

Indoor Distribution Test Report

Spectrum Lighting Inc.

994 Jefferson Street
Fall River, MA 02721
+1.508.678.2303

Spectrum Lighting Photometric Lab

Luminaire

AS01SQ IC 935 004 DL FL MW xx
Nom 1" square recessed downlight

Test Number

SP-00828_M-4L

Test Date

3/7/2019

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

Summary of Results

Power

| | |
|-------------|-------|
| Input Watts | 4.3 W |
|-------------|-------|

Lumen Output

| | |
|---------------|------------|
| Output Lumens | 218 |
| Efficacy | 50.74 lm/W |

Luminous Dimensions

| | |
|-----------------|------|
| 0° - 180° Size | 0.07 |
| 90° - 270° Size | 0.07 |
| Height | 0 |

Spacing Criterion

| | |
|---------------------------|------|
| Two luminaires, plane 0° | 0.55 |
| Two luminaires, plane 90° | 0.56 |
| Four luminaires | 0.6 |

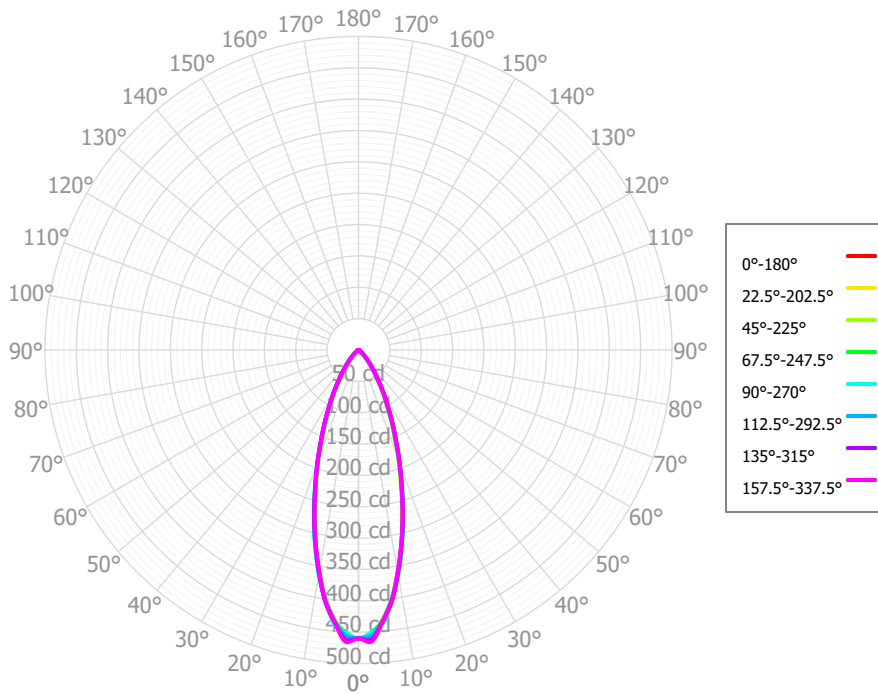
Full Beam Angle

| | |
|------------|-----|
| 0° - 180° | 34° |
| 90° - 270° | 35° |

IES File Header Contents

| Keyword | Value |
|-----------|---|
| TEST | SP-00828_M-4L |
| TESTLAB | Spectrum Lighting Photometric Lab, VLS-245-981 |
| MANUFAC | Spectrum Lighting |
| TESTDATE | 3/7/2019 |
| ISSUEDATE | 2/5/2020 |
| LUMCAT | AS01SQ IC 935 004 DL FL MW xx |
| LUMINAIRE | Nom 1" square recessed downlight |
| OTHER | Beam angle: 33.3 degrees |
| LAMP | N/A |
| LAMPCAT | N/A, CRI: 90 min |
| OTHER | CCT Multipliers: 927 x 0.96, 930 x 0.99, 940 x 1.02 |
| OTHER | Total luminaire wattages is approximate |
| OTHER | This report prepared by Spectrum Lighting, scaled from 7L |
| _CRI | 90+ |
| _CCTMULT | 927 x 0.96, 930 x 0.99, 940 x 1.02 |
| _LAMPMULT | N/A |

Candela Polar Plot



Zonal Lumen Summary

| Zone | Lumens | % Fixture | Zone | Lumens | % Fixture |
|-----------------|--------|-----------|-------------------|--------|-----------|
| 0.00° - 10.00° | 39.62 | 18.16% | 90.00° - 100.00° | 0.05 | 0.02% |
| 10.00° - 20.00° | 74.49 | 34.14% | 100.00° - 110.00° | 0.00 | 0.00% |
| 20.00° - 30.00° | 57.47 | 26.34% | 100.00° - 120.00° | 0.00 | 0.00% |
| 30.00° - 40.00° | 29.89 | 13.70% | 120.00° - 130.00° | 0.00 | 0.00% |
| 40.00° - 50.00° | 11.09 | 5.08% | 130.00° - 140.00° | 0.00 | 0.00% |
| 50.00° - 60.00° | 2.86 | 1.31% | 140.00° - 150.00° | 0.00 | 0.00% |
| 60.00° - 70.00° | 1.19 | 0.55% | 150.00° - 160.00° | 0.00 | 0.00% |
| 70.00° - 80.00° | 0.80 | 0.37% | 160.00° - 170.00° | 0.00 | 0.00% |
| 80.00° - 90.00° | 0.71 | 0.33% | 170.00° - 180.00° | 0.00 | 0.00% |
| 0.00° - 90.00° | 218.13 | 99.98% | 0.00° - 180.00° | 218.17 | 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° | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 | 459.95 |
| 2.50° | 459.59 | 459.30 | 455.50 | 451.36 | 452.29 | 456.23 | 462.75 | 465.80 | 459.59 | 459.30 | 455.50 | 451.36 | 452.29 | 456.23 | 462.75 | 465.80 | 459.59 |
| 5.00° | 433.49 | 434.04 | 434.06 | 434.58 | 439.12 | 436.42 | 435.76 | 435.58 | 433.49 | 434.04 | 434.06 | 434.58 | 439.12 | 436.42 | 435.76 | 435.58 | 433.49 |
| 7.50° | 402.56 | 404.65 | 403.25 | 402.15 | 403.19 | 404.06 | 405.43 | 404.35 | 402.56 | 404.65 | 403.25 | 402.15 | 403.19 | 404.06 | 405.43 | 404.35 | 402.56 |
| 10.00° | 359.61 | 361.34 | 361.88 | 362.89 | 364.21 | 363.26 | 361.46 | 360.25 | 359.61 | 361.34 | 361.88 | 362.89 | 364.21 | 363.26 | 361.46 | 360.25 | 359.61 |
| 12.50° | 315.64 | 316.92 | 317.23 | 318.69 | 319.38 | 318.47 | 316.86 | 316.08 | 315.64 | 316.92 | 317.23 | 318.69 | 319.38 | 318.47 | 316.86 | 316.08 | 315.64 |
| 15.00° | 269.76 | 270.95 | 271.94 | 273.87 | 274.28 | 274.32 | 272.63 | 271.53 | 269.76 | 270.95 | 271.94 | 273.87 | 274.28 | 274.32 | 272.63 | 271.53 | 269.76 |
| 17.50° | 226.83 | 225.38 | 226.52 | 228.72 | 231.49 | 230.38 | 228.98 | 228.32 | 226.83 | 225.38 | 226.52 | 228.72 | 231.49 | 230.38 | 228.98 | 228.32 | 226.83 |
| 20.00° | 188.15 | 187.40 | 188.22 | 189.56 | 189.43 | 192.31 | 191.97 | 190.58 | 188.15 | 187.40 | 188.22 | 189.56 | 189.43 | 192.31 | 191.97 | 190.58 | 188.15 |
| 22.50° | 153.96 | 150.63 | 150.83 | 152.81 | 156.51 | 155.67 | 156.23 | 155.31 | 153.96 | 150.63 | 150.83 | 152.81 | 156.51 | 155.67 | 156.23 | 155.31 | 153.96 |
| 25.00° | 124.69 | 122.93 | 122.77 | 123.79 | 124.81 | 127.35 | 127.89 | 126.95 | 124.69 | 122.93 | 122.77 | 123.79 | 124.81 | 127.35 | 127.89 | 126.95 | 124.69 |
| 27.50° | 99.82 | 96.70 | 95.28 | 97.06 | 100.76 | 100.27 | 101.27 | 100.85 | 99.82 | 96.70 | 95.28 | 97.06 | 100.76 | 100.27 | 101.27 | 100.85 | 99.82 |
| 30.00° | 78.76 | 77.08 | 76.49 | 77.24 | 78.17 | 80.59 | 81.13 | 79.34 | 78.76 | 77.08 | 76.49 | 77.24 | 78.17 | 80.59 | 81.13 | 79.34 | 78.76 |
| 32.50° | 61.36 | 59.06 | 58.21 | 58.77 | 61.32 | 61.41 | 62.67 | 60.93 | 61.36 | 59.06 | 58.21 | 58.77 | 61.32 | 61.41 | 62.67 | 60.93 | 61.36 |
| 35.00° | 46.38 | 46.05 | 45.94 | 46.05 | 46.07 | 48.55 | 48.73 | 47.38 | 46.38 | 46.05 | 45.94 | 46.05 | 46.07 | 48.55 | 48.73 | 47.38 | 46.38 |
| 37.50° | 35.04 | 34.55 | 34.35 | 33.94 | 35.26 | 35.98 | 36.68 | 35.91 | 35.04 | 34.55 | 34.35 | 33.94 | 35.26 | 35.98 | 36.68 | 35.91 | 35.04 |
| 40.00° | 25.50 | 26.47 | 26.82 | 25.94 | 25.71 | 27.51 | 28.33 | 26.93 | 25.50 | 26.47 | 26.82 | 25.94 | 25.71 | 27.51 | 28.33 | 26.93 | 25.50 |
| 42.50° | 18.22 | 19.23 | 19.86 | 18.17 | 18.72 | 19.47 | 21.18 | 19.40 | 18.22 | 19.23 | 19.86 | 18.17 | 18.72 | 19.47 | 21.18 | 19.40 | 18.22 |
| 45.00° | 11.79 | 13.41 | 15.12 | 13.40 | 12.53 | 14.42 | 15.78 | 13.21 | 11.79 | 13.41 | 15.12 | 13.40 | 12.53 | 14.42 | 15.78 | 13.21 | 11.79 |
| 47.50° | 7.69 | 8.98 | 10.92 | 8.82 | 7.56 | 9.72 | 11.37 | 8.69 | 7.69 | 8.98 | 10.92 | 8.82 | 7.56 | 9.72 | 11.37 | 8.69 | 7.69 |
| 50.00° | 4.19 | 6.37 | 8.21 | 6.10 | 4.31 | 6.52 | 8.10 | 5.37 | 4.19 | 6.37 | 8.21 | 6.10 | 4.31 | 6.52 | 8.10 | 5.37 | 4.19 |
| 52.50° | 3.09 | 4.22 | 5.80 | 3.65 | 3.13 | 3.85 | 5.66 | 3.51 | 3.09 | 4.22 | 5.80 | 3.65 | 3.13 | 3.85 | 5.66 | 3.51 | 3.09 |
| 55.00° | 2.38 | 2.53 | 3.97 | 2.72 | 2.31 | 2.75 | 3.95 | 2.45 | 2.38 | 2.53 | 3.97 | 2.72 | 2.31 | 2.75 | 3.95 | 2.45 | 2.38 |
| 57.50° | 1.98 | 1.74 | 2.60 | 1.92 | 1.81 | 1.93 | 2.76 | 1.86 | 1.98 | 1.74 | 2.60 | 1.92 | 1.81 | 1.93 | 2.76 | 1.86 | 1.98 |
| 60.00° | 1.60 | 1.65 | 1.93 | 1.59 | 1.45 | 1.70 | 1.92 | 1.45 | 1.60 | 1.65 | 1.93 | 1.59 | 1.45 | 1.70 | 1.92 | 1.45 | 1.60 |
| 62.50° | 1.35 | 1.55 | 1.44 | 1.31 | 1.18 | 1.47 | 1.46 | 1.25 | 1.35 | 1.55 | 1.44 | 1.31 | 1.18 | 1.47 | 1.46 | 1.25 | 1.35 |
| 65.00° | 1.10 | 1.44 | 1.17 | 1.16 | 1.03 | 1.23 | 1.21 | 1.11 | 1.10 | 1.44 | 1.17 | 1.16 | 1.03 | 1.23 | 1.21 | 1.11 | 1.10 |
| 67.50° | 0.99 | 1.14 | 0.96 | 1.03 | 0.93 | 1.03 | 1.04 | 0.93 | 0.99 | 1.14 | 0.96 | 1.03 | 0.93 | 1.03 | 1.04 | 0.93 | 0.99 |
| 70.00° | 0.89 | 0.77 | 0.81 | 0.92 | 0.91 | 0.84 | 0.90 | 0.78 | 0.89 | 0.77 | 0.81 | 0.92 | 0.91 | 0.84 | 0.90 | 0.78 | 0.89 |
| 72.50° | 0.85 | 0.78 | 0.78 | 0.88 | 0.89 | 0.79 | 0.83 | 0.76 | 0.85 | 0.78 | 0.78 | 0.88 | 0.89 | 0.79 | 0.83 | 0.76 | 0.85 |
| 75.00° | 0.79 | 0.74 | 0.74 | 0.86 | 0.76 | 0.75 | 0.78 | 0.74 | 0.79 | 0.74 | 0.74 | 0.86 | 0.76 | 0.75 | 0.78 | 0.74 | 0.79 |
| 77.50° | 0.71 | 0.66 | 0.66 | 0.75 | 0.68 | 0.62 | 0.74 | 0.72 | 0.71 | 0.66 | 0.66 | 0.75 | 0.68 | 0.62 | 0.74 | 0.72 | 0.71 |
| 80.00° | 0.68 | 0.70 | 0.65 | 0.75 | 0.66 | 0.68 | 0.57 | 0.67 | 0.68 | 0.70 | 0.65 | 0.75 | 0.66 | 0.68 | 0.57 | 0.67 | 0.68 |
| 82.50° | 0.67 | 0.74 | 0.71 | 0.69 | 0.72 | 0.77 | 0.73 | 0.70 | 0.67 | 0.74 | 0.71 | 0.69 | 0.72 | 0.77 | 0.73 | 0.70 | 0.67 |
| 85.00° | 0.68 | 0.74 | 0.84 | 0.67 | 0.72 | 0.61 | 0.72 | 0.67 | 0.68 | 0.74 | 0.84 | 0.67 | 0.72 | 0.61 | 0.72 | 0.67 | 0.68 |
| 87.50° | 0.54 | 0.67 | 0.69 | 0.81 | 0.76 | 0.64 | 0.61 | 0.82 | 0.54 | 0.67 | 0.69 | 0.81 | 0.76 | 0.64 | 0.61 | 0.82 | 0.54 |
| 90.00° | 0.31 | 0.32 | 0.34 | 0.33 | 0.40 | 0.36 | 0.24 | 0.42 | 0.31 | 0.32 | 0.34 | 0.33 | 0.40 | 0.36 | 0.24 | 0.42 | 0.31 |
| 92.50° | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95.00° | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 97.50° | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 100.00° | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 102.50° | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 105.00° | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 107.50° | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 110.00° | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 112.50° | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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% | 0% |
| | pw | 70% | 50% | 30% | 10% | 70% | 50% | 30% | 10% | 50% | 30% | 10% | 50% | 30% | 10% | 50% | 30% | 30% |
| | 0 | 260 | 260 | 260 | 260 | 254 | 254 | 254 | 254 | 242 | 242 | 242 | 232 | 232 | 232 | 223 | 223 | 218 |
| | 1 | 248 | 242 | 237 | 233 | 243 | 238 | 233 | 229 | 229 | 225 | 222 | 221 | 218 | 215 | 213 | 211 | 209 |
| | 2 | 237 | 227 | 219 | 212 | 232 | 223 | 216 | 209 | 216 | 210 | 205 | 210 | 205 | 201 | 204 | 200 | 196 |
| | 3 | 226 | 213 | 203 | 195 | 222 | 210 | 201 | 194 | 205 | 197 | 191 | 200 | 193 | 188 | 195 | 189 | 185 |
| | 4 | 216 | 201 | 190 | 182 | 213 | 199 | 188 | 180 | 194 | 185 | 178 | 190 | 182 | 176 | 186 | 180 | 174 |
| | 5 | 207 | 190 | 178 | 170 | 203 | 188 | 177 | 169 | 184 | 175 | 168 | 181 | 173 | 166 | 178 | 170 | 165 |
| | 6 | 198 | 180 | 168 | 160 | 195 | 179 | 167 | 159 | 175 | 165 | 158 | 172 | 164 | 157 | 170 | 162 | 156 |
| | 7 | 190 | 171 | 159 | 151 | 187 | 170 | 158 | 150 | 167 | 157 | 150 | 165 | 156 | 149 | 162 | 154 | 148 |
| | 8 | 182 | 163 | 151 | 143 | 179 | 162 | 151 | 143 | 160 | 149 | 142 | 157 | 148 | 142 | 155 | 147 | 141 |
| | 9 | 175 | 156 | 144 | 136 | 172 | 154 | 143 | 136 | 153 | 142 | 135 | 151 | 141 | 135 | 149 | 141 | 134 |
| | 10 | 168 | 149 | 137 | 130 | 166 | 148 | 137 | 129 | 146 | 136 | 129 | 145 | 135 | 129 | 143 | 135 | 128 |

Cone of Light

| Mtg Height | Light Level | Beam Diameter |
|------------|-------------|---------------|
| 5.5 ft | 15.2 fc | 3.4 ft |
| 6.5 ft | 10.9 fc | 4.0 ft |
| 7.5 ft | 8.2 fc | 4.6 ft |
| 8.0 ft | 7.2 fc | 4.9 ft |
| 10.0 ft | 4.6 fc | 6.2 ft |
| 12.0 ft | 3.2 fc | 7.4 ft |
| 14.0 ft | 2.3 fc | 8.6 ft |
| 16.0 ft | 1.8 fc | 9.9 ft |
| 20.0 ft | 1.1 fc | 12.3 ft |
| 24.0 ft | 0.8 fc | 14.8 ft |
| 28.0 ft | 0.6 fc | 17.3 ft |

Average Luminaire Luminance [cd/m²]

| | 0.00° | 45.00° | 90.00° |
|---------------|-----------|-----------|-----------|
| 0.00° | 1,010,386 | 1,010,386 | 1,010,386 |
| 45.00° | 36,631 | 46,969 | 38,927 |
| 55.00° | 9,122 | 15,221 | 8,850 |
| 65.00° | 5,726 | 6,057 | 5,329 |
| 75.00° | 6,728 | 6,291 | 6,457 |
| 85.00° | 17,170 | 21,172 | 18,134 |

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 | 9.6 | 10.6 | 10.0 | 10.9 | 11.2 | 9.9 | 10.8 | 10.2 | 11.2 | 11.5 |
| | 3H | 10.8 | 11.7 | 11.2 | 12.0 | 12.4 | 11.0 | 11.9 | 11.4 | 12.2 | 12.6 |
| | 4H | 11.6 | 12.4 | 12.0 | 12.8 | 13.2 | 11.8 | 12.6 | 12.2 | 12.9 | 13.3 |
| | 6H | 12.5 | 13.3 | 12.9 | 13.6 | 14.0 | 12.6 | 13.4 | 13.0 | 13.7 | 14.1 |
| | 8H | 13.2 | 13.8 | 13.6 | 14.2 | 14.6 | 13.3 | 14.0 | 13.7 | 14.4 | 14.8 |
| | 12H | 14.0 | 14.6 | 14.4 | 15.0 | 15.5 | 14.2 | 14.8 | 14.6 | 15.2 | 15.6 |
| 4H | 2H | 10.0 | 10.8 | 10.4 | 11.1 | 11.5 | 10.2 | 11.0 | 10.6 | 11.3 | 11.7 |
| | 3H | 11.4 | 12.1 | 11.8 | 12.5 | 12.9 | 11.6 | 12.3 | 12.0 | 12.7 | 13.1 |
| | 4H | 12.4 | 12.9 | 12.8 | 13.4 | 13.8 | 12.6 | 13.2 | 13.0 | 13.6 | 14.0 |
| | 6H | 13.5 | 14.0 | 14.0 | 14.5 | 15.0 | 13.7 | 14.2 | 14.2 | 14.6 | 15.1 |
| | 8H | 14.3 | 14.8 | 14.8 | 15.3 | 15.7 | 14.5 | 15.0 | 15.0 | 15.4 | 15.9 |
| | 12H | 15.4 | 15.8 | 15.9 | 16.3 | 16.7 | 15.6 | 16.0 | 16.1 | 16.4 | 16.9 |
| 8H | 4H | 12.7 | 13.2 | 13.2 | 13.6 | 14.1 | 12.9 | 13.4 | 13.4 | 13.8 | 14.3 |
| | 6H | 14.2 | 14.6 | 14.7 | 15.1 | 15.5 | 14.3 | 14.7 | 14.8 | 15.2 | 15.7 |
| | 8H | 15.2 | 15.6 | 15.8 | 16.1 | 16.6 | 15.4 | 15.7 | 15.9 | 16.2 | 16.7 |
| | 12H | 16.6 | 16.9 | 17.1 | 17.4 | 17.9 | 16.7 | 17.0 | 17.2 | 17.5 | 18.1 |
| 12H | 4H | 12.8 | 13.2 | 13.3 | 13.7 | 14.2 | 13.0 | 13.4 | 13.5 | 13.9 | 14.3 |
| | 6H | 14.4 | 14.7 | 14.9 | 15.2 | 15.8 | 14.5 | 14.8 | 15.0 | 15.3 | 15.9 |
| | 8H | 15.6 | 15.9 | 16.1 | 16.4 | 17.0 | 15.7 | 16.0 | 16.3 | 16.5 | 17.1 |

Corrected UGR values based on total output lumens

SHR = 1.0