## Indoor Distribution Test Report

# Spectrum Lighting Inc.

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## Spectrum Lighting Photometric Lab

**Luminaire**

CK0407PC 20L 35K MD xx SO xx MW

Nom. 4.5" Diam x 7"H Round Cylinder, Medium Beam

**Test Number**

SP-01440_M-20L

**Test Date**

11/21/2022

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

## Summary of Results

### Power

| | |
|---|---|
| **Input Watts** | 13.2 W |

### Lumen Output

| | |
|---|---|
| **Output Lumens** | 1353 |
| **Efficacy** | 102.46 lm/W |

### Luminous Dimensions

| | |
|---|---|
| **0° - 180° Size** | -0.38 |
| **90° - 270° Size** | -0.38 |
| **Height** | 0 |

### Spacing Criterion

| | |
|---|---|
| **Two luminaires, plane 0°** | 0.5 |
| **Two luminaires, plane 90°** | 0.49 |
| **Four luminaires** | 0.53 |

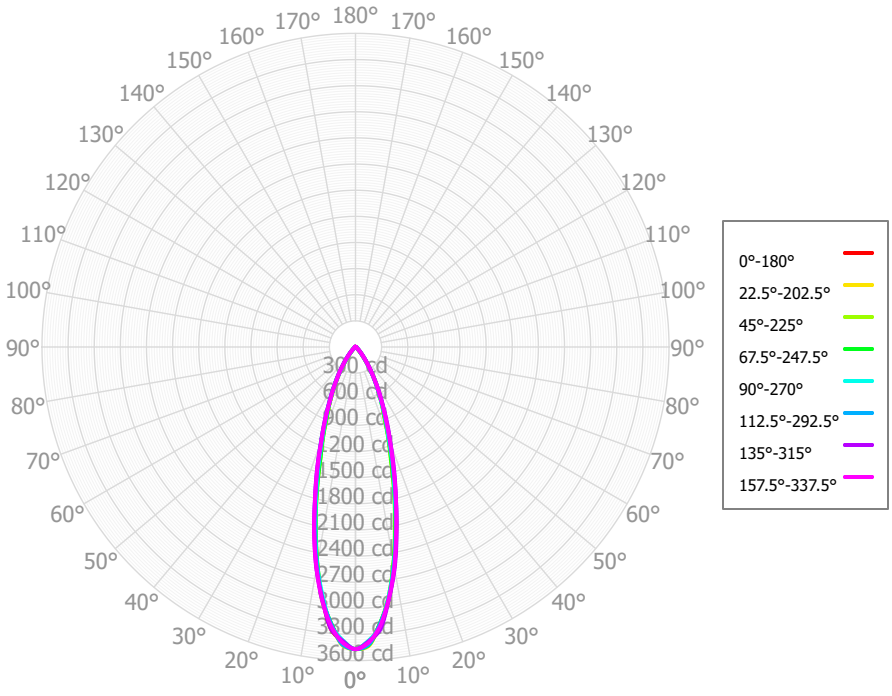
### Full Beam Angle

| | |
|---|---|
| **0° - 180°** | 30° |
| **90° - 270°** | 30° |

## IES File Header Contents

| Keyword | Value |
|---|---|
| TEST | SP-01440_M-20L |
| TESTLAB | Spectrum Lighting Photometric Lab, VLS-245-981 |
| MANUFAC | Spectrum Lighting |
| TESTDATE | 11/21/2022 |
| ISSUEDATE | 11/22/2022 |
| LUMCAT | CK0407PC 20L 35K MD xx SO xx MW |
| LUMINAIRE | Nom. 4.5" Diam x 7"H Round Cylinder, Medium Beam |
| OTHER | Solite lens, Matte White finish |
| OTHER | 30 Degree Beam Angle |
| OTHER | Reference Project SL378 |
| LAMP | N/A |
| LAMPCAT | N/A, Min. 80 CRI |
| OTHER | Total Luminaire Watts is approximate |
| OTHER | CCT Multipliers: 27K x 0.95, 30K x 0.97, 40K x 1.03 |
| OTHER | This report prepared by Spectrum Lighting |

## Candela Polar Plot




## Zonal Lumen Summary

| Zone | Lumens | % Fixture | Zone | Lumens | % Fixture |
|---|---|---|---|---|---|
| 0.00° - 10.00° | 287.78 | 21.28% | 90.00° - 100.00° | 1.76 | 0.13% |
| 10.00° - 20.00° | 480.50 | 35.53% | 100.00° - 110.00° | 1.65 | 0.12% |
| 20.00° - 30.00° | 331.57 | 24.51% | 100.00° - 120.00° | 3.28 | 0.24% |
| 30.00° - 40.00° | 155.29 | 11.48% | 120.00° - 130.00° | 1.49 | 0.11% |
| 40.00° - 50.00° | 47.94 | 3.54% | 130.00° - 140.00° | 1.39 | 0.10% |
| 50.00° - 60.00° | 19.04 | 1.41% | 140.00° - 150.00° | 1.17 | 0.09% |
| 60.00° - 70.00° | 11.51 | 0.85% | 150.00° - 160.00° | 0.86 | 0.06% |
| 70.00° - 80.00° | 5.91 | 0.44% | 160.00° - 170.00° | 0.54 | 0.04% |
| 80.00° - 90.00° | 2.31 | 0.17% | 170.00° - 180.00° | 0.18 | 0.01% |
| 0.00° - 90.00° | 1341.85 | 99.21% | 0.00° - 180.00° | 1352.52 | 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°** | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 | 3469.35 |
| **2.50°** | 3387.33 | 3438.16 | 3406.73 | 3427.80 | 3378.03 | 3420.40 | 3379.05 | 3398.15 | 3390.35 | 3428.67 | 3404.46 | 3415.75 | 3370.73 | 3422.56 | 3387.16 | 3400.50 | 3387.33 |
| **5.00°** | 3240.95 | 3197.80 | 3199.15 | 3194.40 | 3228.52 | 3194.56 | 3247.27 | 3216.68 | 3248.62 | 3191.45 | 3202.17 | 3190.71 | 3214.79 | 3197.38 | 3257.64 | 3220.26 | 3240.95 |
| **7.50°** | 2907.92 | 2933.73 | 2900.40 | 2920.82 | 2900.14 | 2928.83 | 2917.73 | 2935.34 | 2914.74 | 2935.94 | 2918.27 | 2925.42 | 2888.09 | 2923.85 | 2925.12 | 2921.72 | 2907.92 |
| **10.00°** | 2562.12 | 2524.84 | 2516.46 | 2517.84 | 2540.64 | 2549.75 | 2584.84 | 2578.87 | 2565.98 | 2531.24 | 2525.16 | 2528.24 | 2540.75 | 2547.28 | 2585.05 | 2566.49 | 2562.12 |
| **12.50°** | 2151.29 | 2119.25 | 2090.06 | 2117.01 | 2141.12 | 2169.71 | 2185.19 | 2195.68 | 2161.60 | 2119.41 | 2120.84 | 2109.23 | 2129.21 | 2150.32 | 2180.93 | 2159.84 | 2151.29 |
| **15.00°** | 1755.56 | 1729.47 | 1708.49 | 1722.12 | 1736.33 | 1787.38 | 1789.23 | 1794.86 | 1754.88 | 1729.47 | 1703.34 | 1722.61 | 1738.74 | 1784.51 | 1788.44 | 1788.18 | 1755.56 |
| **17.50°** | 1421.75 | 1366.00 | 1346.23 | 1366.51 | 1417.07 | 1437.79 | 1462.82 | 1454.01 | 1427.59 | 1342.37 | 1354.00 | 1340.00 | 1403.84 | 1423.50 | 1469.07 | 1444.46 | 1421.75 |
| **20.00°** | 1116.85 | 1105.10 | 1085.78 | 1103.60 | 1105.75 | 1156.66 | 1145.37 | 1148.19 | 1103.78 | 1094.85 | 1075.32 | 1092.75 | 1107.02 | 1162.89 | 1166.83 | 1163.11 | 1116.85 |
| **22.50°** | 910.09 | 869.18 | 862.85 | 873.88 | 903.46 | 911.53 | 928.23 | 914.51 | 897.76 | 851.84 | 859.68 | 857.04 | 897.41 | 913.65 | 948.93 | 925.51 | 910.09 |
| **25.00°** | 720.25 | 714.27 | 704.15 | 711.77 | 707.28 | 731.74 | 719.46 | 717.50 | 695.49 | 700.77 | 701.59 | 704.63 | 709.94 | 737.43 | 743.85 | 736.55 | 720.25 |
| **27.50°** | 578.73 | 568.23 | 565.47 | 564.36 | 572.60 | 573.50 | 576.10 | 567.15 | 557.82 | 552.21 | 561.26 | 556.33 | 566.31 | 566.72 | 589.92 | 577.48 | 578.73 |
| **30.00°** | 446.77 | 446.52 | 445.41 | 442.96 | 439.61 | 449.41 | 439.17 | 437.31 | 423.58 | 433.16 | 435.20 | 436.11 | 435.51 | 443.62 | 446.98 | 447.33 | 446.77 |
| **32.50°** | 338.10 | 333.50 | 330.18 | 332.95 | 339.59 | 341.23 | 340.10 | 335.00 | 325.43 | 317.78 | 325.67 | 316.93 | 326.83 | 322.41 | 340.41 | 332.86 | 338.10 |
| **35.00°** | 242.34 | 240.87 | 239.81 | 240.57 | 241.14 | 255.17 | 247.47 | 243.05 | 231.49 | 232.09 | 227.94 | 234.05 | 234.65 | 244.00 | 245.18 | 246.88 | 242.34 |
| **37.50°** | 173.69 | 162.36 | 154.68 | 165.30 | 178.51 | 183.99 | 184.79 | 178.35 | 168.93 | 152.34 | 156.83 | 153.06 | 167.33 | 166.80 | 181.56 | 174.31 | 173.69 |
| **40.00°** | 117.13 | 112.43 | 107.99 | 113.23 | 118.22 | 131.01 | 127.94 | 122.34 | 111.10 | 108.59 | 102.38 | 109.47 | 114.50 | 124.80 | 126.96 | 126.62 | 117.13 |
| **42.50°** | 82.87 | 72.61 | 67.69 | 75.24 | 87.19 | 90.89 | 93.22 | 88.70 | 80.11 | 69.32 | 69.27 | 68.00 | 80.84 | 84.00 | 93.88 | 89.00 | 82.87 |
| **45.00°** | 56.03 | 50.54 | 48.33 | 54.06 | 58.05 | 64.74 | 63.19 | 61.00 | 52.67 | 51.45 | 47.82 | 50.97 | 55.67 | 64.27 | 66.44 | 64.83 | 56.03 |
| **47.50°** | 41.13 | 34.63 | 31.65 | 38.81 | 44.97 | 45.62 | 48.19 | 46.16 | 41.23 | 35.58 | 35.41 | 35.05 | 40.34 | 45.43 | 50.63 | 45.29 | 41.13 |
| **50.00°** | 30.18 | 28.17 | 26.16 | 29.88 | 32.80 | 33.22 | 35.10 | 34.11 | 30.82 | 27.45 | 27.28 | 27.92 | 29.57 | 36.13 | 37.89 | 34.17 | 30.18 |
| **52.50°** | 24.80 | 22.67 | 21.68 | 23.78 | 26.44 | 25.17 | 27.20 | 27.34 | 24.18 | 20.80 | 22.51 | 21.35 | 23.44 | 27.36 | 30.61 | 25.48 | 24.80 |
| **55.00°** | 20.56 | 18.45 | 18.68 | 20.34 | 20.75 | 20.78 | 20.87 | 21.49 | 18.62 | 18.96 | 19.11 | 18.11 | 19.55 | 22.58 | 24.89 | 21.29 | 20.56 |
| **57.50°** | 17.73 | 15.59 | 15.75 | 17.21 | 18.45 | 18.09 | 18.20 | 17.45 | 16.38 | 16.97 | 16.23 | 15.12 | 17.68 | 18.18 | 21.62 | 18.17 | 17.73 |
| **60.00°** | 15.37 | 14.37 | 14.57 | 14.34 | 16.24 | 16.66 | 15.60 | 13.65 | 14.34 | 14.61 | 13.53 | 13.33 | 15.92 | 15.95 | 18.05 | 15.35 | 15.37 |
| **62.50°** | 13.51 | 13.30 | 13.42 | 13.08 | 14.36 | 14.35 | 13.19 | 12.70 | 12.83 | 12.53 | 12.42 | 11.55 | 14.25 | 13.78 | 14.05 | 12.59 | 13.51 |
| **65.00°** | 11.81 | 12.37 | 12.15 | 12.97 | 12.53 | 11.46 | 11.16 | 12.00 | 11.18 | 11.09 | 11.78 | 9.77 | 12.17 | 11.87 | 11.42 | 10.85 | 11.81 |
| **67.50°** | 10.29 | 10.75 | 10.87 | 11.39 | 10.80 | 9.89 | 9.80 | 9.96 | 9.20 | 9.59 | 9.62 | 8.05 | 9.79 | 10.07 | 10.45 | 9.27 | 10.29 |
| **70.00°** | 9.10 | 8.49 | 9.46 | 8.87 | 9.18 | 9.07 | 8.49 | 7.84 | 7.51 | 7.99 | 7.09 | 6.49 | 7.88 | 8.65 | 8.89 | 8.01 | 9.10 |
| **72.50°** | 8.21 | 6.78 | 8.01 | 7.23 | 7.85 | 7.69 | 7.27 | 6.43 | 6.35 | 6.46 | 5.70 | 5.09 | 6.25 | 7.28 | 6.71 | 6.78 | 8.21 |
| **75.00°** | 6.64 | 5.54 | 5.99 | 6.07 | 6.42 | 6.02 | 5.94 | 5.03 | 5.17 | 5.06 | 4.54 | 4.09 | 4.99 | 6.06 | 5.26 | 6.04 | 6.64 |
| **77.50°** | 4.55 | 4.34 | 4.08 | 4.81 | 4.72 | 4.69 | 4.49 | 3.98 | 3.96 | 3.78 | 3.52 | 3.21 | 3.92 | 4.71 | 4.49 | 5.33 | 4.55 |
| **80.00°** | 3.22 | 3.17 | 3.15 | 3.50 | 3.35 | 3.49 | 3.39 | 2.94 | 2.90 | 2.70 | 2.52 | 2.60 | 3.06 | 3.02 | 3.71 | 3.89 | 3.22 |
| **82.50°** | 2.39 | 2.39 | 2.29 | 2.63 | 2.66 | 2.63 | 2.71 | 2.40 | 2.05 | 1.99 | 1.97 | 2.06 | 2.29 | 1.84 | 2.90 | 2.43 | 2.39 |
| **85.00°** | 2.08 | 1.85 | 1.93 | 1.96 | 2.13 | 1.90 | 2.07 | 1.91 | 1.56 | 1.76 | 1.48 | 1.64 | 2.03 | 1.79 | 2.55 | 1.97 | 2.08 |
| **87.50°** | 2.09 | 1.63 | 1.63 | 1.82 | 1.88 | 1.80 | 1.45 | 1.96 | 1.55 | 1.69 | 1.34 | 1.43 | 1.98 | 1.79 | 2.53 | 1.52 | 2.09 |
| **90.00°** | 1.96 | 1.58 | 1.71 | 1.87 | 1.71 | 1.89 | 1.18 | 1.98 | 1.48 | 1.80 | 1.22 | 1.57 | 1.83 | 1.85 | 2.35 | 1.68 | 1.96 |
| **92.50°** | 1.76 | 1.47 | 1.74 | 1.97 | 1.69 | 1.73 | 1.22 | 1.69 | 1.35 | 1.79 | 1.44 | 1.66 | 1.64 | 1.88 | 2.07 | 1.81 | 1.76 |
| **95.00°** | 1.61 | 1.35 | 1.58 | 2.08 | 1.63 | 1.51 | 1.47 | 1.44 | 1.32 | 1.67 | 1.66 | 1.66 | 1.47 | 1.86 | 1.80 | 1.55 | 1.61 |
| **97.50°** | 1.47 | 1.47 | 1.46 | 1.76 | 1.51 | 1.65 | 1.89 | 1.48 | 1.39 | 1.55 | 1.49 | 1.70 | 1.29 | 1.79 | 1.52 | 1.31 | 1.47 |
| **100.00°** | 1.35 | 1.69 | 1.47 | 1.35 | 1.53 | 1.86 | 1.91 | 1.52 | 1.35 | 1.45 | 1.32 | 1.78 | 1.00 | 1.68 | 1.70 | 1.25 | 1.35 |

## 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 | 1608 | 1608 | 1608 | 1608 | 1569 | 1569 | 1569 | 1569 | 1497 | 1497 | 1497 | 1431 | 1431 | 1431 | 1370 | 1370 | 1370 | 1342 |
| | 1 | 1539 | 1504 | 1473 | 1445 | 1505 | 1474 | 1446 | 1421 | 1418 | 1396 | 1375 | 1366 | 1349 | 1333 | 1318 | 1305 | 1292 | 1278 |
| | 2 | 1472 | 1412 | 1362 | 1321 | 1442 | 1388 | 1343 | 1305 | 1343 | 1307 | 1275 | 1302 | 1272 | 1246 | 1264 | 1240 | 1219 | 1215 |
| | 3 | 1409 | 1331 | 1270 | 1222 | 1382 | 1311 | 1256 | 1212 | 1275 | 1229 | 1191 | 1242 | 1203 | 1171 | 1211 | 1179 | 1152 | 1156 |
| | 4 | 1349 | 1258 | 1192 | 1141 | 1325 | 1243 | 1181 | 1134 | 1213 | 1161 | 1119 | 1186 | 1141 | 1105 | 1160 | 1123 | 1092 | 1102 |
| RCR | 5 | 1293 | 1194 | 1124 | 1073 | 1272 | 1181 | 1116 | 1067 | 1156 | 1100 | 1057 | 1134 | 1085 | 1047 | 1112 | 1071 | 1037 | 1051 |
| | 6 | 1241 | 1135 | 1064 | 1013 | 1222 | 1125 | 1058 | 1010 | 1104 | 1046 | 1002 | 1085 | 1034 | 995 | 1067 | 1023 | 988 | 1005 |
| | 7 | 1192 | 1083 | 1011 | 962 | 1175 | 1074 | 1006 | 959 | 1056 | 997 | 953 | 1040 | 987 | 948 | 1025 | 978 | 942 | 962 |
| | 8 | 1147 | 1035 | 964 | 916 | 1131 | 1027 | 960 | 913 | 1012 | 952 | 909 | 998 | 944 | 905 | 986 | 937 | 901 | 922 |
| | 9 | 1104 | 991 | 921 | 874 | 1090 | 984 | 918 | 873 | 972 | 911 | 869 | 960 | 905 | 866 | 948 | 899 | 863 | 885 |
| | 10 | 1064 | 950 | 882 | 837 | 1051 | 945 | 880 | 836 | 934 | 874 | 833 | 924 | 869 | 831 | 914 | 864 | 828 | 851 |

## Cone of Light

| Mtg Height | Light Level | Beam Diameter |
|---|---|---|
| 5.5 ft | 114.7 fc | 3.0 ft |
| 6.5 ft | 82.1 fc | 3.5 ft |
| 7.5 ft | 61.7 fc | 4.1 ft |
| 8.0 ft | 54.2 fc | 4.3 ft |
| 10.0 ft | 34.7 fc | 5.4 ft |
| 12.0 ft | 24.1 fc | 6.5 ft |
| 14.0 ft | 17.7 fc | 7.6 ft |
| 16.0 ft | 13.6 fc | 8.7 ft |
| 20.0 ft | 8.7 fc | 10.8 ft |
| 24.0 ft | 6.0 fc | 13.0 ft |
| 28.0 ft | 4.4 fc | 15.2 ft |

## Average Luminaire Luminance [cd/m²]

| | 0.00° | 45.00° | 90.00° |
|---|---|---|---|
| 0.00° | 329277 | 329277 | 329277 |
| 45.00° | 7520 | 6487 | 7792 |
| 55.00° | 3403 | 3090 | 3434 |
| 65.00° | 2653 | 2728 | 2813 |
| 75.00° | 2433 | 2196 | 2353 |
| 85.00° | 2270 | 2097 | 2317 |

## 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 | 7.0 | 8.0 | 7.4 | 8.3 | 8.6 | 7.0 | 7.9 | 7.3 | 8.3 | 8.6 |
| | 3H | 8.5 | 9.3 | 8.9 | 9.7 | 10.0 | 8.3 | 9.1 | 8.7 | 9.5 | 9.9 |
| | 4H | 9.1 | 9.8 | 9.5 | 10.2 | 10.6 | 8.8 | 9.6 | 9.2 | 9.9 | 10.3 |
| | 6H | 9.4 | 10.1 | 9.8 | 10.5 | 10.9 | 9.1 | 9.8 | 9.5 | 10.2 | 10.6 |
| | 8H | 9.5 | 10.1 | 9.9 | 10.6 | 11.0 | 9.2 | 9.8 | 9.6 | 10.3 | 10.7 |
| | 12H | 9.6 | 10.2 | 10.0 | 10.6 | 11.1 | 9.3 | 9.9 | 9.7 | 10.3 | 10.8 |
| 4H | 2H | 7.4 | 8.2 | 7.9 | 8.6 | 9.0 | 7.4 | 8.1 | 7.8 | 8.5 | 8.9 |
| | 3H | 9.1 | 9.7 | 9.5 | 10.1 | 10.6 | 8.8 | 9.5 | 9.3 | 9.9 | 10.3 |
| | 4H | 9.7 | 10.3 | 10.2 | 10.8 | 11.2 | 9.4 | 10.0 | 9.9 | 10.4 | 10.9 |
| | 6H | 10.2 | 10.7 | 10.7 | 11.2 | 11.7 | 9.8 | 10.3 | 10.3 | 10.8 | 11.3 |
| | 8H | 10.3 | 10.8 | 10.8 | 11.2 | 11.7 | 10.0 | 10.4 | 10.4 | 10.9 | 11.4 |
| | 12H | 10.5 | 10.9 | 11.0 | 11.4 | 11.9 | 10.1 | 10.5 | 10.6 | 11.0 | 11.5 |
| 8H | 4H | 9.9 | 10.4 | 10.4 | 10.8 | 11.3 | 9.5 | 10.0 | 10.0 | 10.4 | 10.9 |
| | 6H | 10.5 | 10.8 | 11.0 | 11.4 | 11.9 | 10.0 | 10.4 | 10.6 | 10.9 | 11.4 |
| | 8H | 10.7 | 11.0 | 11.2 | 11.5 | 12.1 | 10.3 | 10.6 | 10.8 | 11.1 | 11.6 |
| | 12H | 10.9 | 11.2 | 11.5 | 11.7 | 12.3 | 10.5 | 10.8 | 11.1 | 11.3 | 11.9 |
| 12H | 4H | 9.9 | 10.3 | 10.4 | 10.8 | 11.3 | 9.5 | 9.9 | 10.0 | 10.4 | 10.9 |
| | 6H | 10.5 | 10.8 | 11.0 | 11.3 | 11.9 | 10.0 | 10.4 | 10.6 | 10.9 | 11.4 |
| | 8H | 10.8 | 11.0 | 11.3 | 11.5 | 12.1 | 10.3 | 10.6 | 10.9 | 11.1 | 11.7 |

Corrected UGR values based on total output energy
SHR = 1.0

Corrected UGR values based on total output lumens

SHR = 1.0