

Indoor Distribution Test Report

Spectrum Lighting Inc.

994 Jefferson Street
Fall River, MA 02721
+1.508.678.2303

Spectrum Lighting Photometric Lab

Luminaire

ES03SMFxx 930 007 xxx DL SP GP MW
Nom 3 inch diam round recessed estimator downlight

Test Number

SP-00874_M-007L

Test Date

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

Summary of Results

Power

| | |
|-------------|-------|
| Input Watts | 8.8 W |
|-------------|-------|

Lumen Output

| | |
|---------------|------------|
| Output Lumens | 364 |
| Efficacy | 41.34 lm/W |

Luminous Dimensions

| | |
|-----------------|------|
| 0° - 180° Size | 0.22 |
| 90° - 270° Size | 0.22 |
| Height | 0 |

Spacing Criterion

| | |
|---------------------------|------|
| Two luminaires, plane 0° | 0.4 |
| Two luminaires, plane 90° | 0.41 |
| Four luminaires | 0.48 |

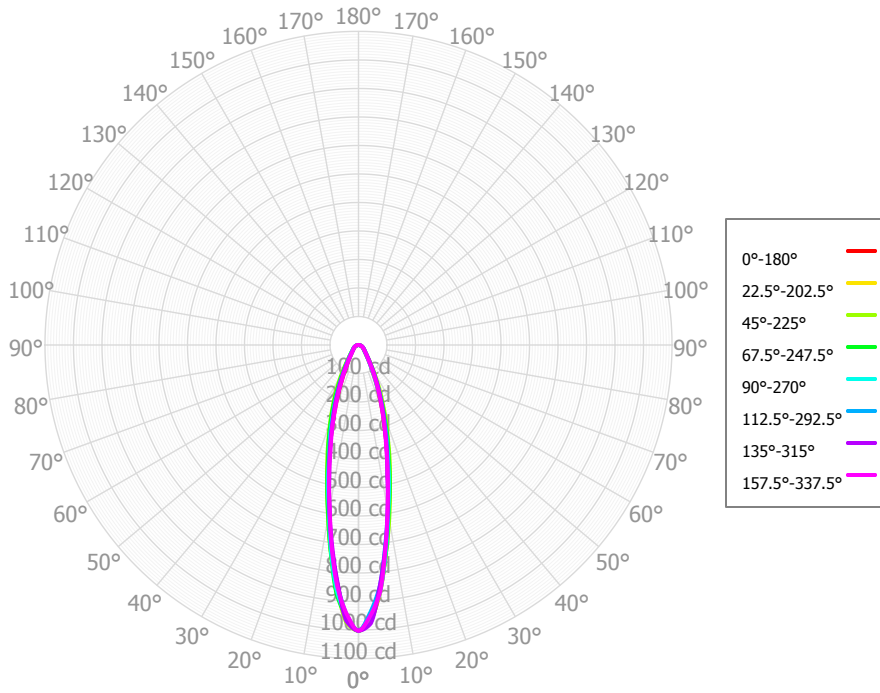
Full Beam Angle

| | |
|------------|-----|
| 0° - 180° | 24° |
| 90° - 270° | 25° |

IES File Header Contents

| Keyword | Value |
|-----------|--|
| TEST | SP-00874_M-007L |
| TESTLAB | Spectrum Lighting Photometric Lab, VLS-245-981 |
| MANUFAC | Spectrum Lighting |
| ISSUEDATE | 6/6/2019 |
| UPDATE | 7/26/2019 |
| LUMCAT | ES03SMFxx 930 007 xxx DL SP GP MW |
| LUMINAIRE | Nom 3 inch diam round recessed estimator downlight |
| LAMPCAT | N/A |
| LAMP | N/A; CRI: 90, 9mm LES |
| OTHER | Beam Angle: 24.2 degrees |
| OTHER | CCT Output Multipliers: 27HK x 0.97 |
| OTHER | This report prepared by Spectrum Lighting, scaled from 13L |
| _CCTMULT | 27HK x 0.97 |

Candela Polar Plot



Zonal Lumen Summary

| Zone | Lumens | % Fixture | Zone | Lumens | % Fixture |
|-----------------|--------|-----------|-------------------|--------|-----------|
| 0.00° - 10.00° | 73.76 | 20.28% | 90.00° - 100.00° | 0.04 | 0.01% |
| 10.00° - 20.00° | 110.37 | 30.34% | 100.00° - 110.00° | 0.00 | 0.00% |
| 20.00° - 30.00° | 74.45 | 20.47% | 100.00° - 120.00° | 0.00 | 0.00% |
| 30.00° - 40.00° | 38.58 | 10.61% | 120.00° - 130.00° | 0.00 | 0.00% |
| 40.00° - 50.00° | 24.37 | 6.70% | 130.00° - 140.00° | 0.00 | 0.00% |
| 50.00° - 60.00° | 18.93 | 5.20% | 140.00° - 150.00° | 0.00 | 0.00% |
| 60.00° - 70.00° | 14.12 | 3.88% | 150.00° - 160.00° | 0.00 | 0.00% |
| 70.00° - 80.00° | 7.69 | 2.11% | 160.00° - 170.00° | 0.00 | 0.00% |
| 80.00° - 90.00° | 1.45 | 0.40% | 170.00° - 180.00° | 0.00 | 0.00% |
| 0.00° - 90.00° | 363.73 | 99.99% | 0.00° - 180.00° | 363.77 | 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° | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 | 1,002.09 |
| 2.50° | 968.38 | 956.05 | 969.88 | 951.63 | 950.52 | 948.28 | 969.82 | 945.44 | 960.21 | 959.84 | 974.58 | 955.52 | 954.33 | 940.46 | 978.44 | 951.14 | 968.38 |
| 5.00° | 867.80 | 870.71 | 863.86 | 862.92 | 869.31 | 845.95 | 839.27 | 851.26 | 843.07 | 858.82 | 857.08 | 878.05 | 867.26 | 852.15 | 851.60 | 869.59 | 867.80 |
| 7.50° | 726.18 | 734.53 | 736.05 | 736.45 | 731.04 | 721.44 | 709.85 | 717.77 | 721.08 | 736.83 | 737.82 | 739.72 | 734.51 | 714.56 | 719.10 | 722.73 | 726.18 |
| 10.00° | 598.21 | 610.67 | 620.44 | 605.40 | 600.67 | 587.10 | 587.39 | 580.18 | 593.03 | 606.22 | 614.37 | 609.99 | 596.49 | 589.35 | 591.48 | 584.80 | 598.21 |
| 12.50° | 476.04 | 502.58 | 506.96 | 505.98 | 493.96 | 483.51 | 472.40 | 478.26 | 482.81 | 504.07 | 505.47 | 505.44 | 495.39 | 479.04 | 466.57 | 474.93 | 476.04 |
| 15.00° | 385.41 | 409.80 | 422.84 | 408.44 | 396.41 | 390.88 | 389.17 | 378.19 | 390.67 | 411.27 | 423.92 | 412.14 | 396.32 | 388.18 | 384.86 | 376.39 | 385.41 |
| 17.50° | 305.52 | 332.97 | 341.88 | 334.61 | 320.05 | 319.80 | 311.99 | 308.06 | 311.69 | 338.58 | 350.92 | 345.23 | 329.24 | 316.37 | 306.11 | 305.74 | 305.52 |
| 20.00° | 244.00 | 267.43 | 281.04 | 261.66 | 250.41 | 254.49 | 254.53 | 239.00 | 243.57 | 270.79 | 291.19 | 282.88 | 263.07 | 255.95 | 251.26 | 242.42 | 244.00 |
| 22.50° | 187.16 | 211.46 | 221.33 | 207.25 | 193.51 | 202.94 | 201.66 | 189.11 | 187.92 | 216.55 | 238.07 | 229.02 | 211.65 | 204.61 | 198.90 | 193.53 | 187.16 |
| 25.00° | 146.97 | 164.95 | 177.74 | 154.72 | 145.78 | 154.00 | 160.24 | 141.18 | 140.85 | 164.59 | 193.28 | 180.64 | 161.82 | 161.67 | 160.11 | 150.56 | 146.97 |
| 27.50° | 109.75 | 125.12 | 134.95 | 121.13 | 111.94 | 120.71 | 123.47 | 110.04 | 107.61 | 128.21 | 153.55 | 140.42 | 127.17 | 124.31 | 124.11 | 116.91 | 109.75 |
| 30.00° | 87.89 | 96.27 | 106.93 | 89.93 | 85.57 | 89.40 | 95.83 | 81.49 | 82.01 | 93.56 | 119.01 | 107.39 | 94.86 | 96.88 | 98.81 | 89.94 | 87.89 |
| 32.50° | 67.87 | 73.68 | 80.13 | 73.25 | 68.39 | 72.39 | 73.28 | 66.98 | 65.27 | 75.05 | 91.77 | 83.31 | 76.96 | 74.74 | 76.56 | 71.50 | 67.87 |
| 35.00° | 56.49 | 59.17 | 65.11 | 57.94 | 55.20 | 56.38 | 58.98 | 53.65 | 52.41 | 57.40 | 70.79 | 65.43 | 60.68 | 60.51 | 63.06 | 57.51 | 56.49 |
| 37.50° | 45.61 | 48.31 | 51.12 | 48.61 | 46.11 | 47.72 | 47.45 | 45.09 | 43.90 | 48.63 | 56.12 | 53.83 | 51.22 | 49.60 | 51.32 | 48.28 | 45.61 |
| 40.00° | 39.45 | 40.72 | 43.18 | 40.19 | 38.99 | 39.29 | 39.54 | 37.39 | 36.93 | 40.05 | 45.85 | 45.03 | 42.76 | 42.47 | 43.65 | 41.12 | 39.45 |
| 42.50° | 33.43 | 34.33 | 35.97 | 34.71 | 33.52 | 33.79 | 33.66 | 32.29 | 32.78 | 35.41 | 38.77 | 38.53 | 37.41 | 36.61 | 37.12 | 35.77 | 33.43 |
| 45.00° | 30.18 | 30.43 | 31.76 | 30.02 | 29.52 | 28.58 | 29.95 | 27.93 | 29.38 | 30.89 | 33.47 | 33.45 | 32.64 | 32.69 | 32.66 | 31.44 | 30.18 |
| 47.50° | 27.00 | 27.23 | 27.97 | 27.29 | 26.50 | 26.60 | 27.07 | 25.27 | 26.10 | 27.52 | 29.39 | 29.33 | 29.32 | 29.25 | 29.06 | 27.83 | 27.00 |
| 50.00° | 24.54 | 24.76 | 25.49 | 24.65 | 24.46 | 24.61 | 24.94 | 23.08 | 22.85 | 24.43 | 25.87 | 26.33 | 26.34 | 27.03 | 26.70 | 25.21 | 24.54 |
| 52.50° | 22.17 | 22.44 | 23.14 | 22.18 | 22.96 | 22.49 | 22.81 | 21.77 | 21.27 | 22.89 | 23.53 | 23.95 | 24.02 | 25.02 | 24.27 | 23.17 | 22.17 |
| 55.00° | 20.39 | 21.07 | 21.09 | 20.00 | 21.44 | 20.47 | 20.68 | 20.54 | 19.91 | 21.25 | 21.60 | 21.98 | 21.78 | 22.24 | 21.73 | 21.06 | 20.39 |
| 57.50° | 18.72 | 19.83 | 19.12 | 18.26 | 19.92 | 18.83 | 19.13 | 19.43 | 18.87 | 19.24 | 19.72 | 20.18 | 19.63 | 19.37 | 19.75 | 18.90 | 18.72 |
| 60.00° | 17.58 | 17.64 | 17.31 | 16.60 | 17.91 | 17.27 | 17.92 | 18.07 | 17.85 | 17.28 | 17.84 | 18.08 | 17.89 | 17.84 | 18.32 | 17.46 | 17.58 |
| 62.50° | 16.26 | 15.38 | 15.61 | 15.04 | 15.73 | 15.96 | 16.37 | 16.40 | 15.70 | 15.45 | 15.83 | 15.87 | 16.65 | 16.39 | 16.65 | 16.28 | 16.26 |
| 65.00° | 14.38 | 14.07 | 14.09 | 13.53 | 14.39 | 14.48 | 14.65 | 14.58 | 13.54 | 13.74 | 13.78 | 13.89 | 15.05 | 14.78 | 14.78 | 14.70 | 14.38 |
| 67.50° | 12.49 | 12.74 | 12.39 | 12.07 | 13.27 | 12.61 | 13.33 | 12.61 | 11.54 | 12.33 | 11.92 | 11.97 | 13.06 | 13.13 | 13.04 | 13.01 | 12.49 |
| 70.00° | 10.59 | 11.25 | 10.49 | 10.28 | 11.15 | 10.97 | 12.14 | 11.03 | 9.67 | 10.95 | 10.16 | 10.62 | 11.21 | 11.25 | 11.37 | 11.16 | 10.59 |
| 72.50° | 8.65 | 9.38 | 8.93 | 8.31 | 8.94 | 9.65 | 10.21 | 9.71 | 8.35 | 9.61 | 9.45 | 9.21 | 9.43 | 9.29 | 9.15 | 9.16 | 8.65 |
| 75.00° | 6.69 | 7.00 | 7.45 | 6.42 | 6.83 | 8.11 | 8.12 | 7.72 | 6.80 | 7.68 | 8.32 | 7.21 | 7.34 | 7.22 | 7.34 | 6.84 | 6.69 |
| 77.50° | 4.71 | 5.14 | 5.79 | 4.65 | 4.97 | 6.29 | 5.71 | 5.63 | 5.03 | 5.56 | 6.59 | 5.36 | 5.06 | 5.09 | 6.50 | 5.24 | 4.71 |
| 80.00° | 3.13 | 3.30 | 3.48 | 2.99 | 3.27 | 3.55 | 3.98 | 3.56 | 3.50 | 3.78 | 4.58 | 3.54 | 2.93 | 3.16 | 4.26 | 3.42 | 3.13 |
| 82.50° | 1.52 | 1.68 | 1.72 | 1.45 | 1.67 | 2.03 | 2.49 | 2.26 | 1.98 | 2.46 | 2.49 | 1.59 | 2.29 | 1.79 | 2.15 | 1.62 | 1.52 |
| 85.00° | 0.80 | 0.64 | 0.76 | 0.65 | 0.91 | 0.90 | 1.18 | 0.99 | 0.86 | 1.37 | 1.01 | 0.84 | 0.52 | 0.82 | 0.81 | 0.79 | 0.80 |
| 87.50° | 0.72 | 0.55 | 0.68 | 0.52 | 0.56 | 0.59 | 0.61 | 0.60 | 0.62 | 0.60 | 0.79 | 0.52 | 0.58 | 0.63 | 0.63 | 0.58 | 0.72 |
| 90.00° | 0.00 | 0.00 | 0.00 | 0.00 | 0.63 | 0.61 | 0.71 | 0.57 | 0.54 | 0.56 | 0.60 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 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% | 10% | 0% |
| | pw | 70% | 50% | 30% | 10% | 70% | 50% | 30% | 10% | 50% | 30% | 10% | 50% | 30% | 10% | 50% | 30% | 10% | 30% |
| | 0 | 433 | 433 | 433 | 433 | 423 | 423 | 423 | 423 | 404 | 404 | 404 | 387 | 387 | 387 | 371 | 371 | 371 | 364 |
| | 1 | 411 | 400 | 390 | 381 | 402 | 392 | 383 | 375 | 377 | 370 | 363 | 363 | 358 | 352 | 351 | 346 | 342 | 339 |
| | 2 | 389 | 370 | 354 | 341 | 381 | 363 | 349 | 337 | 352 | 340 | 330 | 341 | 331 | 322 | 330 | 323 | 316 | 316 |
| | 3 | 369 | 344 | 325 | 310 | 362 | 339 | 322 | 308 | 330 | 315 | 303 | 321 | 308 | 298 | 312 | 302 | 293 | 296 |
| | 4 | 351 | 322 | 302 | 286 | 344 | 318 | 299 | 284 | 310 | 294 | 281 | 303 | 289 | 277 | 296 | 284 | 274 | 279 |
| | 5 | 334 | 303 | 282 | 266 | 328 | 300 | 280 | 265 | 293 | 276 | 262 | 287 | 272 | 260 | 282 | 268 | 258 | 264 |
| | 6 | 319 | 287 | 265 | 249 | 314 | 284 | 263 | 249 | 278 | 260 | 247 | 273 | 257 | 245 | 269 | 255 | 244 | 250 |
| | 7 | 305 | 272 | 251 | 235 | 301 | 270 | 249 | 235 | 265 | 247 | 234 | 261 | 244 | 232 | 257 | 242 | 231 | 238 |
| | 8 | 293 | 259 | 238 | 223 | 288 | 257 | 237 | 223 | 253 | 235 | 222 | 249 | 233 | 221 | 246 | 231 | 220 | 227 |
| | 9 | 281 | 247 | 227 | 213 | 277 | 246 | 226 | 212 | 242 | 224 | 212 | 239 | 223 | 211 | 236 | 221 | 210 | 218 |
| | 10 | 270 | 237 | 217 | 203 | 267 | 235 | 216 | 203 | 232 | 215 | 202 | 230 | 213 | 202 | 227 | 212 | 201 | 209 |

Cone of Light

| Mtg Height | Light Level | Beam Diameter |
|------------|-------------|---------------|
| 5.5 ft | 33.1 fc | 2.4 ft |
| 6.5 ft | 23.7 fc | 2.8 ft |
| 7.5 ft | 17.8 fc | 3.2 ft |
| 8.0 ft | 15.7 fc | 3.4 ft |
| 10.0 ft | 10.0 fc | 4.3 ft |
| 12.0 ft | 7.0 fc | 5.2 ft |
| 14.0 ft | 5.1 fc | 6.0 ft |
| 16.0 ft | 3.9 fc | 6.9 ft |
| 20.0 ft | 2.5 fc | 8.6 ft |
| 24.0 ft | 1.7 fc | 10.3 ft |
| 28.0 ft | 1.3 fc | 12.1 ft |

Average Luminaire Luminance [cd/m²]

| | 0.00° | 45.00° | 90.00° |
|---------------|---------|---------|---------|
| 0.00° | 222,860 | 222,860 | 222,860 |
| 45.00° | 9,492 | 9,988 | 9,284 |
| 55.00° | 7,905 | 8,177 | 8,313 |
| 65.00° | 7,565 | 7,416 | 7,571 |
| 75.00° | 5,749 | 6,399 | 5,869 |
| 85.00° | 2,036 | 1,947 | 2,327 |

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 | 16.0 | 17.2 | 16.4 | 17.5 | 17.8 | 16.1 | 17.3 | 16.5 | 17.6 | 17.9 |
| | 3H | 17.8 | 18.8 | 18.2 | 19.2 | 19.5 | 17.9 | 18.9 | 18.3 | 19.2 | 19.6 |
| | 4H | 18.3 | 19.3 | 18.7 | 19.6 | 20.0 | 18.5 | 19.4 | 18.9 | 19.8 | 20.2 |
| | 6H | 18.6 | 19.4 | 19.0 | 19.8 | 20.2 | 18.7 | 19.6 | 19.1 | 20.0 | 20.4 |
| | 8H | 18.6 | 19.4 | 19.0 | 19.8 | 20.2 | 18.8 | 19.6 | 19.2 | 20.0 | 20.4 |
| | 12H | 18.6 | 19.3 | 19.0 | 19.7 | 20.2 | 18.7 | 19.5 | 19.2 | 19.9 | 20.4 |
| 4H | 2H | 16.6 | 17.6 | 17.0 | 17.9 | 18.3 | 16.7 | 17.6 | 17.1 | 18.0 | 18.4 |
| | 3H | 18.6 | 19.3 | 19.0 | 19.8 | 20.2 | 18.6 | 19.4 | 19.0 | 19.8 | 20.2 |
| | 4H | 19.2 | 19.9 | 19.6 | 20.3 | 20.7 | 19.3 | 20.0 | 19.8 | 20.5 | 20.9 |
| | 6H | 19.5 | 20.1 | 20.0 | 20.6 | 21.0 | 19.7 | 20.3 | 20.2 | 20.8 | 21.2 |
| | 8H | 19.5 | 20.1 | 20.0 | 20.5 | 21.0 | 19.7 | 20.3 | 20.2 | 20.8 | 21.2 |
| | 12H | 19.5 | 20.0 | 20.0 | 20.5 | 21.0 | 19.7 | 20.2 | 20.2 | 20.7 | 21.2 |
| 8H | 4H | 19.4 | 20.0 | 19.9 | 20.4 | 20.9 | 19.6 | 20.2 | 20.1 | 20.6 | 21.1 |
| | 6H | 19.8 | 20.3 | 20.3 | 20.8 | 21.2 | 20.0 | 20.5 | 20.5 | 21.0 | 21.5 |
| | 8H | 19.9 | 20.3 | 20.4 | 20.8 | 21.3 | 20.1 | 20.5 | 20.6 | 21.0 | 21.5 |
| | 12H | 19.9 | 20.2 | 20.4 | 20.7 | 21.3 | 20.1 | 20.5 | 20.7 | 21.0 | 21.6 |
| 12H | 4H | 19.4 | 19.9 | 19.9 | 20.4 | 20.8 | 19.6 | 20.1 | 20.1 | 20.6 | 21.0 |
| | 6H | 19.8 | 20.2 | 20.3 | 20.7 | 21.2 | 20.1 | 20.5 | 20.6 | 20.9 | 21.5 |
| | 8H | 19.9 | 20.2 | 20.4 | 20.7 | 21.3 | 20.2 | 20.5 | 20.7 | 21.0 | 21.6 |

Corrected UGR values based on total output lumens

SHR = 1.0