

## Indoor Distribution Test Report

# Spectrum Lighting Inc.

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## Spectrum Lighting Photometric Lab

### Luminaire

GL04IND48LX 07L 35K EX DW XX MW

Milltown Light 5.1" Wide x 48" linear pendant or surface mount luminaire

### Test Number

SP-00618\_1\_M-07L

### Test Date

The results contained in this report pertain only to this IES file.

### Summary of Results

#### Power

|             |      |
|-------------|------|
| Input Watts | 21 W |
|-------------|------|

#### Lumen Output

|               |             |
|---------------|-------------|
| Output Lumens | 2386        |
| Efficacy      | 113.63 lm/W |

#### Luminous Dimensions

|                 |      |
|-----------------|------|
| 0° - 180° Size  | 0.43 |
| 90° - 270° Size | 4.02 |
| Height          | 0.17 |

#### Spacing Criterion

|                           |      |
|---------------------------|------|
| Two luminaires, plane 0°  | 1.36 |
| Two luminaires, plane 90° | 1.23 |
| Four luminaires           | 1.45 |

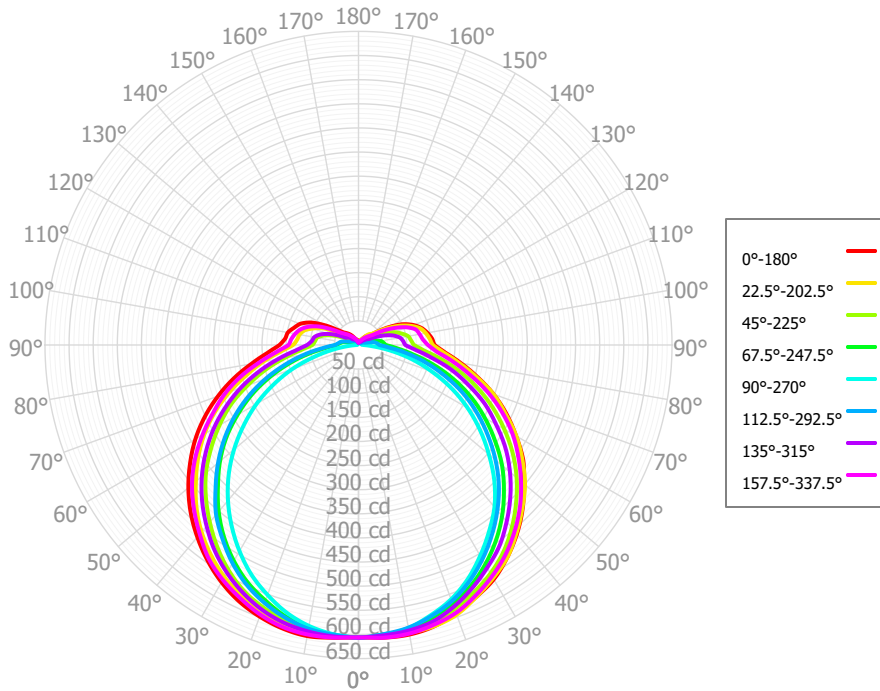
#### Full Beam Angle

|            |      |
|------------|------|
| 0° - 180°  | 139° |
| 90° - 270° | 108° |

### IES File Header Contents

| Keyword   | Value  |
|-----------|--|
| TEST      | SP-00618_1_M-07L   |
| TESTLAB   | VLS-245-981  |
| MANUFAC   | Spectrum Lighting  |
| ISSUEDATE | 10/16/2017   |
| UPDATE    | 3/9/2020   |
| LUMCAT    | GL04IND48LX 07L 35K EX DW XX MW  |
| LUMINAIRE | Milltown Light 5.1" Wide x 48" linear pendant or surface mount luminaire |
| OTHER     | 48" Linear LED, Diffuse White Acrylic Lens                               |
| OTHER     | Matte White interior finish  |
| OTHER     | 112 Degree Beam Angle  |
| LAMPCAT   | N/A  |
| LAMP      | N/A, 700 Source Lm/Ft  |
| OTHER     | Total Luminaire Watts is approximate                                     |
| OTHER     | CCT Output Multipliers: 30K x 0.98, 35K x 1.0, 40K x 1.03, 50K x 1.06    |
| OTHER     | This report prepared by Spectrum Lighting, scaled from 20L               |

### Candela Polar Plot



### Zonal Lumen Summary

| Zone            | Lumens   | % Fixture | Zone              | Lumens   | % Fixture |
|-----------------|----------|-----------|-------------------|----------|-----------|
| 0.00° - 10.00°  | 61.22    | 2.57%     | 90.00° - 100.00°  | 97.69    | 4.09%     |
| 10.00° - 20.00° | 167.12   | 7.00%     | 100.00° - 110.00° | 79.19    | 3.32%     |
| 20.00° - 30.00° | 257.74   | 10.80%    | 100.00° - 120.00° | 129.54   | 5.43%     |
| 30.00° - 40.00° | 318.88   | 13.36%    | 120.00° - 130.00° | 24.76    | 1.04%     |
| 40.00° - 50.00° | 343.87   | 14.41%    | 130.00° - 140.00° | 13.76    | 0.58%     |
| 50.00° - 60.00° | 331.61   | 13.90%    | 140.00° - 150.00° | 7.66     | 0.32%     |
| 60.00° - 70.00° | 284.31   | 11.91%    | 150.00° - 160.00° | 4.04     | 0.17%     |
| 70.00° - 80.00° | 209.25   | 8.77%     | 160.00° - 170.00° | 1.98     | 0.08%     |
| 80.00° - 90.00° | 132.17   | 5.54%     | 170.00° - 180.00° | 0.57     | 0.02%     |
| 0.00° - 90.00°  | 2,106.18 | 88.27%    | 0.00° - 180.00°   | 2,386.17 | 100.00%   |

### Candela Distribution

|         | 0.00°  | 22.50° | 45.00° | 67.50° | 90.00° | 112.50° | 135.00° | 157.50° | 180.00° | 202.50° | 225.00° | 247.50° | 270.00° | 292.50° | 315.00° | 337.50° | 360.00° |
|---------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0.00°   | 606.48 | 606.48 | 606.48 | 606.48 | 606.48 | 606.48  | 606.48  | 606.48  | 606.48  | 606.48  | 606.48  | 606.48  | 606.48  | 606.48  | 606.48  | 606.48  | 606.48  |
| 5.00°   | 609.08 | 607.18 | 604.96 | 605.20 | 604.04 | 602.86  | 606.51  | 608.88  | 609.25  | 607.14  | 605.16  | 604.13  | 601.83  | 601.78  | 604.26  | 609.07  | 609.08  |
| 10.00°  | 609.47 | 606.05 | 603.28 | 599.16 | 595.72 | 597.39  | 603.07  | 609.41  | 612.72  | 606.75  | 601.12  | 594.68  | 591.42  | 595.12  | 601.20  | 607.51  | 609.47  |
| 15.00°  | 604.07 | 603.78 | 596.25 | 586.21 | 579.86 | 585.54  | 596.36  | 605.33  | 608.43  | 600.51  | 591.19  | 582.84  | 574.64  | 582.13  | 593.69  | 600.87  | 604.07  |
| 20.00°  | 591.86 | 594.96 | 582.66 | 570.80 | 561.17 | 569.23  | 584.41  | 594.80  | 599.23  | 592.75  | 578.74  | 563.85  | 551.37  | 565.26  | 577.50  | 590.94  | 591.86  |
| 25.00°  | 576.64 | 576.73 | 565.87 | 550.84 | 535.74 | 548.61  | 566.87  | 579.38  | 586.25  | 574.15  | 562.32  | 543.30  | 525.33  | 541.84  | 556.71  | 573.56  | 576.64  |
| 30.00°  | 560.90 | 557.92 | 547.00 | 525.31 | 504.54 | 522.36  | 545.33  | 562.36  | 567.94  | 555.68  | 538.83  | 516.84  | 493.41  | 513.34  | 533.44  | 553.71  | 560.90  |
| 35.00°  | 537.65 | 537.71 | 523.76 | 496.08 | 471.87 | 491.29  | 519.91  | 541.13  | 545.51  | 532.59  | 510.69  | 486.07  | 458.38  | 481.67  | 509.14  | 531.02  | 537.65  |
| 40.00°  | 511.03 | 509.40 | 494.50 | 463.10 | 438.57 | 459.27  | 489.92  | 511.90  | 519.84  | 506.10  | 479.55  | 451.01  | 420.96  | 447.76  | 477.92  | 503.62  | 511.03  |
| 45.00°  | 481.12 | 480.06 | 462.13 | 426.38 | 398.28 | 418.92  | 458.39  | 482.19  | 491.87  | 475.16  | 447.39  | 412.07  | 380.62  | 411.53  | 445.17  | 473.52  | 481.12  |
| 50.00°  | 447.70 | 450.64 | 427.90 | 388.52 | 352.87 | 380.01  | 423.84  | 450.60  | 460.39  | 440.16  | 412.83  | 374.87  | 336.75  | 370.76  | 409.92  | 439.72  | 447.70  |
| 55.00°  | 417.00 | 414.64 | 390.13 | 345.29 | 307.58 | 339.44  | 386.24  | 414.12  | 426.09  | 405.56  | 372.95  | 334.58  | 290.47  | 327.65  | 371.82  | 404.61  | 417.00  |
| 60.00°  | 377.20 | 377.68 | 348.84 | 302.42 | 261.35 | 296.72  | 346.54  | 373.59  | 390.46  | 368.74  | 332.74  | 289.54  | 244.03  | 284.64  | 329.32  | 368.77  | 377.20  |
| 65.00°  | 338.58 | 335.85 | 307.16 | 258.61 | 213.07 | 251.62  | 303.80  | 332.37  | 351.36  | 328.19  | 291.74  | 244.46  | 194.70  | 240.76  | 288.94  | 327.90  | 338.58  |
| 70.00°  | 297.72 | 297.81 | 263.76 | 211.52 | 162.41 | 204.93  | 259.77  | 294.61  | 309.86  | 284.18  | 244.53  | 196.49  | 146.37  | 193.21  | 242.70  | 284.83  | 297.72  |
| 75.00°  | 254.66 | 251.99 | 219.84 | 163.09 | 115.21 | 157.69  | 214.15  | 252.81  | 267.64  | 239.91  | 200.18  | 149.30  | 94.83   | 147.29  | 199.78  | 239.43  | 254.66  |
| 80.00°  | 215.09 | 211.05 | 176.29 | 116.17 | 67.63  | 113.73  | 169.78  | 208.74  | 225.38  | 200.91  | 155.82  | 104.76  | 51.02   | 104.17  | 154.59  | 198.93  | 215.09  |
| 85.00°  | 180.48 | 176.69 | 137.13 | 80.78  | 28.45  | 74.44   | 130.79  | 171.36  | 189.57  | 162.70  | 119.48  | 67.45   | 17.94   | 65.12   | 119.21  | 163.20  | 180.48  |
| 90.00°  | 158.13 | 154.42 | 115.33 | 57.07  | 10.25  | 48.78   | 106.61  | 145.25  | 163.85  | 135.62  | 95.60   | 45.30   | 3.50    | 43.55   | 97.14   | 143.86  | 158.13  |
| 95.00°  | 152.98 | 148.12 | 109.32 | 52.17  | 7.29   | 41.93   | 97.00   | 139.78  | 152.64  | 127.70  | 90.53   | 39.17   | 3.45    | 38.89   | 92.95   | 133.90  | 152.98  |
| 100.00° | 145.01 | 141.63 | 104.62 | 47.24  | 8.01   | 37.45   | 93.20   | 133.30  | 148.66  | 124.02  | 87.20   | 33.05   | 2.36    | 33.02   | 87.44   | 128.67  | 145.01  |
| 105.00° | 135.48 | 132.74 | 92.02  | 33.91  | 6.12   | 28.06   | 83.07   | 124.66  | 138.25  | 116.19  | 75.62   | 18.00   | 2.18    | 20.28   | 75.42   | 123.19  | 135.48  |
| 110.00° | 120.92 | 115.71 | 77.81  | 22.07  | 8.18   | 20.09   | 67.07   | 110.62  | 128.38  | 100.33  | 57.95   | 11.33   | 2.49    | 13.99   | 58.30   | 107.06  | 120.92  |
| 115.00° | 101.72 | 94.45  | 55.08  | 19.18  | 7.79   | 17.91   | 48.05   | 90.65   | 110.27  | 82.25   | 36.76   | 10.58   | 2.85    | 12.35   | 38.92   | 83.84   | 101.72  |
| 120.00° | 75.36  | 70.12  | 34.01  | 17.23  | 8.29   | 16.03   | 30.37   | 64.80   | 82.86   | 55.48   | 22.34   | 8.81    | 3.26    | 9.55    | 24.88   | 60.59   | 75.36   |
| 125.00° | 49.13  | 47.51  | 29.43  | 15.49  | 6.79   | 14.43   | 27.09   | 44.16   | 56.07   | 33.63   | 18.63   | 7.11    | 3.51    | 7.66    | 20.84   | 37.05   | 49.13   |
| 130.00° | 32.02  | 35.90  | 25.41  | 12.73  | 6.38   | 13.35   | 23.21   | 35.77   | 40.63   | 28.31   | 16.90   | 7.12    | 3.08    | 5.57    | 16.00   | 28.94   | 32.02   |
| 135.00° | 27.42  | 32.01  | 20.75  | 11.27  | 7.01   | 12.01   | 16.55   | 30.08   | 34.82   | 24.14   | 13.47   | 7.17    | 2.76    | 5.74    | 12.74   | 23.76   | 27.42   |
| 140.00° | 23.80  | 25.55  | 18.62  | 10.64  | 6.22   | 10.30   | 15.12   | 24.02   | 29.50   | 18.21   | 10.20   | 5.33    | 3.86    | 5.43    | 9.49    | 18.99   | 23.80   |
| 145.00° | 18.23  | 18.30  | 12.82  | 8.00   | 6.46   | 9.20    | 13.20   | 19.86   | 23.64   | 13.03   | 7.95    | 5.72    | 3.76    | 5.30    | 8.25    | 15.26   | 18.23   |
| 150.00° | 13.33  | 14.11  | 11.66  | 7.50   | 5.96   | 8.36    | 12.38   | 16.28   | 17.21   | 11.44   | 7.28    | 5.06    | 3.07    | 4.65    | 8.10    | 11.88   | 13.33   |
| 155.00° | 10.49  | 12.70  | 9.69   | 7.86   | 5.38   | 7.09    | 9.92    | 13.01   | 13.72   | 9.32    | 6.93    | 4.98    | 3.34    | 3.85    | 7.39    | 9.26    | 10.49   |
| 160.00° | 8.83   | 11.23  | 9.33   | 6.18   | 5.66   | 6.96    | 9.33    | 10.88   | 12.57   | 9.19    | 5.89    | 4.60    | 3.81    | 4.73    | 6.76    | 8.13    | 8.83    |
| 165.00° | 8.83   | 7.69   | 7.64   | 6.71   | 5.39   | 5.29    | 7.52    | 8.90    | 10.98   | 6.89    | 6.32    | 4.50    | 3.43    | 4.92    | 6.21    | 7.04    | 8.83    |
| 170.00° | 6.64   | 6.74   | 6.01   | 5.76   | 4.71   | 5.56    | 6.43    | 7.41    | 10.49   | 6.64    | 4.89    | 5.44    | 4.88    | 4.20    | 5.56    | 5.82    | 6.64    |
| 175.00° | 5.72   | 5.36   | 5.26   | 4.71   | 4.45   | 5.03    | 5.20    | 5.90    | 6.18    | 5.41    | 5.47    | 4.62    | 4.70    | 3.93    | 4.89    | 6.30    | 5.72    |
| 180.00° | 5.25   | 5.25   | 5.25   | 5.25   | 5.25   | 5.25    | 5.25    | 5.25    | 5.25    | 5.25    | 5.25    | 5.25    | 5.25    | 5.25    | 5.25    | 5.25    | 5.25    |

### Coefficients of Utilization – Zonal Cavity Method

Values are lumens delivered to the workplane.

|     |     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| RCR | pfc | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 0%    |       |
|     | pcc | 80%   | 80%   | 80%   | 80%   | 70%   | 70%   | 70%   | 70%   | 50%   | 50%   | 50%   | 30%   | 30%   | 30%   | 10%   | 10%   | 10%   | 0%    |
|     | pw  | 70%   | 50%   | 30%   | 10%   | 70%   | 50%   | 30%   | 10%   | 50%   | 30%   | 10%   | 50%   | 30%   | 10%   | 50%   | 30%   | 10%   | 30%   |
|     | 0   | 2,774 | 2,774 | 2,774 | 2,774 | 2,677 | 2,677 | 2,677 | 2,677 | 2,496 | 2,496 | 2,496 | 2,330 | 2,330 | 2,330 | 2,178 | 2,178 | 2,178 | 2,106 |
|     | 1   | 2,482 | 2,348 | 2,229 | 2,121 | 2,386 | 2,266 | 2,158 | 2,059 | 2,111 | 2,023 | 1,943 | 1,969 | 1,899 | 1,833 | 1,839 | 1,783 | 1,730 | 1,719 |
|     | 2   | 2,237 | 2,019 | 1,839 | 1,688 | 2,145 | 1,949 | 1,785 | 1,646 | 1,817 | 1,682 | 1,565 | 1,696 | 1,585 | 1,487 | 1,583 | 1,493 | 1,413 | 1,438 |
|     | 3   | 2,028 | 1,758 | 1,548 | 1,381 | 1,943 | 1,698 | 1,505 | 1,351 | 1,585 | 1,423 | 1,290 | 1,481 | 1,346 | 1,233 | 1,384 | 1,272 | 1,177 | 1,225 |
|     | 4   | 1,850 | 1,547 | 1,326 | 1,156 | 1,771 | 1,496 | 1,291 | 1,133 | 1,399 | 1,225 | 1,087 | 1,310 | 1,162 | 1,042 | 1,226 | 1,101 | 998   | 1,061 |
|     | 5   | 1,696 | 1,375 | 1,151 | 986   | 1,624 | 1,331 | 1,123 | 967   | 1,248 | 1,068 | 931   | 1,171 | 1,016 | 895   | 1,098 | 966   | 860   | 931   |
|     | 6   | 1,562 | 1,233 | 1,012 | 853   | 1,497 | 1,195 | 988   | 838   | 1,123 | 943   | 809   | 1,056 | 899   | 779   | 993   | 857   | 751   | 827   |
|     | 7   | 1,446 | 1,114 | 899   | 748   | 1,387 | 1,081 | 879   | 735   | 1,018 | 841   | 711   | 960   | 803   | 687   | 905   | 768   | 663   | 741   |
|     | 8   | 1,344 | 1,013 | 806   | 663   | 1,290 | 985   | 789   | 652   | 930   | 756   | 632   | 878   | 724   | 611   | 830   | 693   | 591   | 670   |
|     | 9   | 1,254 | 928   | 728   | 593   | 1,205 | 902   | 713   | 584   | 854   | 685   | 566   | 809   | 657   | 549   | 766   | 631   | 532   | 610   |
|     | 10  | 1,174 | 854   | 662   | 534   | 1,129 | 831   | 649   | 527   | 789   | 625   | 512   | 748   | 601   | 497   | 710   | 578   | 482   | 560   |

### Cone of Light

| Mtg Height | Light Level | Beam Diameter |
|------------|-------------|---------------|
| 5.5 ft     | 20.0 fc     | 22.2 ft       |
| 6.5 ft     | 14.4 fc     | 26.2 ft       |
| 7.5 ft     | 10.8 fc     | 30.2 ft       |
| 8.0 ft     | 9.5 fc      | 32.3 ft       |
| 10.0 ft    | 6.1 fc      | 40.3 ft       |
| 12.0 ft    | 4.2 fc      | 48.4 ft       |
| 14.0 ft    | 3.1 fc      | 56.5 ft       |
| 16.0 ft    | 2.4 fc      | 64.5 ft       |
| 20.0 ft    | 1.5 fc      | 80.7 ft       |
| 24.0 ft    | 1.1 fc      | 96.8 ft       |
| 28.0 ft    | 0.8 fc      | 112.9 ft      |

### Average Luminaire Luminance [cd/m²]

|               | 0.00° | 45.00° | 90.00° |
|---------------|-------|--------|--------|
| <b>0.00°</b>  | 3,777 | 3,777  | 3,777  |
| <b>45.00°</b> | 3,036 | 3,108  | 3,365  |
| <b>55.00°</b> | 2,893 | 2,937  | 3,149  |
| <b>65.00°</b> | 2,700 | 2,720  | 2,878  |
| <b>75.00°</b> | 2,475 | 2,454  | 2,394  |
| <b>85.00°</b> | 2,336 | 2,159  | 1,371  |

### UGR CIE 190:2010

|                            |            |                         |            |            |            |            |                       |            |            |            |            |
|----------------------------|------------|-------------------------|------------|------------|------------|------------|-----------------------|------------|------------|------------|------------|
| <b>Ceiling reflectance</b> |            | <b>0.7</b>              | <b>0.7</b> | <b>0.5</b> | <b>0.5</b> | <b>0.3</b> | <b>0.7</b>            | <b>0.7</b> | <b>0.5</b> | <b>0.5</b> | <b>0.3</b> |
| <b>Wall reflectance</b>    |            | <b>0.5</b>              | <b>0.3</b> | <b>0.5</b> | <b>0.3</b> | <b>0.3</b> | <b>0.5</b>            | <b>0.3</b> | <b>0.5</b> | <b>0.3</b> | <b>0.3</b> |
| <b>Plane reflectance</b>   |            | <b>0.2</b>              | <b>0.2</b> | <b>0.2</b> | <b>0.2</b> | <b>0.2</b> | <b>0.2</b>            | <b>0.2</b> | <b>0.2</b> | <b>0.2</b> | <b>0.2</b> |
| <b>Room dimensions</b>     |            | <b>Viewed crosswise</b> |            |            |            |            | <b>Viewed endwise</b> |            |            |            |            |
| <b>2H</b>                  | <b>2H</b>  | 16.1                    | 17.6       | 16.7       | 18.1       | 18.7       | 13.6                  | 15.1       | 14.1       | 15.6       | 16.2       |
|                            | <b>3H</b>  | 18.6                    | 20.0       | 19.2       | 20.5       | 21.1       | 15.1                  | 16.4       | 15.6       | 17.0       | 17.6       |
|                            | <b>4H</b>  | 19.8                    | 21.1       | 20.4       | 21.6       | 22.3       | 15.6                  | 16.8       | 16.1       | 17.4       | 18.0       |
|                            | <b>6H</b>  | 21.0                    | 22.2       | 21.6       | 22.7       | 23.4       | 15.8                  | 17.0       | 16.4       | 17.6       | 18.2       |
|                            | <b>8H</b>  | 21.6                    | 22.7       | 22.2       | 23.3       | 24.0       | 15.9                  | 17.0       | 16.5       | 17.6       | 18.3       |
|                            | <b>12H</b> | 22.3                    | 23.3       | 22.8       | 23.9       | 24.6       | 15.9                  | 17.0       | 16.5       | 17.6       | 18.3       |
| <b>4H</b>                  | <b>2H</b>  | 16.6                    | 17.9       | 17.2       | 18.4       | 19.1       | 14.6                  | 15.9       | 15.2       | 16.5       | 17.1       |
|                            | <b>3H</b>  | 19.3                    | 20.4       | 19.9       | 21.0       | 21.6       | 16.4                  | 17.5       | 17.0       | 18.1       | 18.7       |
|                            | <b>4H</b>  | 20.6                    | 21.6       | 21.2       | 22.2       | 22.9       | 17.0                  | 18.0       | 17.6       | 18.6       | 19.3       |
|                            | <b>6H</b>  | 22.0                    | 22.9       | 22.6       | 23.5       | 24.2       | 17.4                  | 18.3       | 18.0       | 18.9       | 19.6       |
|                            | <b>8H</b>  | 22.7                    | 23.5       | 23.3       | 24.2       | 24.9       | 17.5                  | 18.3       | 18.1       | 19.0       | 19.7       |
|                            | <b>12H</b> | 23.5                    | 24.2       | 24.1       | 24.9       | 25.6       | 17.5                  | 18.3       | 18.2       | 19.0       | 19.7       |
| <b>8H</b>                  | <b>4H</b>  | 20.9                    | 21.7       | 21.5       | 22.3       | 23.0       | 17.7                  | 18.6       | 18.4       | 19.2       | 19.9       |
|                            | <b>6H</b>  | 22.4                    | 23.1       | 23.0       | 23.8       | 24.5       | 18.3                  | 19.0       | 19.0       | 19.7       | 20.4       |
|                            | <b>8H</b>  | 23.2                    | 23.9       | 23.9       | 24.5       | 25.3       | 18.5                  | 19.2       | 19.2       | 19.8       | 20.6       |
|                            | <b>12H</b> | 24.2                    | 24.7       | 24.8       | 25.4       | 26.2       | 18.7                  | 19.2       | 19.3       | 19.9       | 20.7       |
| <b>12H</b>                 | <b>4H</b>  | 20.9                    | 21.6       | 21.5       | 22.3       | 23.0       | 17.9                  | 18.7       | 18.6       | 19.3       | 20.1       |
|                            | <b>6H</b>  | 22.4                    | 23.1       | 23.1       | 23.7       | 24.5       | 18.6                  | 19.3       | 19.3       | 19.9       | 20.7       |
|                            | <b>8H</b>  | 23.3                    | 23.9       | 24.0       | 24.6       | 25.4       | 18.9                  | 19.5       | 19.6       | 20.2       | 21.0       |

Corrected UGR values based on total output lumens

SHR = 1.0