

## Indoor Distribution Test Report

# Spectrum Lighting Inc.

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## Spectrum Lighting Photometric Lab

### Luminaire

GL04IND96LX 05L 35K EX DW XX MW

Milltown Light 5.1" Wide x 96" linear pendant or surface mount luminaire

### Test Number

SP-00618\_2\_M-05L

### Test Date

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

### Summary of Results

#### Power

|             |      |
|-------------|------|
| Input Watts | 32 W |
|-------------|------|

#### Lumen Output

|               |             |
|---------------|-------------|
| Output Lumens | 3823        |
| Efficacy      | 119.48 lm/W |

#### Luminous Dimensions

|                 |      |
|-----------------|------|
| 0° - 180° Size  | 0.43 |
| 90° - 270° Size | 8.02 |
| Height          | 0.17 |

#### Spacing Criterion

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

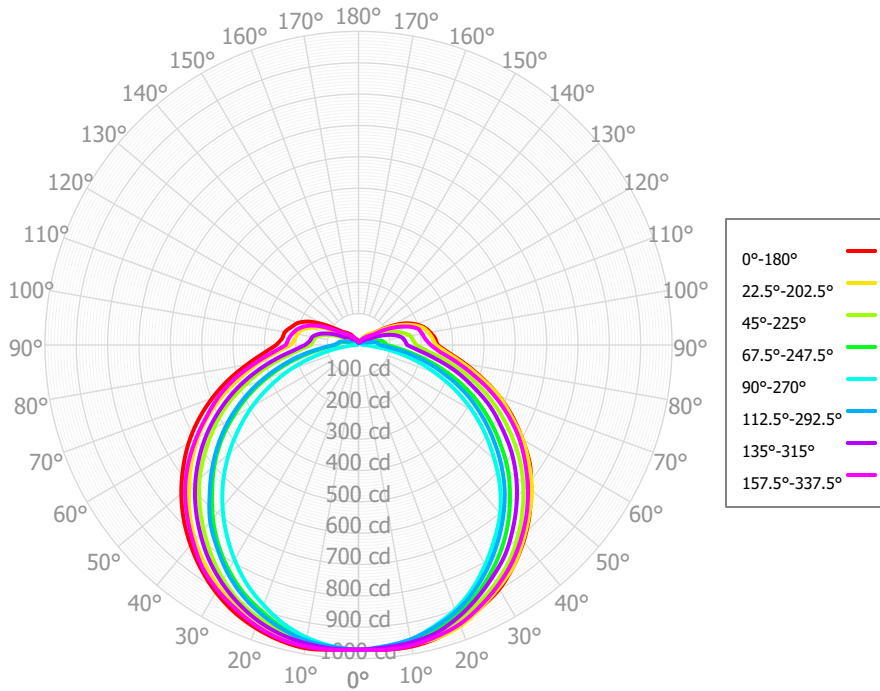
#### Full Beam Angle

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

### IES File Header Contents

| Keyword   | Value  |
|-----------|--|
| TEST      | SP-00618_2_M-05L   |
| TESTLAB   | VLS-245-981  |
| MANUFAC   | Spectrum Lighting  |
| ISSUEDATE | 10/16/2017   |
| UPDATE    | 3/9/2020   |
| LUMCAT    | GL04IND96LX 05L 35K EX DW XX MW  |
| LUMINAIRE | Milltown Light 5.1" Wide x 96" linear pendant or surface mount luminaire |
| OTHER     | 96" Linear LED, Diffuse White Acrylic Lens                               |
| OTHER     | Matte White interior finish  |
| OTHER     | 112 Degree Beam Angle  |
| LAMPCAT   | N/A  |
| LAMP      | N/A, 550 Source Lms/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°  | 98.09    | 2.57%     | 90.00° - 100.00°  | 156.53   | 4.09%     |
| 10.00° - 20.00° | 267.78   | 7.00%     | 100.00° - 110.00° | 126.89   | 3.32%     |
| 20.00° - 30.00° | 412.97   | 10.80%    | 100.00° - 120.00° | 207.56   | 5.43%     |
| 30.00° - 40.00° | 510.94   | 13.36%    | 120.00° - 130.00° | 39.67    | 1.04%     |
| 40.00° - 50.00° | 550.97   | 14.41%    | 130.00° - 140.00° | 22.05    | 0.58%     |
| 50.00° - 60.00° | 531.34   | 13.90%    | 140.00° - 150.00° | 12.27    | 0.32%     |
| 60.00° - 70.00° | 455.54   | 11.91%    | 150.00° - 160.00° | 6.47     | 0.17%     |
| 70.00° - 80.00° | 335.28   | 8.77%     | 160.00° - 170.00° | 3.17     | 0.08%     |
| 80.00° - 90.00° | 211.77   | 5.54%     | 170.00° - 180.00° | 0.91     | 0.02%     |
| 0.00° - 90.00°  | 3,374.68 | 88.27%    | 0.00° - 180.00°   | 3,823.32 | 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°   | 971.75 | 971.75 | 971.75 | 971.75 | 971.75 | 971.75  | 971.75  | 971.75  | 971.75  | 971.75  | 971.75  | 971.75  | 971.75  | 971.75  | 971.75  | 971.75  | 971.75  |
| 5.00°   | 975.92 | 972.86 | 969.32 | 969.70 | 967.83 | 965.95  | 971.80  | 975.60  | 976.19  | 972.81  | 969.64  | 967.98  | 964.30  | 964.21  | 968.20  | 975.90  | 975.92  |
| 10.00°  | 976.55 | 971.07 | 966.62 | 960.03 | 954.50 | 957.19  | 966.29  | 976.45  | 981.75  | 972.18  | 963.17  | 952.84  | 947.62  | 953.55  | 963.29  | 973.40  | 976.55  |
| 15.00°  | 967.89 | 967.42 | 955.37 | 939.27 | 929.10 | 938.19  | 955.53  | 969.91  | 974.87  | 962.19  | 947.25  | 933.88  | 920.73  | 932.73  | 951.26  | 962.75  | 967.89  |
| 20.00°  | 948.32 | 953.29 | 933.58 | 914.58 | 899.15 | 912.07  | 936.38  | 953.04  | 960.14  | 949.75  | 927.30  | 903.44  | 883.45  | 905.71  | 925.32  | 946.86  | 948.32  |
| 25.00°  | 923.94 | 924.08 | 906.67 | 882.60 | 858.40 | 879.03  | 908.28  | 928.32  | 939.33  | 919.94  | 900.99  | 870.53  | 841.73  | 868.19  | 892.01  | 919.00  | 923.94  |
| 30.00°  | 898.72 | 893.95 | 876.45 | 841.70 | 808.42 | 836.97  | 873.78  | 901.06  | 910.00  | 890.35  | 863.36  | 828.13  | 790.58  | 822.52  | 854.73  | 887.20  | 898.72  |
| 35.00°  | 861.47 | 861.56 | 839.21 | 794.85 | 756.07 | 787.18  | 833.03  | 867.04  | 874.06  | 853.35  | 818.26  | 778.83  | 734.46  | 771.77  | 815.78  | 850.85  | 861.47  |
| 40.00°  | 818.81 | 816.20 | 792.33 | 742.01 | 702.71 | 735.88  | 785.00  | 820.21  | 832.92  | 810.91  | 768.38  | 722.64  | 674.50  | 717.43  | 765.75  | 806.95  | 818.81  |
| 45.00°  | 770.89 | 769.19 | 740.46 | 683.18 | 638.15 | 671.22  | 734.46  | 772.60  | 788.11  | 761.33  | 716.85  | 660.25  | 609.86  | 659.38  | 713.28  | 758.71  | 770.89  |
| 50.00°  | 717.34 | 722.06 | 685.62 | 622.51 | 565.39 | 608.88  | 679.12  | 721.99  | 737.68  | 705.25  | 661.47  | 600.65  | 539.57  | 594.06  | 656.81  | 704.55  | 717.34  |
| 55.00°  | 668.15 | 664.37 | 625.10 | 553.25 | 492.84 | 543.88  | 618.87  | 663.54  | 682.71  | 649.82  | 597.57  | 536.10  | 465.41  | 524.99  | 595.77  | 648.29  | 668.15  |
| 60.00°  | 604.37 | 605.15 | 558.94 | 484.57 | 418.76 | 475.43  | 555.25  | 598.59  | 625.62  | 590.83  | 533.14  | 463.92  | 391.01  | 456.07  | 527.66  | 590.88  | 604.37  |
| 65.00°  | 542.49 | 538.12 | 492.16 | 414.36 | 341.41 | 403.17  | 486.77  | 532.55  | 562.97  | 525.85  | 467.45  | 391.69  | 311.97  | 385.77  | 462.97  | 525.38  | 542.49  |
| 70.00°  | 477.03 | 477.18 | 422.62 | 338.92 | 260.23 | 328.35  | 416.23  | 472.04  | 496.49  | 455.34  | 391.81  | 314.83  | 234.53  | 309.57  | 388.87  | 456.38  | 477.03  |
| 75.00°  | 408.03 | 403.76 | 352.24 | 261.32 | 184.60 | 252.67  | 343.12  | 405.08  | 428.83  | 384.41  | 320.75  | 239.22  | 151.95  | 235.99  | 320.10  | 383.63  | 408.03  |
| 80.00°  | 344.64 | 338.16 | 282.46 | 186.14 | 108.35 | 182.23  | 272.04  | 334.45  | 361.12  | 321.91  | 249.67  | 167.86  | 81.74   | 166.92  | 247.70  | 318.74  | 344.64  |
| 85.00°  | 289.18 | 283.11 | 219.72 | 129.42 | 45.59  | 119.28  | 209.57  | 274.57  | 303.75  | 260.69  | 191.44  | 108.07  | 28.74   | 104.34  | 191.00  | 261.49  | 289.18  |
| 90.00°  | 253.37 | 247.43 | 184.78 | 91.45  | 16.42  | 78.16   | 170.83  | 232.74  | 262.53  | 217.29  | 153.18  | 72.59   | 5.60    | 69.78   | 155.64  | 230.50  | 253.37  |
| 95.00°  | 245.11 | 237.34 | 175.16 | 83.60  | 11.68  | 67.18   | 155.42  | 223.96  | 244.58  | 204.61  | 145.05  | 62.76   | 5.52    | 62.31   | 148.93  | 214.54  | 245.11  |
| 100.00° | 232.35 | 226.93 | 167.63 | 75.69  | 12.83  | 60.00   | 149.33  | 213.58  | 238.20  | 198.71  | 139.73  | 52.95   | 3.79    | 52.91   | 140.11  | 206.16  | 232.35  |
| 105.00° | 217.08 | 212.68 | 147.45 | 54.33  | 9.81   | 44.96   | 133.11  | 199.75  | 221.51  | 186.17  | 121.16  | 28.84   | 3.50    | 32.50   | 120.85  | 197.39  | 217.08  |
| 110.00° | 193.74 | 185.40 | 124.68 | 35.36  | 13.11  | 32.18   | 107.47  | 177.25  | 205.71  | 160.75  | 92.85   | 18.15   | 3.98    | 22.41   | 93.42   | 171.54  | 193.74  |
| 115.00° | 162.99 | 151.34 | 88.26  | 30.73  | 12.49  | 28.69   | 77.00   | 145.25  | 176.68  | 131.79  | 58.89   | 16.95   | 4.56    | 19.78   | 62.36   | 134.34  | 162.99  |
| 120.00° | 120.75 | 112.36 | 54.50  | 27.61  | 13.28  | 25.69   | 48.67   | 103.82  | 132.76  | 88.89   | 35.80   | 14.12   | 5.22    | 15.31   | 39.87   | 97.09   | 120.75  |
| 125.00° | 78.72  | 76.12  | 47.16  | 24.82  | 10.88  | 23.13   | 43.41   | 70.75   | 89.84   | 53.89   | 29.86   | 11.40   | 5.63    | 12.27   | 33.38   | 59.36   | 78.72   |
| 130.00° | 51.30  | 57.52  | 40.71  | 20.40  | 10.22  | 21.39   | 37.18   | 57.32   | 65.10   | 45.36   | 27.07   | 11.41   | 4.93    | 8.93    | 25.63   | 46.37   | 51.30   |
| 135.00° | 43.93  | 51.29  | 33.25  | 18.06  | 11.23  | 19.25   | 26.52   | 48.19   | 55.78   | 38.68   | 21.58   | 11.49   | 4.43    | 9.20    | 20.41   | 38.07   | 43.93   |
| 140.00° | 38.14  | 40.94  | 29.83  | 17.04  | 9.97   | 16.50   | 24.22   | 38.48   | 47.28   | 29.17   | 16.34   | 8.54    | 6.19    | 8.71    | 15.20   | 30.42   | 38.14   |
| 145.00° | 29.21  | 29.32  | 20.55  | 12.82  | 10.35  | 14.74   | 21.16   | 31.83   | 37.89   | 20.88   | 12.74   | 9.16    | 6.02    | 8.50    | 13.21   | 24.46   | 29.21   |
| 150.00° | 21.36  | 22.62  | 18.69  | 12.02  | 9.55   | 13.39   | 19.83   | 26.09   | 27.57   | 18.32   | 11.66   | 8.11    | 4.92    | 7.45    | 12.98   | 19.04   | 21.36   |
| 155.00° | 16.80  | 20.35  | 15.53  | 12.60  | 8.63   | 11.35   | 15.89   | 20.84   | 21.99   | 14.93   | 11.11   | 7.97    | 5.34    | 6.17    | 11.84   | 14.83   | 16.80   |
| 160.00° | 14.14  | 17.99  | 14.96  | 9.91   | 9.07   | 11.15   | 14.94   | 17.43   | 20.14   | 14.72   | 9.43    | 7.38    | 6.11    | 7.58    | 10.83   | 13.03   | 14.14   |
| 165.00° | 14.15  | 12.33  | 12.25  | 10.75  | 8.64   | 8.48    | 12.06   | 14.26   | 17.59   | 11.05   | 10.12   | 7.22    | 5.49    | 7.89    | 9.95    | 11.27   | 14.15   |
| 170.00° | 10.64  | 10.80  | 9.62   | 9.22   | 7.54   | 8.90    | 10.30   | 11.88   | 16.81   | 10.63   | 7.83    | 8.72    | 7.83    | 6.74    | 8.90    | 9.32    | 10.64   |
| 175.00° | 9.16   | 8.59   | 8.43   | 7.55   | 7.12   | 8.06    | 8.33    | 9.46    | 9.91    | 8.67    | 8.77    | 7.40    | 7.53    | 6.30    | 7.83    | 10.10   | 9.16    |
| 180.00° | 8.96   | 8.96   | 8.96   | 8.96   | 8.96   | 8.96    | 8.96    | 8.96    | 8.96    | 8.96    | 8.96    | 8.96    | 8.96    | 8.96    | 8.96    | 8.96    | 8.96    |

### Coefficients of Utilization – Zonal Cavity Method

Values are lumens delivered to the workplane.

|            |            |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|            | <b>pfc</b> | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 20%   | 0%    |
|            | <b>pcc</b> | 80%   | 80%   | 80%   | 80%   | 70%   | 70%   | 70%   | 70%   | 50%   | 50%   | 50%   | 30%   | 30%   | 30%   | 10%   | 10%   | 0%    |
|            | <b>pw</b>  | 70%   | 50%   | 30%   | 10%   | 70%   | 50%   | 30%   | 10%   | 50%   | 30%   | 10%   | 50%   | 30%   | 10%   | 50%   | 30%   | 30%   |
| <b>RCR</b> | <b>0</b>   | 4,445 | 4,445 | 4,445 | 4,445 | 4,289 | 4,289 | 4,289 | 4,289 | 3,999 | 3,999 | 3,999 | 3,733 | 3,733 | 3,733 | 3,489 | 3,489 | 3,375 |
|            | <b>1</b>   | 3,977 | 3,763 | 3,571 | 3,398 | 3,823 | 3,630 | 3,457 | 3,300 | 3,383 | 3,242 | 3,113 | 3,155 | 3,042 | 2,937 | 2,946 | 2,856 | 2,755 |
|            | <b>2</b>   | 3,584 | 3,236 | 2,947 | 2,705 | 3,438 | 3,123 | 2,860 | 2,637 | 2,912 | 2,695 | 2,507 | 2,717 | 2,539 | 2,382 | 2,537 | 2,392 | 2,263 |
|            | <b>3</b>   | 3,250 | 2,816 | 2,481 | 2,213 | 3,113 | 2,720 | 2,412 | 2,164 | 2,540 | 2,281 | 2,068 | 2,373 | 2,156 | 1,975 | 2,218 | 2,039 | 1,885 |
|            | <b>4</b>   | 2,964 | 2,479 | 2,124 | 1,853 | 2,838 | 2,397 | 2,069 | 1,815 | 2,242 | 1,962 | 1,741 | 2,098 | 1,861 | 1,669 | 1,965 | 1,765 | 1,699 |
|            | <b>5</b>   | 2,717 | 2,204 | 1,845 | 1,580 | 2,602 | 2,133 | 1,799 | 1,550 | 2,000 | 1,712 | 1,491 | 1,876 | 1,628 | 1,434 | 1,760 | 1,548 | 1,492 |
|            | <b>6</b>   | 2,503 | 1,976 | 1,621 | 1,367 | 2,399 | 1,915 | 1,584 | 1,343 | 1,800 | 1,511 | 1,296 | 1,692 | 1,441 | 1,249 | 1,591 | 1,373 | 1,203 |
|            | <b>7</b>   | 2,317 | 1,785 | 1,440 | 1,198 | 2,222 | 1,732 | 1,408 | 1,178 | 1,632 | 1,347 | 1,139 | 1,538 | 1,287 | 1,100 | 1,450 | 1,230 | 1,062 |
|            | <b>8</b>   | 2,153 | 1,624 | 1,291 | 1,062 | 2,067 | 1,578 | 1,264 | 1,045 | 1,490 | 1,211 | 1,012 | 1,407 | 1,160 | 980   | 1,330 | 1,111 | 947   |
|            | <b>9</b>   | 2,009 | 1,486 | 1,166 | 950   | 1,931 | 1,446 | 1,143 | 935   | 1,368 | 1,097 | 907   | 1,296 | 1,053 | 880   | 1,227 | 1,011 | 852   |
|            | <b>10</b>  | 1,881 | 1,368 | 1,061 | 856   | 1,810 | 1,332 | 1,041 | 844   | 1,264 | 1,001 | 820   | 1,199 | 963   | 796   | 1,138 | 926   | 772   |

### Cone of Light

| Mtg Height | Light Level | Beam Diameter |
|------------|-------------|---------------|
| 5.5 ft     | 32.1 fc     | 22.2 ft       |
| 6.5 ft     | 23.0 fc     | 26.2 ft       |
| 7.5 ft     | 17.3 fc     | 30.2 ft       |
| 8.0 ft     | 15.2 fc     | 32.3 ft       |
| 10.0 ft    | 9.7 fc      | 40.3 ft       |
| 12.0 ft    | 6.7 fc      | 48.4 ft       |
| 14.0 ft    | 5.0 fc      | 56.5 ft       |
| 16.0 ft    | 3.8 fc      | 64.5 ft       |
| 20.0 ft    | 2.4 fc      | 80.7 ft       |
| 24.0 ft    | 1.7 fc      | 96.8 ft       |
| 28.0 ft    | 1.2 fc      | 112.9 ft      |

### Average Luminaire Luminance [cd/m²]

|               | 0.00° | 45.00° | 90.00° |
|---------------|-------|--------|--------|
| <b>0.00°</b>  | 3,033 | 3,033  | 3,033  |
| <b>45.00°</b> | 2,439 | 2,525  | 2,758  |
| <b>55.00°</b> | 2,324 | 2,394  | 2,603  |
| <b>65.00°</b> | 2,168 | 2,228  | 2,412  |
| <b>75.00°</b> | 1,988 | 2,024  | 2,063  |
| <b>85.00°</b> | 1,876 | 1,802  | 1,314  |

### 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>  | 15.5                    | 16.9       | 16.0       | 17.5       | 18.1       | 12.9                  | 14.3       | 13.4       | 14.9       | 15.4       |
|                            | <b>3H</b>  | 18.0                    | 19.3       | 18.5       | 19.9       | 20.5       | 14.3                  | 15.7       | 14.9       | 16.2       | 16.9       |
|                            | <b>4H</b>  | 19.2                    | 20.5       | 19.8       | 21.0       | 21.7       | 14.8                  | 16.1       | 15.4       | 16.6       | 17.3       |
|                            | <b>6H</b>  | 20.4                    | 21.6       | 21.0       | 22.2       | 22.8       | 15.1                  | 16.3       | 15.7       | 16.8       | 17.5       |
|                            | <b>8H</b>  | 21.0                    | 22.2       | 21.6       | 22.8       | 23.4       | 15.1                  | 16.3       | 15.7       | 16.9       | 17.5       |
|                            | <b>12H</b> | 21.7                    | 22.8       | 22.3       | 23.4       | 24.1       | 15.2                  | 16.2       | 15.8       | 16.8       | 17.5       |
| <b>4H</b>                  | <b>2H</b>  | 15.9                    | 17.2       | 16.5       | 17.7       | 18.4       | 13.9                  | 15.2       | 14.5       | 15.7       | 16.4       |
|                            | <b>3H</b>  | 18.7                    | 19.7       | 19.2       | 20.3       | 21.0       | 15.6                  | 16.7       | 16.2       | 17.3       | 18.0       |
|                            | <b>4H</b>  | 20.0                    | 21.0       | 20.6       | 21.6       | 22.3       | 16.3                  | 17.3       | 16.9       | 17.9       | 18.6       |
|                            | <b>6H</b>  | 21.4                    | 22.3       | 22.0       | 22.9       | 23.6       | 16.7                  | 17.5       | 17.3       | 18.2       | 18.9       |
|                            | <b>8H</b>  | 22.2                    | 23.0       | 22.8       | 23.6       | 24.3       | 16.8                  | 17.6       | 17.4       | 18.2       | 18.9       |
|                            | <b>12H</b> | 23.0                    | 23.7       | 23.6       | 24.4       | 25.1       | 16.8                  | 17.6       | 17.5       | 18.2       | 18.9       |
| <b>8H</b>                  | <b>4H</b>  | 20.2                    | 21.0       | 20.8       | 21.7       | 22.4       | 17.0                  | 17.8       | 17.6       | 18.5       | 19.2       |
|                            | <b>6H</b>  | 21.8                    | 22.5       | 22.5       | 23.2       | 23.9       | 17.6                  | 18.3       | 18.3       | 19.0       | 19.7       |
|                            | <b>8H</b>  | 22.7                    | 23.3       | 23.3       | 24.0       | 24.7       | 17.8                  | 18.4       | 18.5       | 19.1       | 19.9       |
|                            | <b>12H</b> | 23.7                    | 24.2       | 24.3       | 24.9       | 25.7       | 17.9                  | 18.5       | 18.6       | 19.2       | 20.0       |
| <b>12H</b>                 | <b>4H</b>  | 20.2                    | 21.0       | 20.9       | 21.6       | 22.4       | 17.2                  | 18.0       | 17.9       | 18.6       | 19.4       |
|                            | <b>6H</b>  | 21.8                    | 22.5       | 22.5       | 23.1       | 23.9       | 17.9                  | 18.6       | 18.6       | 19.2       | 20.0       |
|                            | <b>8H</b>  | 22.8                    | 23.3       | 23.4       | 24.0       | 24.8       | 18.2                  | 18.8       | 18.9       | 19.5       | 20.3       |

Corrected UGR values based on total output lumens

SHR = 1.0