## Indoor Distribution Test Report

# Spectrum Lighting Inc.

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## Spectrum Lighting Photometric Lab

**Luminaire**

AP12XT 20L 35HK EX CSD MWI

Nom 12" diam x 12" H Aluminum reflector pendant

**Test Number**

SP-00684_2_M-20L

**Test Date**

10/15/2019

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

## Summary of Results

### Power

| | |
|---|---|
| **Input Watts** | 23.5 W |

### Lumen Output

| | |
|---|---|
| **Output Lumens** | 1067 |
| **Efficacy** | 45.4 lm/W |

### Luminous Dimensions

| | |
|---|---|
| **0° - 180° Size** | -1 |
| **90° - 270° Size** | -1 |
| **Height** | 0 |

### Spacing Criterion

| | |
|---|---|
| **Two luminaires, plane 0°** | 0.82 |
| **Two luminaires, plane 90°** | 0.82 |
| **Four luminaires** | 0.98 |

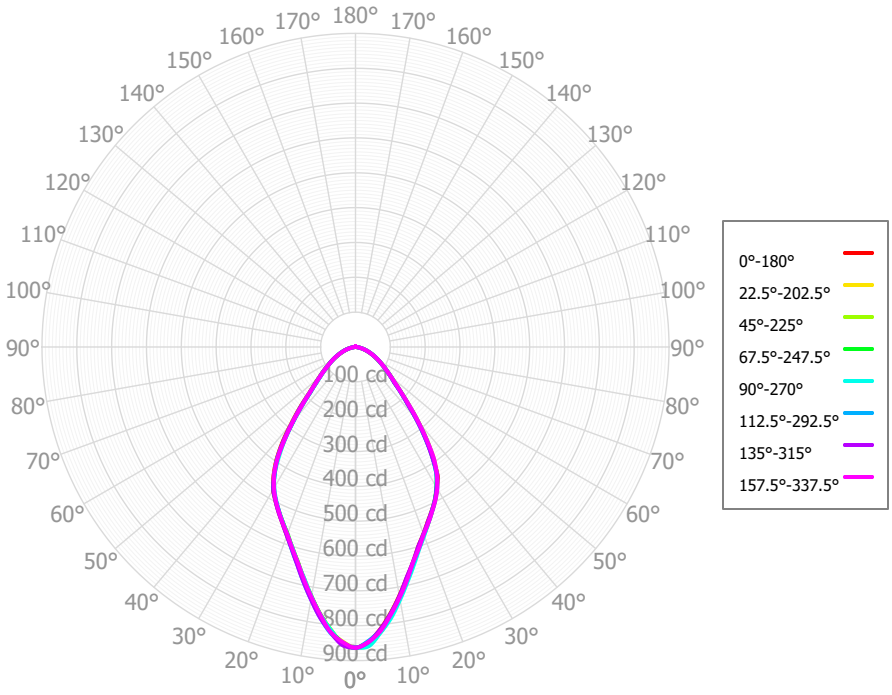
### Full Beam Angle

| | |
|---|---|
| **0° - 180°** | 66° |
| **90° - 270°** | 65° |

## IES File Header Contents

| Keyword | Value |
|---|---|
| TEST | SP-00684_2_M-20L |
| TESTLAB | Spectrum Lighting Photometric Lab, VLS-245-981 |
| MANUFAC | Spectrum Lighting |
| TESTDATE | 10/15/2019 |
| ISSUEDATE | 5/15/2020 |
| LUMCAT | AP12XT 20L 35HK EX CSD MWI |
| LUMINAIRE | Nom 12" diam x 12" H Aluminum reflector pendant |
| OTHER | Matte White finish - Interior, Khatod closed sphere optic, Open aperture |
| OTHER | Beam Angle: 65.6 degrees |
| LAMPCAT | N/A |
| LAMP | N/A, 19mm LES |
| OTHER | LEDXT lumen output is the same for all available CCT's |
| OTHER | Total luminaire wattage is approximate |
| OTHER | This report prepared by Spectrum Lighting, scaled from 30L |

## Candela Polar Plot




## Zonal Lumen Summary

| Zone | Lumens | % Fixture | Zone | Lumens | % Fixture |
|---|---|---|---|---|---|
| 0.00° - 10.00° | 76.20 | 7.14% | 90.00° - 100.00° | 1.03 | 0.10% |
| 10.00° - 20.00° | 180.24 | 16.89% | 100.00° - 110.00° | 0.96 | 0.09% |
| 20.00° - 30.00° | 239.22 | 22.42% | 100.00° - 120.00° | 1.88 | 0.18% |
| 30.00° - 40.00° | 237.47 | 22.26% | 120.00° - 130.00° | 0.81 | 0.08% |
| 40.00° - 50.00° | 147.87 | 13.86% | 130.00° - 140.00° | 0.73 | 0.07% |
| 50.00° - 60.00° | 91.08 | 8.54% | 140.00° - 150.00° | 0.59 | 0.06% |
| 60.00° - 70.00° | 55.94 | 5.24% | 150.00° - 160.00° | 0.46 | 0.04% |
| 70.00° - 80.00° | 26.86 | 2.52% | 160.00° - 170.00° | 0.28 | 0.03% |
| 80.00° - 90.00° | 6.18 | 0.58% | 170.00° - 180.00° | 0.10 | 0.01% |
| 0.00° - 90.00° | 1,061.05 | 99.45% | 0.00° - 180.00° | 1,066.94 | 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°** | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 | 863.22 |
| **2.50°** | 847.90 | 846.99 | 858.01 | 848.21 | 859.98 | 851.84 | 856.52 | 847.98 | 854.48 | 846.43 | 853.09 | 848.85 | 852.43 | 844.80 | 848.62 | 847.67 | 847.90 |
| **5.00°** | 813.59 | 821.19 | 819.12 | 821.57 | 823.25 | 824.12 | 821.66 | 821.61 | 818.69 | 819.58 | 814.02 | 817.00 | 815.51 | 816.34 | 814.63 | 819.18 | 813.59 |
| **7.50°** | 770.68 | 776.35 | 779.59 | 777.86 | 784.26 | 781.87 | 782.77 | 775.05 | 778.82 | 773.94 | 774.38 | 774.34 | 774.90 | 772.98 | 773.49 | 775.16 | 770.68 |
| **10.00°** | 725.05 | 731.29 | 732.10 | 732.55 | 736.54 | 735.18 | 735.75 | 728.70 | 731.76 | 728.33 | 727.29 | 727.77 | 727.78 | 728.69 | 726.51 | 730.10 | 725.05 |
| **12.50°** | 678.66 | 684.85 | 685.30 | 684.98 | 690.13 | 690.26 | 690.10 | 683.18 | 686.57 | 683.22 | 681.10 | 683.17 | 680.25 | 682.87 | 678.23 | 684.65 | 678.66 |
| **15.00°** | 638.61 | 640.51 | 643.26 | 642.50 | 647.48 | 645.75 | 646.68 | 640.26 | 644.04 | 639.25 | 641.29 | 639.12 | 641.56 | 640.81 | 638.51 | 639.57 | 638.61 |
| **17.50°** | 599.87 | 605.16 | 603.32 | 605.92 | 608.08 | 609.10 | 608.13 | 604.75 | 606.85 | 604.94 | 603.17 | 603.90 | 603.27 | 603.68 | 600.14 | 605.75 | 599.87 |
| **20.00°** | 570.46 | 572.00 | 573.57 | 573.96 | 576.20 | 573.72 | 576.01 | 572.21 | 575.81 | 571.92 | 573.43 | 570.50 | 573.98 | 571.70 | 571.31 | 572.60 | 570.46 |
| **22.50°** | 542.32 | 545.92 | 544.84 | 546.48 | 546.44 | 546.49 | 547.52 | 546.24 | 547.72 | 545.85 | 544.94 | 544.95 | 545.08 | 545.19 | 543.38 | 546.70 | 542.32 |
| **25.00°** | 518.21 | 520.18 | 519.69 | 519.81 | 520.56 | 520.04 | 522.91 | 520.68 | 522.47 | 520.30 | 520.89 | 520.47 | 520.18 | 519.69 | 518.73 | 520.97 | 518.21 |
| **27.50°** | 494.41 | 495.30 | 494.19 | 493.78 | 494.70 | 494.90 | 497.84 | 495.88 | 497.58 | 496.70 | 496.00 | 496.09 | 494.75 | 495.07 | 494.17 | 496.35 | 494.41 |
| **30.00°** | 467.15 | 467.63 | 467.74 | 464.28 | 468.84 | 469.70 | 472.36 | 467.62 | 472.96 | 470.04 | 468.85 | 471.72 | 466.04 | 465.43 | 466.13 | 469.76 | 467.15 |
| **32.50°** | 439.08 | 434.45 | 434.82 | 432.59 | 433.27 | 431.61 | 435.95 | 434.34 | 437.70 | 434.33 | 435.00 | 431.86 | 433.30 | 432.14 | 436.52 | 434.19 | 439.08 |
| **35.00°** | 384.92 | 392.06 | 388.00 | 385.88 | 386.06 | 392.33 | 391.53 | 389.97 | 395.69 | 392.27 | 386.57 | 391.15 | 382.60 | 383.92 | 382.86 | 393.55 | 384.92 |
| **37.50°** | 330.67 | 335.11 | 337.12 | 331.29 | 333.76 | 334.15 | 338.79 | 332.57 | 343.56 | 335.65 | 335.38 | 333.69 | 330.73 | 326.95 | 329.04 | 336.02 | 330.67 |
| **40.00°** | 275.35 | 280.32 | 279.32 | 277.72 | 276.36 | 276.89 | 281.13 | 277.99 | 286.12 | 280.73 | 279.40 | 276.92 | 275.04 | 273.11 | 273.97 | 280.53 | 275.35 |
| **42.50°** | 222.43 | 228.36 | 228.31 | 224.58 | 226.94 | 227.52 | 231.82 | 226.18 | 236.02 | 228.91 | 229.22 | 228.09 | 223.89 | 220.72 | 221.73 | 230.25 | 222.43 |
| **45.00°** | 185.51 | 187.03 | 186.66 | 186.34 | 184.03 | 181.86 | 186.58 | 186.11 | 188.97 | 186.51 | 187.13 | 182.35 | 184.09 | 183.28 | 184.67 | 186.75 | 185.51 |
| **47.50°** | 151.73 | 157.07 | 154.62 | 152.85 | 154.38 | 156.36 | 157.65 | 155.44 | 159.78 | 158.29 | 154.78 | 157.12 | 151.01 | 151.48 | 151.35 | 157.24 | 151.73 |
| **50.00°** | 132.81 | 133.75 | 133.65 | 131.73 | 133.49 | 132.79 | 134.93 | 132.96 | 136.28 | 134.88 | 133.79 | 133.34 | 131.55 | 130.87 | 132.24 | 132.40 | 132.81 |
| **52.50°** | 114.84 | 116.21 | 115.52 | 113.64 | 116.01 | 116.63 | 117.09 | 115.81 | 118.44 | 117.32 | 116.15 | 116.42 | 114.28 | 113.46 | 114.38 | 115.24 | 114.84 |
| **55.00°** | 100.11 | 101.25 | 100.06 | 99.39 | 100.41 | 101.27 | 100.66 | 100.90 | 101.99 | 101.97 | 101.70 | 100.52 | 100.53 | 99.87 | 100.09 | 100.16 | 100.11 |
| **57.50°** | 86.36 | 88.15 | 87.20 | 85.80 | 87.23 | 88.32 | 88.74 | 87.19 | 89.36 | 88.82 | 88.75 | 88.06 | 87.62 | 87.06 | 86.75 | 87.83 | 86.36 |
| **60.00°** | 75.16 | 76.39 | 76.32 | 74.97 | 75.10 | 76.09 | 77.79 | 75.81 | 77.38 | 76.85 | 76.96 | 76.19 | 75.83 | 76.03 | 75.61 | 76.45 | 75.16 |
| **62.50°** | 64.58 | 65.41 | 65.89 | 64.42 | 65.69 | 65.52 | 67.31 | 65.43 | 66.77 | 65.84 | 65.95 | 65.86 | 65.49 | 65.26 | 64.87 | 66.13 | 64.58 |
| **65.00°** | 55.34 | 55.63 | 55.73 | 55.69 | 57.17 | 55.87 | 56.89 | 55.79 | 56.29 | 56.24 | 55.45 | 56.00 | 56.75 | 56.30 | 54.85 | 56.66 | 55.34 |
| **67.50°** | 46.34 | 46.40 | 46.70 | 47.06 | 48.28 | 47.92 | 48.01 | 46.39 | 47.63 | 47.59 | 46.89 | 47.16 | 48.18 | 47.49 | 45.91 | 47.97 | 46.34 |
| **70.00°** | 37.77 | 38.77 | 38.23 | 39.19 | 39.28 | 40.49 | 39.26 | 38.72 | 39.07 | 39.90 | 39.34 | 38.89 | 39.77 | 39.61 | 38.54 | 39.60 | 37.77 |
| **72.50°** | 30.35 | 31.75 | 30.99 | 31.39 | 32.09 | 33.85 | 32.25 | 31.49 | 32.76 | 32.73 | 32.22 | 31.57 | 32.11 | 31.77 | 31.57 | 31.48 | 30.35 |
| **75.00°** | 24.47 | 24.54 | 24.23 | 24.80 | 25.23 | 26.97 | 25.32 | 24.66 | 26.46 | 26.13 | 25.27 | 24.82 | 24.99 | 25.00 | 25.10 | 24.52 | 24.47 |
| **77.50°** | 18.62 | 17.28 | 18.53 | 18.34 | 19.56 | 19.81 | 19.57 | 17.91 | 20.30 | 19.77 | 18.63 | 18.81 | 18.66 | 18.32 | 18.71 | 18.28 | 18.62 |
| **80.00°** | 12.78 | 12.08 | 13.16 | 13.00 | 14.04 | 13.69 | 13.90 | 12.98 | 14.26 | 13.88 | 12.08 | 13.42 | 12.80 | 12.73 | 12.42 | 13.18 | 12.78 |
| **82.50°** | 8.11 | 7.31 | 8.73 | 8.01 | 9.07 | 8.60 | 9.45 | 8.25 | 9.25 | 8.15 | 7.70 | 8.71 | 8.23 | 7.49 | 7.71 | 8.64 | 8.11 |
| **85.00°** | 4.53 | 4.52 | 4.53 | 5.07 | 4.13 | 5.09 | 5.25 | 5.02 | 4.70 | 5.00 | 3.83 | 5.14 | 4.28 | 4.67 | 4.28 | 5.27 | 4.53 |
| **87.50°** | 2.43 | 2.03 | 2.79 | 2.52 | 2.58 | 2.89 | 2.96 | 1.87 | 2.78 | 2.52 | 2.18 | 2.61 | 2.30 | 2.21 | 2.25 | 2.36 | 2.43 |
| **90.00°** | 1.44 | 1.33 | 1.45 | 1.53 | 1.12 | 1.67 | 1.03 | 1.28 | 1.19 | 1.61 | 0.89 | 1.30 | 1.06 | 1.51 | 1.16 | 1.36 | 1.44 |
| **92.50°** | 1.05 | 0.77 | 1.04 | 0.79 | 1.10 | 1.11 | 0.94 | 0.73 | 0.89 | 1.01 | 0.83 | 0.92 | 0.72 | 0.94 | 0.80 | 0.95 | 1.05 |
| **95.00°** | 1.02 | 0.82 | 0.71 | 0.82 | 1.07 | 1.00 | 0.84 | 0.85 | 0.68 | 0.91 | 0.90 | 0.73 | 0.64 | 0.86 | 0.83 | 0.95 | 1.02 |
| **97.50°** | 0.98 | 0.88 | 0.87 | 0.92 | 0.96 | 1.15 | 0.75 | 0.94 | 0.74 | 0.86 | 1.03 | 0.68 | 0.79 | 0.79 | 0.85 | 1.04 | 0.98 |
| **100.00°** | 0.96 | 0.91 | 1.05 | 1.19 | 0.86 | 1.05 | 0.74 | 0.81 | 0.77 | 0.91 | 1.15 | 0.66 | 1.01 | 0.79 | 0.85 | 1.01 | 0.96 |
| **102.50°** | 0.98 | 0.93 | 0.84 | 1.30 | 0.87 | 0.84 | 0.93 | 0.71 | 0.72 | 0.96 | 1.10 | 0.67 | 1.03 | 0.83 | 0.82 | 0.96 | 0.98 |
| **105.00°** | 1.03 | 0.88 | 0.65 | 1.13 | 0.87 | 0.80 | 1.05 | 0.83 | 0.69 | 1.00 | 1.04 | 0.69 | 1.04 | 0.95 | 0.77 | 1.00 | 1.03 |
| **107.50°** | 0.94 | 0.83 | 0.81 | 0.97 | 0.85 | 0.81 | 0.99 | 0.92 | 0.71 | 1.04 | 0.93 | 0.72 | 0.95 | 0.99 | 0.96 | 1.04 | 0.94 |
| **110.00°** | 0.80 | 0.83 | 0.97 | 0.82 | 0.83 | 0.79 | 0.95 | 0.91 | 0.75 | 1.17 | 0.84 | 0.68 | 0.85 | 0.90 | 1.21 | 1.16 | 0.80 |
| **112.50°** | 0.90 | 0.83 | 1.00 | 0.88 | 0.82 | 0.76 | 0.92 | 0.92 | 0.81 | 1.27 | 0.77 | 0.61 | 1.01 | 0.88 | 1.04 | 1.27 | 0.90 |

## Coefficients of Utilization – Zonal Cavity Method

Values are lumens delivered to the workplane.

| | ρfc | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 0% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ρcc | 80% | 80% | 80% | 80% | 70% | 70% | 70% | 70% | 50% | 50% | 50% | 30% | 30% | 30% | 10% | 10% | 10% | 0% |
| | ρw | 70% | 50% | 30% | 10% | 70% | 50% | 30% | 10% | 50% | 30% | 10% | 50% | 30% | 10% | 50% | 30% | 10% | 30% |
| | 0 | 1,269 | 1,269 | 1,269 | 1,269 | 1,239 | 1,239 | 1,239 | 1,239 | 1,182 | 1,182 | 1,182 | 1,131 | 1,131 | 1,131 | 1,083 | 1,083 | 1,083 | 1,061 |
| | 1 | 1,188 | 1,149 | 1,114 | 1,083 | 1,160 | 1,125 | 1,093 | 1,065 | 1,079 | 1,054 | 1,030 | 1,038 | 1,017 | 998 | 1,000 | 983 | 968 | 963 |
| | 2 | 1,106 | 1,038 | 981 | 934 | 1,080 | 1,018 | 966 | 923 | 981 | 938 | 901 | 947 | 911 | 880 | 915 | 886 | 860 | 868 |
| | 3 | 1,030 | 941 | 872 | 817 | 1,006 | 925 | 861 | 810 | 894 | 840 | 796 | 866 | 820 | 782 | 840 | 801 | 769 | 785 |
| | 4 | 961 | 858 | 782 | 725 | 939 | 844 | 774 | 720 | 819 | 758 | 710 | 795 | 743 | 700 | 773 | 728 | 691 | 713 |
| RCR | 5 | 898 | 786 | 707 | 649 | 878 | 774 | 701 | 645 | 753 | 688 | 639 | 733 | 676 | 632 | 714 | 665 | 625 | 652 |
| | 6 | 841 | 723 | 643 | 586 | 823 | 713 | 638 | 584 | 695 | 629 | 579 | 678 | 619 | 574 | 662 | 610 | 569 | 598 |
| | 7 | 790 | 668 | 589 | 534 | 773 | 660 | 585 | 532 | 644 | 577 | 528 | 630 | 570 | 525 | 616 | 562 | 521 | 552 |
| | 8 | 743 | 620 | 542 | 489 | 728 | 613 | 539 | 488 | 599 | 533 | 485 | 587 | 526 | 482 | 575 | 520 | 479 | 511 |
| | 9 | 701 | 577 | 502 | 450 | 687 | 571 | 499 | 449 | 560 | 494 | 447 | 549 | 488 | 445 | 538 | 483 | 443 | 475 |
| | 10 | 663 | 540 | 466 | 417 | 650 | 534 | 464 | 416 | 524 | 459 | 414 | 515 | 455 | 413 | 506 | 451 | 411 | 443 |

## Cone of Light

| Mtg Height | Light Level | Beam Diameter |
|---|---|---|
| 5.5 ft | 28.5 fc | 7.1 ft |
| 6.5 ft | 20.4 fc | 8.4 ft |
| 7.5 ft | 15.3 fc | 9.7 ft |
| 8.0 ft | 13.5 fc | 10.3 ft |
| 10.0 ft | 8.6 fc | 12.9 ft |
| 12.0 ft | 6.0 fc | 15.5 ft |
| 14.0 ft | 4.4 fc | 18.1 ft |
| 16.0 ft | 3.4 fc | 20.7 ft |
| 20.0 ft | 2.2 fc | 25.8 ft |
| 24.0 ft | 1.5 fc | 31.0 ft |
| 28.0 ft | 1.1 fc | 36.2 ft |

## Average Luminaire Luminance [cd/m²]

| | 0.00° | 45.00° | 90.00° |
|---|---|---|---|
| 0.00° | 11,831 | 11,831 | 11,831 |
| 45.00° | 3,596 | 3,618 | 3,567 |
| 55.00° | 2,392 | 2,391 | 2,399 |
| 65.00° | 1,794 | 1,807 | 1,854 |
| 75.00° | 1,296 | 1,283 | 1,336 |
| 85.00° | 712 | 713 | 650 |

## UGR CIE 190:2010

| Ceiling reflectance | | 0.7 | 0.7 | 0.5 | 0.5 | 0.3 | 0.7 | 0.7 | 0.5 | 0.5 | 0.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wall reflectance | | 0.5 | 0.3 | 0.5 | 0.3 | 0.3 | 0.5 | 0.3 | 0.5 | 0.3 | 0.3 |
| Plane reflectance | | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Room dimensions | | Viewed crosswise | | | | | Viewed endwise | | | | |
| 2H | 2H | 12.1 | 13.4 | 12.4 | 13.7 | 14.0 | 12.1 | 13.4 | 12.5 | 13.7 | 14.1 |
| | 3H | 13.3 | 14.4 | 13.6 | 14.8 | 15.1 | 13.3 | 14.5 | 13.7 | 14.8 | 15.2 |
| | 4H | 13.6 | 14.7 | 14.1 | 15.1 | 15.5 | 13.7 | 14.8 | 14.2 | 15.2 | 15.6 |
| | 6H | 13.9 | 14.9 | 14.3 | 15.2 | 15.7 | 14.0 | 15.0 | 14.4 | 15.4 | 15.8 |
| | 8H | 13.9 | 14.9 | 14.3 | 15.3 | 15.7 | 14.0 | 15.0 | 14.5 | 15.4 | 15.8 |
| | 12H | 13.9 | 14.8 | 14.4 | 15.2 | 15.7 | 14.0 | 14.9 | 14.5 | 15.3 | 15.8 |
| 4H | 2H | 12.5 | 13.5 | 12.9 | 13.9 | 14.3 | 12.5 | 13.6 | 12.9 | 13.9 | 14.3 |
| | 3H | 13.8 | 14.7 | 14.3 | 15.2 | 15.6 | 13.9 | 14.8 | 14.4 | 15.2 | 15.7 |
| | 4H | 14.3 | 15.1 | 14.8 | 15.6 | 16.0 | 14.5 | 15.3 | 14.9 | 15.7 | 16.1 |
| | 6H | 14.6 | 15.3 | 15.1 | 15.8 | 16.3 | 14.8 | 15.5 | 15.3 | 15.9 | 16.4 |
| | 8H | 14.7 | 15.3 | 15.2 | 15.8 | 16.3 | 14.9 | 15.5 | 15.3 | 16.0 | 16.4 |
| | 12H | 14.7 | 15.3 | 15.2 | 15.8 | 16.3 | 14.9 | 15.5 | 15.4 | 16.0 | 16.4 |
| 8H | 4H | 14.5 | 15.1 | 14.9 | 15.6 | 16.1 | 14.6 | 15.2 | 15.1 | 15.7 | 16.2 |
| | 6H | 14.8 | 15.4 | 15.4 | 15.9 | 16.4 | 15.0 | 15.5 | 15.5 | 16.0 | 16.5 |
| | 8H | 15.0 | 15.4 | 15.5 | 15.9 | 16.5 | 15.1 | 15.6 | 15.7 | 16.1 | 16.6 |
| | 12H | 15.0 | 15.4 | 15.6 | 15.9 | 16.5 | 15.2 | 15.6 | 15.7 | 16.1 | 16.7 |
| 12H | 4H | 14.5 | 15.0 | 14.9 | 15.5 | 16.0 | 14.6 | 15.2 | 15.1 | 15.6 | 16.1 |
| | 6H | 14.9 | 15.3 | 15.4 | 15.8 | 16.4 | 15.0 | 15.5 | 15.6 | 16.0 | 16.5 |
| | 8H | 15.0 | 15.4 | 15.5 | 15.9 | 16.5 | 15.2 | 15.6 | 15.7 | 16.1 | 16.7 |

Corrected UGR values based on total output lumens

SHR = 1.0