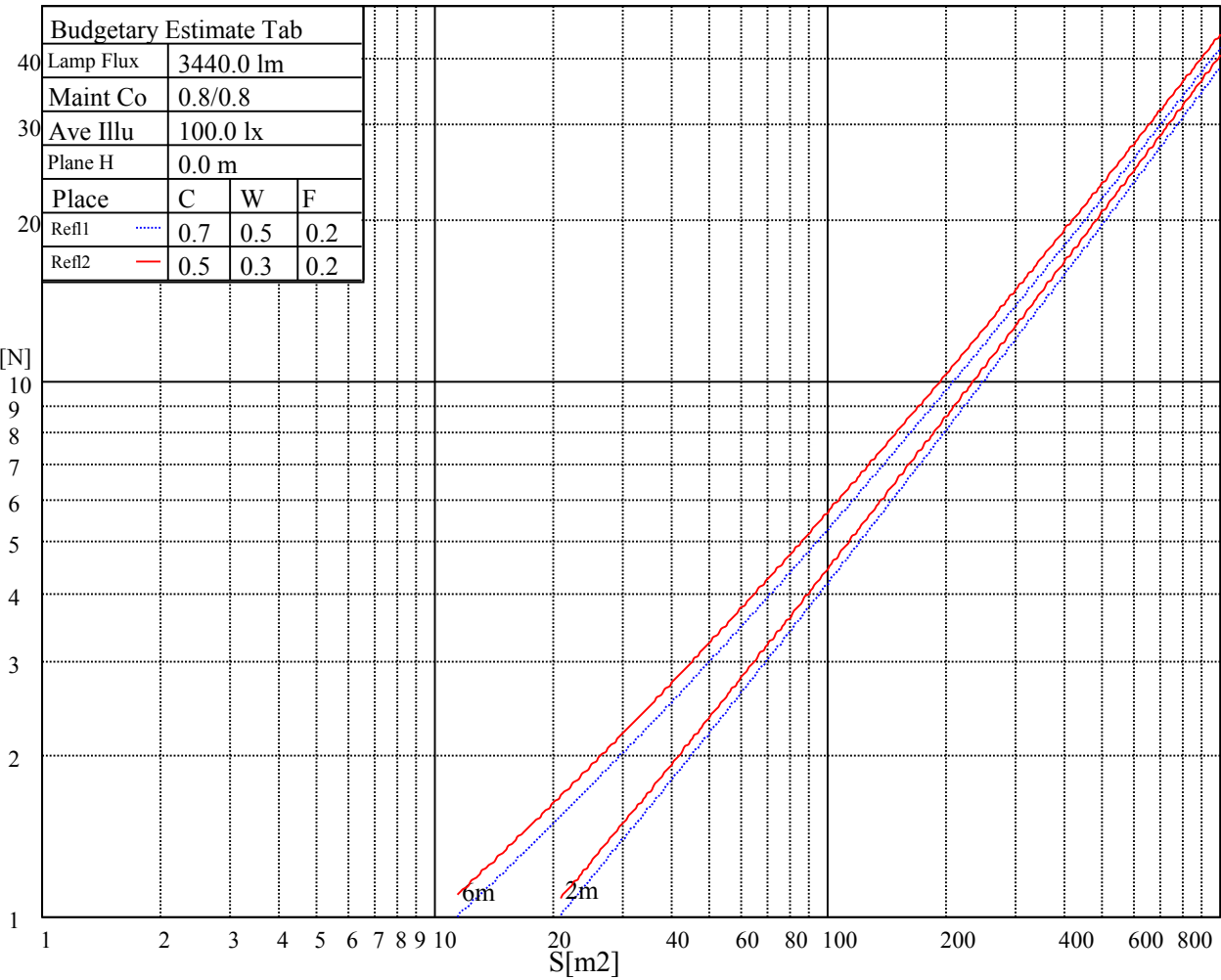
 $\gamma(^{\circ})$ 

C0 ———

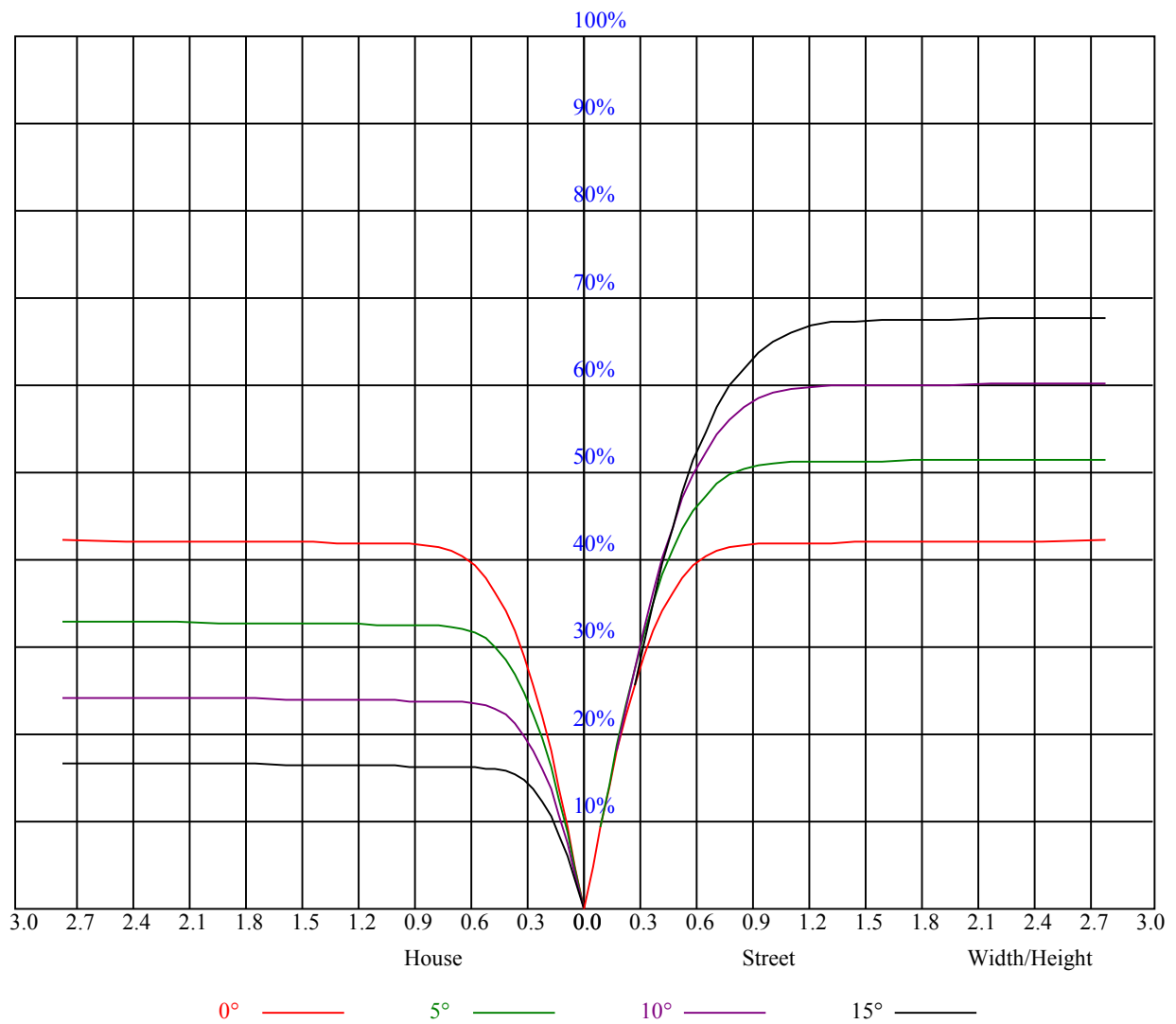
C45 ———

C90 ———

| Illumination assessment according UGR             |     |                  |       |       |       |       |                |       |       |       |       |
|---------------------------------------------------|-----|------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|
| Rf of Ceiling                                     |     | 70               | 70    | 50    | 50    | 30    | 70             | 70    | 50    | 50    | 30    |
| Rf of Wall                                        |     | 50               | 30    | 50    | 30    | 30    | 50             | 30    | 50    | 30    | 30    |
| Rf of Floor                                       |     | 20               | 20    | 20    | 20    | 20    | 20             | 20    | 20    | 20    | 20    |
| Room dimensions                                   |     | Viewed crosswise |       |       |       |       | Viewed endwise |       |       |       |       |
| X                                                 | Y   |                  |       |       |       |       |                |       |       |       |       |
| 2H                                                | 2H  | 2.75             | 3.67  | 3.12  | 3.98  | 4.30  | 2.77           | 3.69  | 3.14  | 4.00  | 4.32  |
|                                                   | 3H  | 5.71             | 6.52  | 6.09  | 6.85  | 7.22  | 5.74           | 6.54  | 6.12  | 6.88  | 7.25  |
|                                                   | 4H  | 7.33             | 8.07  | 7.73  | 8.43  | 8.82  | 7.35           | 8.10  | 7.76  | 8.45  | 8.84  |
|                                                   | 6H  | 9.19             | 9.87  | 9.61  | 10.25 | 10.65 | 9.20           | 9.88  | 9.61  | 10.26 | 10.65 |
|                                                   | 8H  | 10.24            | 10.88 | 10.67 | 11.27 | 11.68 | 10.24          | 10.88 | 10.67 | 11.27 | 11.68 |
|                                                   | 12H | 11.96            | 12.57 | 12.39 | 12.95 | 13.38 | 11.95          | 12.56 | 12.39 | 12.95 | 13.38 |
| 4H                                                | 2H  | 3.58             | 4.33  | 3.99  | 4.69  | 5.08  | 3.60           | 4.35  | 4.01  | 4.70  | 5.09  |
|                                                   | 3H  | 6.80             | 7.41  | 7.21  | 7.82  | 8.23  | 6.82           | 7.43  | 7.23  | 7.84  | 8.25  |
|                                                   | 4H  | 8.59             | 9.14  | 9.03  | 9.57  | 10.02 | 8.61           | 9.16  | 9.05  | 9.58  | 10.03 |
|                                                   | 6H  | 10.63            | 11.10 | 11.10 | 11.55 | 12.03 | 10.64          | 11.10 | 11.11 | 11.56 | 12.03 |
|                                                   | 8H  | 11.78            | 12.22 | 12.26 | 12.67 | 13.15 | 11.78          | 12.22 | 12.26 | 12.67 | 13.15 |
|                                                   | 12H | 13.41            | 13.79 | 13.90 | 14.28 | 14.75 | 13.40          | 13.78 | 13.90 | 14.27 | 14.75 |
| 8H                                                | 4H  | 9.28             | 9.72  | 9.76  | 10.17 | 10.65 | 9.30           | 9.73  | 9.77  | 10.18 | 10.66 |
|                                                   | 6H  | 11.61            | 11.95 | 12.12 | 12.45 | 12.94 | 11.60          | 11.95 | 12.12 | 12.45 | 12.94 |
|                                                   | 8H  | 12.95            | 13.25 | 13.48 | 13.78 | 14.28 | 12.94          | 13.25 | 13.48 | 13.77 | 14.27 |
|                                                   | 12H | 14.73            | 14.99 | 15.25 | 15.49 | 16.07 | 14.72          | 14.98 | 15.24 | 15.48 | 16.06 |
| 12H                                               | 4H  | 9.48             | 9.85  | 9.97  | 10.34 | 10.82 | 9.49           | 9.87  | 9.98  | 10.36 | 10.84 |
|                                                   | 6H  | 12.12            | 12.22 | 12.45 | 12.69 | 13.24 | 12.12          | 12.22 | 12.45 | 12.69 | 13.24 |
|                                                   | 8H  | 13.39            | 13.65 | 13.91 | 14.15 | 14.73 | 13.38          | 13.64 | 13.91 | 14.14 | 14.72 |
| Variation with the observer position at spacings: |     |                  |       |       |       |       |                |       |       |       |       |
| S = 1.0H                                          |     | 5.9/-8.1         |       |       |       |       | 5.9/-8.1       |       |       |       |       |
| S = 1.5H                                          |     | 8.2/-6.2         |       |       |       |       | 8.2/-6.2       |       |       |       |       |
| S = 2.0H                                          |     | 9.6/-4.7         |       |       |       |       | 9.6/-4.7       |       |       |       |       |
| Standard tables:                                  |     | BK2              |       |       |       |       | BK2            |       |       |       |       |
| Uncorrected UGR                                   |     | 2.3              |       |       |       |       | 2.3            |       |       |       |       |



| 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    | 1.01                                    | 1.01 | 1.01 | 0.99 | 0.99 | 0.99 | 0.94 | 0.94 | 0.94 | 0.90 | 0.90 | 0.90 | 0.87 | 0.87 | 0.87 | 0.85 |
| 1    | 0.94                                    | 0.92 | 0.91 | 0.93 | 0.91 | 0.89 | 0.89 | 0.88 | 0.86 | 0.86 | 0.85 | 0.84 | 0.83 | 0.82 | 0.81 | 0.80 |
| 2    | 0.89                                    | 0.85 | 0.83 | 0.87 | 0.84 | 0.82 | 0.84 | 0.82 | 0.80 | 0.82 | 0.80 | 0.78 | 0.80 | 0.78 | 0.77 | 0.75 |
| 3    | 0.83                                    | 0.80 | 0.76 | 0.82 | 0.79 | 0.76 | 0.80 | 0.77 | 0.75 | 0.78 | 0.76 | 0.73 | 0.76 | 0.74 | 0.72 | 0.71 |
| 4    | 0.79                                    | 0.74 | 0.71 | 0.78 | 0.74 | 0.71 | 0.76 | 0.73 | 0.70 | 0.74 | 0.71 | 0.69 | 0.73 | 0.70 | 0.68 | 0.67 |
| 5    | 0.75                                    | 0.70 | 0.67 | 0.74 | 0.70 | 0.66 | 0.72 | 0.69 | 0.66 | 0.71 | 0.68 | 0.65 | 0.70 | 0.67 | 0.65 | 0.64 |
| 6    | 0.71                                    | 0.66 | 0.63 | 0.70 | 0.66 | 0.63 | 0.69 | 0.65 | 0.62 | 0.68 | 0.64 | 0.62 | 0.67 | 0.64 | 0.61 | 0.60 |
| 7    | 0.67                                    | 0.63 | 0.59 | 0.67 | 0.62 | 0.59 | 0.66 | 0.62 | 0.59 | 0.65 | 0.61 | 0.59 | 0.64 | 0.61 | 0.58 | 0.57 |
| 8    | 0.64                                    | 0.59 | 0.56 | 0.63 | 0.59 | 0.56 | 0.63 | 0.59 | 0.56 | 0.62 | 0.58 | 0.56 | 0.61 | 0.58 | 0.55 | 0.54 |
| 9    | 0.61                                    | 0.56 | 0.53 | 0.61 | 0.56 | 0.53 | 0.60 | 0.56 | 0.53 | 0.59 | 0.56 | 0.53 | 0.58 | 0.55 | 0.53 | 0.52 |
| 10   | 0.58                                    | 0.54 | 0.51 | 0.58 | 0.54 | 0.51 | 0.57 | 0.53 | 0.51 | 0.57 | 0.53 | 0.51 | 0.56 | 0.53 | 0.50 | 0.49 |



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| 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                | 4931.44 | 4941.00 | 4933.69 | 4916.81 | 4885.88 | 4832.44 | 4775.06 | 4705.88 | 4627.69                    |
| 45.0               | 4932.56 | 4932.56 | 4920.19 | 4894.31 | 4849.88 | 4796.44 | 4732.31 | 4646.25 | 4548.38                    |
| 90.0               | 4932.00 | 4917.94 | 4888.69 | 4852.13 | 4799.81 | 4732.31 | 4659.75 | 4575.38 | 4453.88                    |
| 135.0              | 4935.38 | 4922.44 | 4894.88 | 4860.56 | 4813.31 | 4753.13 | 4689.56 | 4598.44 | 4503.94                    |
| 180.0              | 4931.44 | 4910.06 | 4881.38 | 4840.88 | 4792.50 | 4726.13 | 4653.56 | 4540.50 | 4442.06                    |
| 225.0              | 4932.56 | 4920.19 | 4897.69 | 4864.50 | 4822.31 | 4760.44 | 4682.81 | 4600.69 | 4497.19                    |
| 270.0              | 4932.00 | 4934.25 | 4925.81 | 4903.31 | 4870.13 | 4814.44 | 4755.38 | 4686.75 | 4587.19                    |
| 315.0              | 4935.38 | 4935.38 | 4925.25 | 4893.75 | 4857.19 | 4812.19 | 4750.31 | 4672.69 | 4591.13                    |
| 360.0              | 4931.44 | 4941.00 | 4933.69 | 4916.81 | 4885.88 | 4832.44 | 4775.06 | 4705.88 | 4627.69                    |
| C/γ(°)             | 9.0     | 10.0    | 11.0    | 12.0    | 13.0    | 14.0    | 15.0    | 16.0    | 17.0                       |
| 0.0                | 4512.94 | 4404.94 | 4288.50 | 4138.31 | 4010.63 | 3879.56 | 3726.56 | 3570.75 | 3451.50                    |
| 45.0               | 4448.25 | 4325.06 | 4194.00 | 4072.50 | 3929.06 | 3796.31 | 3643.31 | 3489.19 | 3350.81                    |
| 90.0               | 4345.88 | 4231.13 | 4080.38 | 3956.63 | 3828.38 | 3679.88 | 3528.56 | 3391.31 | 3219.75                    |
| 135.0              | 4386.94 | 4258.69 | 4135.50 | 4008.94 | 3845.81 | 3711.94 | 3576.38 | 3404.25 | 3260.81                    |
| 180.0              | 4330.69 | 4200.75 | 4064.63 | 3937.50 | 3807.00 | 3639.94 | 3506.63 | 3366.00 | 3192.75                    |
| 225.0              | 4381.88 | 4269.94 | 4150.13 | 3996.56 | 3862.69 | 3727.69 | 3573.56 | 3412.69 | 3259.13                    |
| 270.0              | 4493.25 | 4386.94 | 4258.69 | 4123.69 | 3996.00 | 3845.25 | 3706.31 | 3547.69 | 3390.75                    |
| 315.0              | 4469.63 | 4358.81 | 4236.75 | 4078.13 | 3963.38 | 3809.81 | 3638.81 | 3517.31 | 3358.69                    |
| 360.0              | 4512.94 | 4404.94 | 4288.50 | 4138.31 | 4010.63 | 3879.56 | 3726.56 | 3570.75 | 3451.50                    |
| C/γ(°)             | 18.0    | 19.0    | 20.0    | 21.0    | 22.0    | 23.0    | 24.0    | 25.0    | 26.0                       |
| 0.0                | 3272.06 | 3119.63 | 2957.06 | 2750.06 | 2583.56 | 2416.50 | 2236.50 | 2111.06 | 1997.44                    |
| 45.0               | 3171.94 | 2987.44 | 2823.75 | 2653.31 | 2444.63 | 2295.00 | 2166.75 | 2044.13 | 1920.94                    |
| 90.0               | 3032.44 | 2861.44 | 2669.63 | 2494.69 | 2319.75 | 2171.81 | 2050.88 | 1939.50 | 1807.88                    |
| 135.0              | 3097.13 | 2904.19 | 2715.75 | 2550.38 | 2354.06 | 2202.19 | 2062.13 | 1937.25 | 1822.50                    |
| 180.0              | 3003.75 | 2832.75 | 2640.38 | 2449.13 | 2300.63 | 2152.69 | 2034.56 | 1907.44 | 1787.06                    |
| 225.0              | 3079.13 | 2895.19 | 2736.56 | 2549.81 | 2396.25 | 2246.63 | 2108.81 | 1998.00 | 1881.00                    |
| 270.0              | 3243.38 | 3069.56 | 2888.44 | 2729.25 | 2566.13 | 2369.25 | 2235.94 | 2108.25 | 1978.88                    |
| 315.0              | 3171.38 | 3034.13 | 2865.38 | 2634.75 | 2484.56 | 2320.31 | 2165.63 | 2027.25 | 1915.88                    |
| 360.0              | 3272.06 | 3119.63 | 2957.06 | 2750.06 | 2583.56 | 2416.50 | 2236.50 | 2111.06 | 1997.44                    |
| C/γ(°)             | 27.0    | 28.0    | 29.0    | 30.0    | 31.0    | 32.0    | 33.0    | 34.0    | 35.0                       |
| 0.0                | 1863.00 | 1763.44 | 1673.44 | 1577.81 | 1475.44 | 1360.69 | 1209.94 | 1052.44 | 908.44                     |
| 45.0               | 1824.19 | 1724.06 | 1624.50 | 1530.00 | 1394.44 | 1243.69 | 1090.69 | 920.81  | 781.31                     |
| 90.0               | 1712.81 | 1621.13 | 1505.81 | 1389.38 | 1115.38 | 1080.73 | 942.81  | 808.20  | 675.51                     |
| 135.0              | 1702.69 | 1596.38 | 1506.94 | 1418.06 | 1265.63 | 1134.00 | 999.56  | 852.19  | 704.25                     |
| 180.0              | 1689.75 | 1584.56 | 1479.94 | 1367.44 | 1113.58 | 1061.94 | 924.13  | 787.84  | 638.16                     |
| 225.0              | 1784.25 | 1676.81 | 1575.00 | 1464.75 | 1333.69 | 1119.71 | 1012.05 | 867.04  | 688.78                     |
| 270.0              | 1853.44 | 1751.06 | 1645.88 | 1548.56 | 1447.31 | 1308.38 | 1171.69 | 1015.88 | 856.69                     |
| 315.0              | 1795.50 | 1684.69 | 1594.13 | 1495.69 | 1401.75 | 1269.56 | 1115.83 | 975.99  | 836.27                     |
| 360.0              | 1863.00 | 1763.44 | 1673.44 | 1577.81 | 1475.44 | 1360.69 | 1209.94 | 1052.44 | 908.44                     |
| C/γ(°)             | 36.0    | 37.0    | 38.0    | 39.0    | 40.0    | 41.0    | 42.0    | 43.0    | 44.0                       |
| 0.0                | 751.50  | 615.38  | 487.69  | 339.75  | 286.31  | 144.68  | 68.74   | 46.29   | 38.31                      |
| 45.0               | 629.44  | 488.25  | 371.81  | 291.38  | 158.18  | 82.58   | 53.55   | 44.10   | 31.56                      |
| 90.0               | 518.91  | 401.51  | 293.63  | 175.39  | 100.91  | 54.73   | 40.56   | 31.84   | 25.03                      |
| 135.0              | 578.25  | 443.81  | 317.25  | 290.25  | 126.06  | 57.21   | 40.89   | 34.31   | 26.61                      |
| 180.0              | 496.74  | 378.06  | 256.78  | 153.39  | 82.91   | 46.91   | 38.81   | 30.04   | 22.16                      |
| 225.0              | 551.53  | 425.14  | 284.01  | 186.92  | 111.09  | 56.25   | 45.84   | 36.23   | 27.11                      |
| 270.0              | 716.06  | 577.69  | 418.50  | 303.75  | 289.69  | 120.99  | 57.21   | 42.41   | 35.10                      |
| 315.0              | 666.96  | 539.16  | 418.89  | 281.70  | 188.33  | 110.36  | 59.34   | 39.21   | 32.29                      |
| 360.0              | 751.50  | 615.38  | 487.69  | 339.75  | 286.31  | 144.68  | 68.74   | 46.29   | 38.31                      |

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| Intensity data(cd) |       |       |       |       |       |       |       |       |       | Appendix Page: 18 Total:19 |  |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------------|--|
| C/ $\gamma$ (°)    | 45.0  | 46.0  | 47.0  | 48.0  | 49.0  | 50.0  | 51.0  | 52.0  | 53.0  |                            |  |
| 0.0                | 29.31 | 23.85 | 21.54 | 20.14 | 19.18 | 18.51 | 18.00 | 17.61 | 17.21 |                            |  |
| 45.0               | 25.14 | 22.84 | 20.93 | 19.74 | 18.96 | 18.23 | 17.72 | 17.38 | 16.93 |                            |  |
| 90.0               | 21.54 | 20.25 | 19.18 | 18.45 | 17.94 | 17.55 | 17.16 | 16.88 | 16.54 |                            |  |
| 135.0              | 21.83 | 19.58 | 18.84 | 18.23 | 17.83 | 17.44 | 17.04 | 16.71 | 16.43 |                            |  |
| 180.0              | 20.08 | 19.29 | 18.51 | 18.06 | 17.66 | 17.21 | 16.99 | 16.65 | 16.31 |                            |  |
| 225.0              | 22.16 | 20.31 | 18.96 | 18.45 | 17.94 | 17.38 | 17.10 | 16.76 | 16.48 |                            |  |
| 270.0              | 26.78 | 22.39 | 20.14 | 19.07 | 18.34 | 17.89 | 17.44 | 17.04 | 16.76 |                            |  |
| 315.0              | 24.98 | 21.09 | 19.86 | 19.07 | 18.39 | 17.89 | 17.49 | 17.10 | 16.76 |                            |  |
| 360.0              | 29.31 | 23.85 | 21.54 | 20.14 | 19.18 | 18.51 | 18.00 | 17.61 | 17.21 |                            |  |
| C/ $\gamma$ (°)    | 54.0  | 55.0  | 56.0  | 57.0  | 58.0  | 59.0  | 60.0  | 61.0  | 62.0  |                            |  |
| 0.0                | 16.82 | 16.54 | 16.20 | 15.92 | 15.69 | 15.47 | 15.24 | 15.08 | 14.85 |                            |  |
| 45.0               | 16.65 | 16.31 | 16.03 | 15.81 | 15.53 | 15.30 | 15.13 | 14.91 | 14.74 |                            |  |
| 90.0               | 16.20 | 15.98 | 15.75 | 15.53 | 15.24 | 15.08 | 14.85 | 14.68 | 14.57 |                            |  |
| 135.0              | 16.09 | 15.92 | 15.69 | 15.41 | 15.19 | 15.02 | 14.85 | 14.68 | 14.51 |                            |  |
| 180.0              | 16.09 | 15.86 | 15.58 | 15.41 | 15.19 | 14.96 | 14.79 | 14.63 | 14.46 |                            |  |
| 225.0              | 16.14 | 15.92 | 15.64 | 15.41 | 15.19 | 15.02 | 14.79 | 14.68 | 14.46 |                            |  |
| 270.0              | 16.37 | 16.14 | 15.86 | 15.58 | 15.41 | 15.19 | 15.02 | 14.79 | 14.68 |                            |  |
| 315.0              | 16.43 | 16.14 | 15.86 | 15.64 | 15.36 | 15.19 | 15.02 | 14.79 | 14.63 |                            |  |
| 360.0              | 16.82 | 16.54 | 16.20 | 15.92 | 15.69 | 15.47 | 15.24 | 15.08 | 14.85 |                            |  |
| C/ $\gamma$ (°)    | 63.0  | 64.0  | 65.0  | 66.0  | 67.0  | 68.0  | 69.0  | 70.0  | 71.0  |                            |  |
| 0.0                | 14.68 | 14.51 | 14.34 | 14.18 | 14.01 | 13.89 | 13.78 | 13.61 | 13.50 |                            |  |
| 45.0               | 14.57 | 14.40 | 14.23 | 14.01 | 13.95 | 13.73 | 13.67 | 13.56 | 13.44 |                            |  |
| 90.0               | 14.34 | 14.23 | 14.01 | 13.89 | 13.73 | 13.61 | 13.50 | 13.39 | 13.33 |                            |  |
| 135.0              | 14.34 | 14.18 | 14.06 | 13.84 | 13.78 | 13.61 | 13.50 | 13.39 | 13.28 |                            |  |
| 180.0              | 14.29 | 14.18 | 14.01 | 13.78 | 13.67 | 13.61 | 13.44 | 13.33 | 13.22 |                            |  |
| 225.0              | 14.29 | 14.12 | 14.01 | 13.84 | 13.67 | 13.56 | 13.44 | 13.33 | 13.28 |                            |  |
| 270.0              | 14.46 | 14.34 | 14.18 | 14.06 | 13.89 | 13.73 | 13.61 | 13.50 | 13.39 |                            |  |
| 315.0              | 14.46 | 14.34 | 14.18 | 14.01 | 13.84 | 13.73 | 13.61 | 13.44 | 13.39 |                            |  |
| 360.0              | 14.68 | 14.51 | 14.34 | 14.18 | 14.01 | 13.89 | 13.78 | 13.61 | 13.50 |                            |  |
| C/ $\gamma$ (°)    | 72.0  | 73.0  | 74.0  | 75.0  | 76.0  | 77.0  | 78.0  | 79.0  | 80.0  |                            |  |
| 0.0                | 13.33 | 13.28 | 13.16 | 13.05 | 13.05 | 12.99 | 12.88 | 12.83 | 12.77 |                            |  |
| 45.0               | 13.33 | 13.22 | 13.16 | 12.99 | 12.94 | 12.88 | 12.83 | 12.77 | 12.77 |                            |  |
| 90.0               | 13.16 | 13.11 | 13.05 | 12.99 | 12.94 | 12.88 | 12.77 | 12.77 | 12.77 |                            |  |
| 135.0              | 13.22 | 13.11 | 13.05 | 12.94 | 12.94 | 12.83 | 12.77 | 12.71 | 12.71 |                            |  |
| 180.0              | 13.16 | 13.05 | 12.99 | 12.94 | 12.88 | 12.83 | 12.77 | 12.71 | 12.71 |                            |  |
| 225.0              | 13.16 | 13.05 | 12.99 | 12.88 | 12.88 | 12.77 | 12.77 | 12.71 | 12.71 |                            |  |
| 270.0              | 13.28 | 13.16 | 13.11 | 12.99 | 12.99 | 12.88 | 12.83 | 12.83 | 12.77 |                            |  |
| 315.0              | 13.22 | 13.22 | 13.05 | 13.05 | 12.99 | 12.94 | 12.83 | 12.83 | 12.77 |                            |  |
| 360.0              | 13.33 | 13.28 | 13.16 | 13.05 | 13.05 | 12.99 | 12.88 | 12.83 | 12.77 |                            |  |
| C/ $\gamma$ (°)    | 81.0  | 82.0  | 83.0  | 84.0  | 85.0  | 86.0  | 87.0  | 88.0  | 89.0  |                            |  |
| 0.0                | 12.71 | 12.66 | 12.66 | 12.66 | 12.60 | 12.54 | 12.49 | 12.54 | 12.54 |                            |  |
| 45.0               | 12.71 | 12.66 | 12.60 | 12.60 | 12.54 | 12.54 | 12.60 | 12.54 | 12.54 |                            |  |
| 90.0               | 12.71 | 12.66 | 12.66 | 12.66 | 12.60 | 12.60 | 12.66 | 12.66 | 12.43 |                            |  |
| 135.0              | 12.66 | 12.60 | 12.66 | 12.60 | 12.60 | 12.60 | 12.60 | 12.71 | 12.49 |                            |  |
| 180.0              | 12.66 | 12.66 | 12.66 | 12.66 | 12.66 | 12.66 | 12.77 | 12.54 | 12.43 |                            |  |
| 225.0              | 12.66 | 12.60 | 12.60 | 12.54 | 12.60 | 12.54 | 12.54 | 12.71 | 12.49 |                            |  |
| 270.0              | 12.71 | 12.71 | 12.71 | 12.71 | 12.71 | 12.71 | 12.77 | 12.71 | 12.71 |                            |  |
| 315.0              | 12.71 | 12.66 | 12.66 | 12.60 | 12.60 | 12.54 | 12.54 | 12.60 | 12.71 |                            |  |
| 360.0              | 12.71 | 12.66 | 12.66 | 12.66 | 12.60 | 12.54 | 12.49 | 12.54 | 12.54 |                            |  |

## Intensity data(cd)

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|                                 |              |
|---------------------------------|--------------|
| <b>C/<math>\gamma</math>(°)</b> | <b>90.0</b>  |
| <b>0.0</b>                      | <b>12.60</b> |
| <b>45.0</b>                     | <b>12.43</b> |
| <b>90.0</b>                     | <b>12.43</b> |
| <b>135.0</b>                    | <b>12.49</b> |
| <b>180.0</b>                    | <b>12.49</b> |
| <b>225.0</b>                    | <b>12.43</b> |
| <b>270.0</b>                    | <b>12.49</b> |
| <b>315.0</b>                    | <b>12.60</b> |
| <b>360.0</b>                    | <b>12.60</b> |