## Indoor Distribution Test Report

# Spectrum Lighting Inc.

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## Spectrum Lighting Photometric Lab

**Luminaire**

SN24 20L 30HK xx xx xx MWI

24" x 23.5" Spin Pendant 20L 30HK MWI

**Test Number**

SP-01611_1

**Test Date**

11/6/2023

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

## Summary of Results

### Power

| | |
|---|---|
| **Input Watts** | 19.4 W |

### Lumen Output

| | |
|---|---|
| **Output Lumens** | 2044 |
| **Efficacy** | 105.39 lm/W |

### Luminous Dimensions

| | |
|---|---|
| **0° - 180° Size** | -2 |
| **90° - 270° Size** | -2 |
| **Height** | 0 |

### Spacing Criterion

| | |
|---|---|
| **Two luminaires, plane 0°** | 1.03 |
| **Two luminaires, plane 90°** | 1.1 |
| **Four luminaires** | 1.16 |

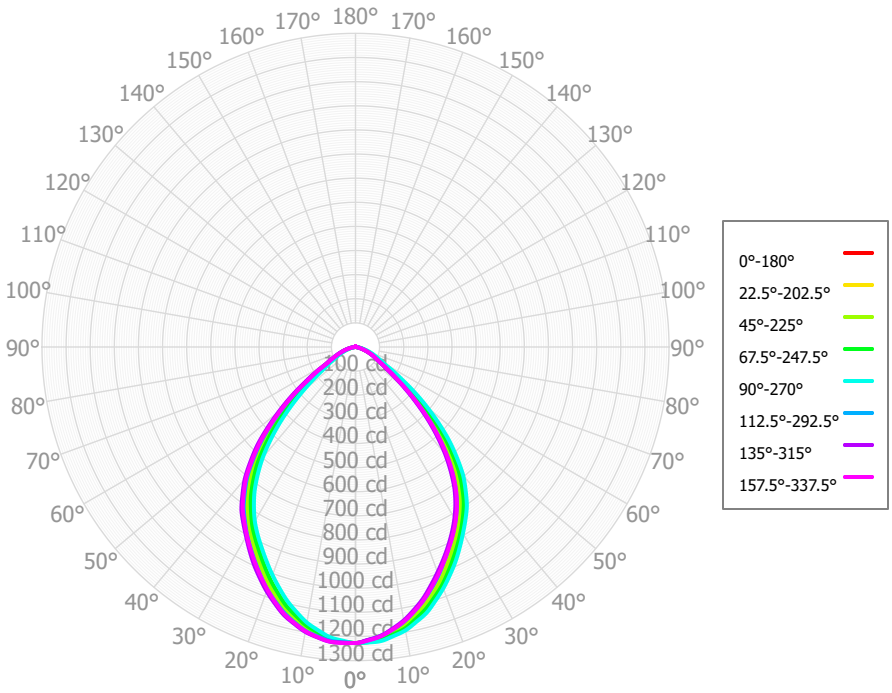
### Full Beam Angle

| | |
|---|---|
| **0° - 180°** | 82° |
| **90° - 270°** | 82° |

## IES File Header Contents

| Keyword | Value |
|---|---|
| TEST | SP-01611_1 |
| TESTLAB | Spectrum Lighting Photometric Lab, VLS-245-981 |
| MANUFAC | Spectrum Lighting |
| TESTDATE | 11/6/2023 |
| ISSUEDATE | 11/07/2023 |
| LUMCAT | SN24 20L 30HK xx xx xx MWI |
| LUMINAIRE | 24" x 23.5" Spin Pendant 20L 30HK MWI |
| OTHER | Beam Angle: 82 deg |
| OTHER | 90 CRI, 3000K tested |
| OTHER | CCT Output Multipliers: 27HK x 0.99, 35HK x 1.01 |
| OTHER | Total luminaire wattages are approximate |
| OTHER | This report prepared by Spectrum Lighting |
| _CRI | 90+ |

## Candela Polar Plot




## Zonal Lumen Summary

| Zone | Lumens | % Fixture | Zone | Lumens | % Fixture |
|---|---|---|---|---|---|
| 0.00° - 10.00° | 116.32 | 5.69% | 90.00° - 100.00° | 1.55 | 0.08% |
| 10.00° - 20.00° | 312.71 | 15.30% | 100.00° - 110.00° | 1.49 | 0.07% |
| 20.00° - 30.00° | 437.36 | 21.39% | 100.00° - 120.00° | 2.92 | 0.14% |
| 30.00° - 40.00° | 476.44 | 23.30% | 120.00° - 130.00° | 1.35 | 0.07% |
| 40.00° - 50.00° | 379.42 | 18.56% | 130.00° - 140.00° | 1.20 | 0.06% |
| 50.00° - 60.00° | 189.26 | 9.26% | 140.00° - 150.00° | 0.93 | 0.05% |
| 60.00° - 70.00° | 82.91 | 4.06% | 150.00° - 160.00° | 0.74 | 0.04% |
| 70.00° - 80.00° | 34.20 | 1.67% | 160.00° - 170.00° | 0.46 | 0.02% |
| 80.00° - 90.00° | 6.57 | 0.32% | 170.00° - 180.00° | 0.16 | 0.01% |
| 0.00° - 90.00° | 2035.20 | 99.55% | 0.00° - 180.00° | 2044.49 | 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°** | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 | 1227.57 |
| **2.50°** | 1216.77 | 1219.60 | 1221.73 | 1225.07 | 1226.43 | 1226.33 | 1226.81 | 1228.63 | 1226.04 | 1224.65 | 1223.13 | 1223.04 | 1218.85 | 1216.18 | 1215.21 | 1218.08 | 1216.77 |
| **5.00°** | 1205.23 | 1209.08 | 1213.82 | 1218.06 | 1223.65 | 1222.20 | 1226.55 | 1225.81 | 1223.41 | 1218.84 | 1217.61 | 1213.95 | 1208.00 | 1202.77 | 1202.20 | 1204.40 | 1205.23 |
| **7.50°** | 1182.38 | 1190.55 | 1194.25 | 1202.06 | 1208.92 | 1209.97 | 1214.26 | 1212.86 | 1211.88 | 1203.67 | 1200.96 | 1193.26 | 1185.01 | 1182.01 | 1177.92 | 1181.83 | 1182.38 |
| **10.00°** | 1156.81 | 1170.12 | 1172.47 | 1184.83 | 1193.22 | 1195.00 | 1199.50 | 1196.43 | 1196.42 | 1187.75 | 1182.43 | 1172.32 | 1160.42 | 1157.24 | 1151.26 | 1155.96 | 1156.81 |
| **12.50°** | 1124.59 | 1138.60 | 1142.72 | 1155.41 | 1167.21 | 1169.65 | 1175.49 | 1171.90 | 1169.94 | 1157.46 | 1153.66 | 1141.47 | 1126.27 | 1124.01 | 1117.05 | 1123.34 | 1124.59 |
| **15.00°** | 1090.98 | 1105.48 | 1110.95 | 1125.16 | 1140.66 | 1141.25 | 1149.87 | 1144.90 | 1140.69 | 1126.37 | 1123.47 | 1110.35 | 1090.77 | 1088.56 | 1080.46 | 1087.62 | 1090.98 |
| **17.50°** | 1048.71 | 1064.52 | 1072.70 | 1088.50 | 1102.86 | 1106.14 | 1114.48 | 1108.57 | 1104.57 | 1088.77 | 1084.92 | 1069.69 | 1048.71 | 1048.96 | 1037.29 | 1046.13 | 1048.71 |
| **20.00°** | 1004.94 | 1023.19 | 1032.65 | 1050.79 | 1064.75 | 1069.30 | 1077.72 | 1069.78 | 1067.07 | 1051.00 | 1045.48 | 1028.85 | 1006.34 | 1007.08 | 994.37 | 1003.95 | 1004.94 |
| **22.50°** | 960.12 | 980.34 | 987.51 | 1006.70 | 1023.09 | 1027.21 | 1036.99 | 1028.29 | 1026.51 | 1007.34 | 1003.05 | 984.37 | 962.64 | 961.31 | 952.11 | 960.62 | 960.12 |
| **25.00°** | 915.14 | 937.79 | 943.08 | 962.70 | 981.35 | 983.94 | 995.82 | 986.17 | 984.73 | 963.68 | 960.38 | 940.09 | 919.49 | 917.01 | 909.47 | 917.75 | 915.14 |
| **27.50°** | 873.18 | 896.31 | 900.43 | 919.19 | 936.28 | 941.30 | 951.56 | 943.51 | 940.54 | 920.99 | 916.13 | 898.27 | 878.33 | 874.98 | 866.01 | 875.56 | 873.18 |
| **30.00°** | 831.57 | 853.57 | 857.05 | 875.38 | 891.30 | 898.77 | 907.06 | 900.74 | 897.35 | 878.22 | 871.79 | 855.73 | 834.85 | 830.26 | 820.50 | 830.81 | 831.57 |
| **32.50°** | 781.31 | 806.85 | 812.08 | 830.31 | 848.45 | 853.66 | 865.77 | 857.96 | 855.95 | 833.53 | 826.76 | 806.45 | 783.95 | 781.75 | 770.90 | 782.58 | 781.31 |
| **35.00°** | 730.32 | 756.16 | 761.93 | 782.61 | 804.82 | 808.16 | 824.67 | 815.17 | 810.21 | 787.98 | 781.70 | 755.82 | 729.63 | 726.38 | 715.14 | 727.09 | 730.32 |
| **37.50°** | 663.79 | 694.33 | 701.39 | 724.96 | 750.25 | 753.04 | 769.59 | 760.09 | 757.49 | 730.45 | 722.55 | 695.42 | 665.77 | 662.33 | 648.37 | 662.54 | 663.79 |
| **40.00°** | 596.40 | 628.28 | 636.03 | 663.55 | 694.15 | 696.72 | 714.10 | 703.35 | 698.69 | 671.47 | 663.07 | 632.78 | 598.10 | 592.29 | 577.66 | 592.45 | 596.40 |
| **42.50°** | 517.19 | 551.63 | 561.92 | 589.86 | 622.27 | 625.32 | 644.66 | 632.54 | 631.08 | 597.67 | 588.41 | 556.72 | 520.87 | 515.30 | 500.63 | 516.02 | 517.19 |
| **45.00°** | 437.59 | 474.03 | 485.11 | 514.02 | 549.32 | 552.45 | 574.94 | 560.28 | 558.05 | 523.12 | 513.48 | 479.73 | 442.39 | 436.40 | 422.24 | 437.39 | 437.59 |
| **47.50°** | 360.42 | 394.34 | 403.92 | 431.89 | 468.07 | 472.02 | 493.18 | 478.58 | 477.84 | 442.76 | 432.63 | 398.02 | 361.12 | 355.51 | 341.87 | 356.49 | 360.42 |
| **50.00°** | 283.49 | 317.53 | 325.39 | 352.15 | 387.33 | 391.09 | 411.61 | 396.19 | 397.96 | 363.05 | 352.28 | 318.60 | 285.05 | 281.20 | 268.40 | 282.22 | 283.49 |
| **52.50°** | 221.18 | 246.51 | 250.83 | 278.63 | 309.86 | 316.46 | 334.33 | 318.87 | 318.47 | 287.53 | 278.82 | 248.89 | 219.43 | 213.23 | 204.21 | 214.14 | 221.18 |
| **55.00°** | 160.24 | 186.25 | 189.69 | 212.11 | 236.11 | 242.11 | 258.26 | 241.80 | 247.43 | 216.25 | 207.95 | 185.65 | 165.18 | 162.66 | 155.16 | 163.28 | 160.24 |
| **57.50°** | 131.16 | 145.35 | 146.58 | 161.75 | 181.79 | 187.19 | 199.38 | 188.56 | 185.64 | 167.03 | 163.98 | 145.84 | 131.34 | 127.43 | 124.42 | 127.13 | 131.16 |
| **60.00°** | 102.96 | 113.23 | 114.71 | 121.82 | 133.70 | 132.78 | 143.56 | 135.96 | 140.09 | 123.20 | 122.72 | 111.35 | 103.97 | 102.68 | 100.72 | 102.90 | 102.96 |
| **62.50°** | 87.78 | 95.49 | 96.64 | 103.26 | 113.55 | 112.34 | 119.43 | 113.71 | 110.85 | 103.38 | 102.75 | 93.97 | 87.15 | 86.26 | 84.83 | 88.01 | 87.78 |
| **65.00°** | 72.69 | 78.77 | 80.10 | 85.69 | 94.50 | 92.08 | 96.22 | 91.66 | 89.41 | 84.62 | 83.59 | 77.88 | 71.52 | 71.48 | 69.92 | 73.40 | 72.69 |
| **67.50°** | 58.37 | 63.55 | 65.24 | 69.96 | 79.67 | 77.45 | 80.50 | 76.30 | 75.04 | 69.88 | 69.47 | 65.54 | 57.65 | 57.89 | 55.99 | 58.97 | 58.37 |
| **70.00°** | 44.40 | 50.05 | 51.69 | 55.54 | 65.18 | 62.99 | 65.14 | 61.15 | 61.63 | 55.84 | 55.73 | 53.28 | 45.14 | 45.70 | 43.42 | 45.82 | 44.40 |
| **72.50°** | 33.18 | 38.87 | 39.47 | 43.37 | 51.78 | 51.73 | 52.21 | 50.23 | 49.02 | 44.15 | 44.00 | 41.23 | 34.48 | 34.42 | 32.11 | 33.50 | 33.18 |
| **75.00°** | 22.64 | 29.13 | 29.08 | 32.58 | 39.08 | 40.53 | 39.84 | 39.34 | 37.68 | 33.03 | 32.66 | 30.15 | 24.75 | 24.45 | 22.98 | 23.73 | 22.64 |
| **77.50°** | 16.41 | 21.14 | 20.39 | 23.91 | 28.38 | 29.96 | 30.46 | 28.82 | 27.30 | 23.56 | 23.11 | 21.29 | 16.19 | 15.26 | 15.67 | 15.45 | 16.41 |
| **80.00°** | 10.45 | 13.99 | 13.44 | 16.23 | 18.89 | 19.72 | 21.46 | 18.62 | 19.18 | 15.19 | 14.42 | 13.66 | 9.88 | 9.09 | 9.72 | 9.41 | 10.45 |
| **82.50°** | 5.98 | 7.75 | 7.97 | 9.92 | 12.51 | 12.46 | 14.15 | 11.42 | 12.61 | 9.66 | 9.04 | 8.52 | 6.05 | 4.53 | 4.80 | 4.54 | 5.98 |
| **85.00°** | 2.19 | 3.80 | 4.42 | 5.27 | 7.04 | 5.80 | 7.71 | 4.86 | 7.63 | 5.09 | 4.49 | 4.58 | 3.40 | 2.49 | 2.33 | 2.46 | 2.19 |
| **87.50°** | 1.50 | 2.20 | 2.38 | 2.70 | 3.71 | 3.51 | 4.71 | 3.11 | 3.64 | 2.74 | 2.71 | 2.84 | 1.91 | 1.66 | 1.52 | 1.70 | 1.50 |
| **90.00°** | 1.00 | 1.47 | 1.53 | 1.50 | 1.43 | 1.52 | 2.27 | 1.60 | 2.02 | 1.15 | 1.33 | 1.70 | 1.24 | 1.27 | 1.17 | 1.47 | 1.00 |
| **92.50°** | 1.25 | 1.53 | 1.51 | 1.89 | 1.34 | 1.33 | 1.70 | 1.52 | 1.74 | 1.13 | 1.13 | 1.56 | 1.32 | 1.07 | 1.11 | 1.45 | 1.25 |
| **95.00°** | 1.41 | 1.57 | 1.58 | 1.95 | 1.28 | 1.20 | 1.24 | 1.46 | 1.53 | 1.16 | 1.01 | 1.46 | 1.35 | 1.31 | 1.25 | 1.50 | 1.41 |
| **97.50°** | 1.26 | 1.59 | 1.70 | 1.67 | 1.28 | 1.36 | 1.13 | 1.51 | 1.36 | 1.27 | 1.07 | 1.41 | 1.34 | 1.73 | 1.51 | 1.57 | 1.26 |
| **100.00°** | 1.21 | 1.47 | 1.55 | 1.54 | 1.30 | 1.48 | 1.06 | 1.56 | 1.40 | 1.41 | 1.19 | 1.34 | 1.23 | 1.73 | 1.61 | 1.56 | 1.21 |
| **102.50°** | 1.45 | 1.24 | 1.26 | 1.53 | 1.36 | 1.43 | 1.11 | 1.55 | 1.52 | 1.61 | 1.47 | 1.23 | 1.04 | 1.59 | 1.64 | 1.54 | 1.45 |
| **105.00°** | 1.64 | 1.23 | 1.10 | 1.56 | 1.34 | 1.41 | 1.17 | 1.51 | 1.33 | 1.76 | 1.58 | 1.39 | 1.15 | 1.42 | 1.49 | 1.47 | 1.64 |

## 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 | 2432 | 2432 | 2432 | 2432 | 2374 | 2374 | 2374 | 2374 | 2266 | 2266 | 2266 | 2168 | 2168 | 2168 | 2078 | 2078 | 2078 | 2035 |
| | 1 | 2279 | 2206 | 2140 | 2081 | 2225 | 2160 | 2100 | 2046 | 2073 | 2025 | 1981 | 1994 | 1956 | 1920 | 1921 | 1891 | 1862 | 1851 |
| | 2 | 2121 | 1991 | 1883 | 1793 | 2071 | 1953 | 1855 | 1771 | 1883 | 1801 | 1730 | 1818 | 1750 | 1690 | 1758 | 1702 | 1653 | 1666 |
| | 3 | 1973 | 1801 | 1668 | 1563 | 1926 | 1770 | 1647 | 1549 | 1712 | 1607 | 1522 | 1657 | 1569 | 1495 | 1607 | 1533 | 1470 | 1501 |
| | 4 | 1835 | 1635 | 1489 | 1377 | 1793 | 1609 | 1473 | 1368 | 1560 | 1443 | 1349 | 1515 | 1414 | 1331 | 1473 | 1386 | 1314 | 1357 |
| RCR | 5 | 1710 | 1491 | 1338 | 1225 | 1671 | 1469 | 1326 | 1218 | 1428 | 1302 | 1205 | 1389 | 1279 | 1193 | 1354 | 1258 | 1181 | 1232 |
| | 6 | 1596 | 1365 | 1210 | 1098 | 1561 | 1347 | 1200 | 1094 | 1311 | 1181 | 1084 | 1279 | 1163 | 1075 | 1248 | 1146 | 1066 | 1124 |
| | 7 | 1493 | 1255 | 1100 | 992 | 1461 | 1239 | 1093 | 989 | 1209 | 1078 | 982 | 1181 | 1063 | 975 | 1155 | 1049 | 968 | 1030 |
| | 8 | 1400 | 1158 | 1006 | 902 | 1370 | 1145 | 1000 | 899 | 1119 | 988 | 894 | 1095 | 976 | 889 | 1072 | 964 | 884 | 947 |
| | 9 | 1316 | 1073 | 925 | 824 | 1289 | 1062 | 919 | 822 | 1039 | 909 | 818 | 1018 | 900 | 814 | 998 | 890 | 811 | 875 |
| | 10 | 1239 | 998 | 854 | 758 | 1215 | 988 | 849 | 756 | 968 | 841 | 753 | 950 | 833 | 750 | 933 | 825 | 747 | 811 |

## Cone of Light

| Mtg Height | Light Level | Beam Diameter |
|---|---|---|
| 5.5 ft | 40.6 fc | 9.6 ft |
| 6.5 ft | 29.1 fc | 11.4 ft |
| 7.5 ft | 21.8 fc | 13.2 ft |
| 8.0 ft | 19.2 fc | 14.0 ft |
| 10.0 ft | 12.3 fc | 17.5 ft |
| 12.0 ft | 8.5 fc | 21.1 ft |
| 14.0 ft | 6.3 fc | 24.6 ft |
| 16.0 ft | 4.8 fc | 28.1 ft |
| 20.0 ft | 3.1 fc | 35.1 ft |
| 24.0 ft | 2.1 fc | 42.1 ft |
| 28.0 ft | 1.6 fc | 49.1 ft |

## Average Luminaire Luminance [cd/m²]

| | 0.00° | 45.00° | 90.00° |
|---|---|---|---|
| 0.00° | 4206 | 4206 | 4206 |
| 45.00° | 2120 | 2351 | 2662 |
| 55.00° | 957 | 1133 | 1410 |
| 65.00° | 589 | 649 | 766 |
| 75.00° | 300 | 385 | 517 |
| 85.00° | 86 | 174 | 277 |

## 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 | 7.9 | 9.3 | 8.3 | 9.6 | 9.9 | 9.3 | 10.7 | 9.7 | 11.0 | 11.3 |
| | 3H | 8.7 | 9.9 | 9.1 | 10.3 | 10.6 | 10.1 | 11.3 | 10.5 | 11.6 | 12.0 |
| | 4H | 8.9 | 10.0 | 9.3 | 10.4 | 10.8 | 10.3 | 11.4 | 10.7 | 11.8 | 12.2 |
| | 6H | 9.0 | 10.0 | 9.4 | 10.3 | 10.8 | 10.4 | 11.4 | 10.8 | 11.8 | 12.2 |
| | 8H | 8.9 | 9.9 | 9.4 | 10.3 | 10.7 | 10.4 | 11.4 | 10.9 | 11.8 | 12.2 |
| | 12H | 8.9 | 9.8 | 9.4 | 10.2 | 10.7 | 10.4 | 11.3 | 10.8 | 11.7 | 12.2 |
| 4H | 2H | 8.2 | 9.3 | 8.6 | 9.7 | 10.1 | 9.6 | 10.7 | 10.0 | 11.1 | 11.4 |
| | 3H | 9.2 | 10.1 | 9.6 | 10.5 | 10.9 | 10.6 | 11.5 | 11.0 | 11.9 | 12.3 |
| | 4H | 9.4 | 10.2 | 9.9 | 10.7 | 11.1 | 10.9 | 11.7 | 11.3 | 12.1 | 12.6 |
| | 6H | 9.5 | 10.2 | 10.0 | 10.7 | 11.2 | 11.0 | 11.7 | 11.5 | 12.2 | 12.7 |
| | 8H | 9.5 | 10.2 | 10.0 | 10.6 | 11.1 | 11.0 | 11.7 | 11.5 | 12.1 | 12.6 |
| | 12H | 9.5 | 10.1 | 10.0 | 10.5 | 11.0 | 11.0 | 11.6 | 11.5 | 12.1 | 12.6 |
| 8H | 4H | 9.5 | 10.1 | 9.9 | 10.6 | 11.1 | 11.0 | 11.6 | 11.4 | 12.1 | 12.5 |
| | 6H | 9.6 | 10.1 | 10.1 | 10.6 | 11.1 | 11.2 | 11.7 | 11.7 | 12.2 | 12.7 |
| | 8H | 9.6 | 10.1 | 10.1 | 10.6 | 11.1 | 11.2 | 11.7 | 11.7 | 12.2 | 12.7 |
| | 12H | 9.6 | 10.0 | 10.1 | 10.5 | 11.1 | 11.2 | 11.6 | 11.7 | 12.1 | 12.7 |
| 12H | 4H | 9.4 | 10.0 | 9.9 | 10.5 | 11.0 | 10.9 | 11.5 | 11.4 | 12.0 | 12.5 |
| | 6H | 9.6 | 10.1 | 10.1 | 10.5 | 11.1 | 11.2 | 11.6 | 11.7 | 12.1 | 12.7 |
| | 8H | 9.6 | 10.0 | 10.1 | 10.5 | 11.1 | 11.2 | 11.6 | 11.7 | 12.1 | 12.7 |

Corrected UGR values based on total output energy
SHR = 1.0

Corrected UGR values based on total output lumens

SHR = 1.0