

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: NEO-RAY

Report Number: P912191

Luminaire Tested: DFN2DIP-SQ4F0-070D160US850-RLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P912191  
REPORT IS A COMBINATION OF REPORTS P901726 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-070D160US850-RLLONL  
Description: 4 foot, Square Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

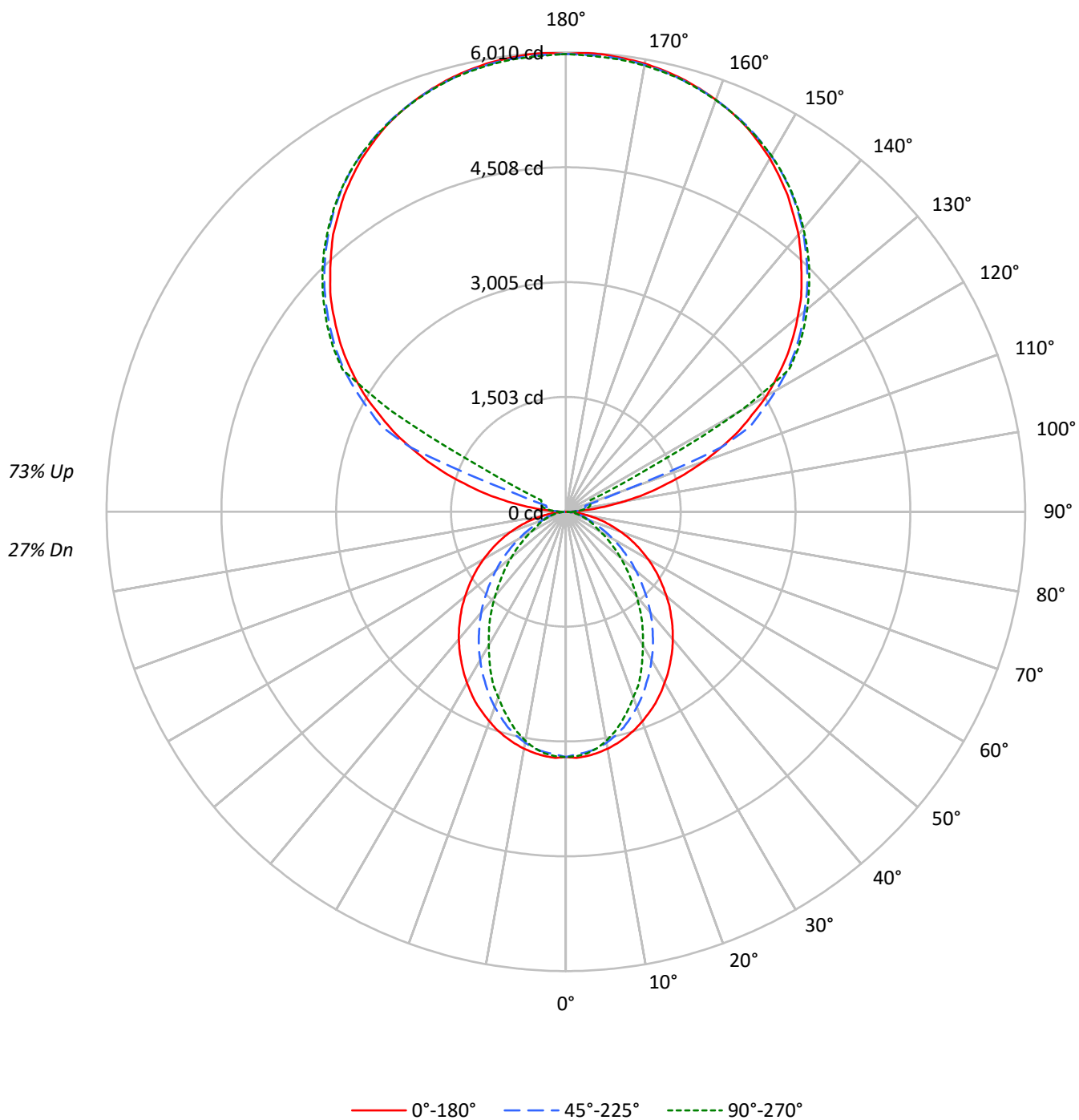
Lumens per Lamp: N/A  
Luminaire Lumens: 24165.1 lumens  
Efficiency: N/A  
Efficacy: 131.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 183.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9967  
Total Harmonic Distortion (THDi): 0.063  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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### Luminous Intensity Polar Plot



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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |  |    |    |    |    |  |    |    |    |  |    |    |    |  |    |    |    |
|-----|-----|-----|-----|-----|--|----|----|----|----|--|----|----|----|--|----|----|----|--|----|----|----|
| RF  | 20  |     |     |     |  | 20 |    |    |    |  | 20 |    |    |  |    | 20 |    |  |    |    | 20 |
| RC  | 80  |     |     |     |  | 70 |    |    |    |  | 50 |    |    |  |    | 30 |    |  |    |    | 10 |
| RW  | 70  | 50  | 30  | 10  |  | 70 | 50 | 30 | 10 |  | 50 | 30 | 10 |  | 50 | 30 | 10 |  | 50 | 30 | 10 |
| RCR |     |     |     |     |  |    |    |    |    |  |    |    |    |  |    |    |    |  |    |    |    |
| 0   | 102 | 102 | 102 | 102 |  | 91 | 91 | 91 | 91 |  | 71 | 71 | 71 |  | 52 | 52 | 52 |  | 35 | 35 | 35 |
| 1   | 93  | 89  | 85  | 82  |  | 83 | 80 | 77 | 74 |  | 62 | 60 | 58 |  | 46 | 45 | 44 |  | 32 | 31 | 30 |
| 2   | 85  | 78  | 72  | 67  |  | 76 | 70 | 65 | 61 |  | 55 | 52 | 49 |  | 41 | 39 | 37 |  | 28 | 27 | 26 |
| 3   | 77  | 69  | 62  | 56  |  | 69 | 62 | 56 | 51 |  | 49 | 44 | 41 |  | 36 | 34 | 32 |  | 25 | 24 | 22 |
| 4   | 71  | 61  | 53  | 48  |  | 63 | 55 | 48 | 43 |  | 43 | 39 | 35 |  | 33 | 30 | 27 |  | 23 | 21 | 19 |
| 5   | 65  | 54  | 46  | 41  |  | 58 | 49 | 42 | 37 |  | 39 | 34 | 30 |  | 29 | 26 | 24 |  | 20 | 19 | 17 |
| 6   | 60  | 49  | 41  | 35  |  | 53 | 44 | 37 | 32 |  | 35 | 30 | 27 |  | 26 | 23 | 21 |  | 19 | 17 | 15 |
| 7   | 55  | 44  | 36  | 31  |  | 49 | 40 | 33 | 28 |  | 32 | 27 | 23 |  | 24 | 21 | 18 |  | 17 | 15 | 13 |
| 8   | 51  | 40  | 32  | 27  |  | 46 | 36 | 29 | 25 |  | 29 | 24 | 21 |  | 22 | 19 | 16 |  | 16 | 14 | 12 |
| 9   | 48  | 36  | 29  | 24  |  | 43 | 33 | 27 | 22 |  | 26 | 22 | 18 |  | 20 | 17 | 15 |  | 14 | 12 | 11 |
| 10  | 44  | 33  | 26  | 22  |  | 40 | 30 | 24 | 20 |  | 24 | 20 | 17 |  | 19 | 15 | 13 |  | 13 | 11 | 10 |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2251 | 2251 | 2251 |
| 5°  | 2255 | 2216 | 2230 |
| 10° | 2233 | 2173 | 2158 |
| 15° | 2202 | 2102 | 2047 |
| 20° | 2161 | 2003 | 1910 |
| 25° | 2119 | 1892 | 1777 |
| 30° | 2063 | 1779 | 1609 |
| 35° | 2009 | 1657 | 1461 |
| 40° | 1953 | 1531 | 1291 |
| 45° | 1888 | 1391 | 1138 |
| 50° | 1821 | 1249 | 988  |
| 55° | 1751 | 1098 | 843  |
| 60° | 1670 | 939  | 695  |
| 65° | 1577 | 779  | 626  |
| 70° | 1464 | 628  | 567  |
| 75° | 1322 | 555  | 518  |
| 80° | 1117 | 467  | 451  |
| 85° | 778  | 314  | 343  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 3210 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 300.7   | 1.2       |
| 10°-20°   | 825.5   | 3.4       |
| 20°-30°   | 1158.9  | 4.8       |
| 30°-40°   | 1263.3  | 5.2       |
| 40°-50°   | 1161.1  | 4.8       |
| 50°-60°   | 911.9   | 3.8       |
| 60°-70°   | 593.5   | 2.5       |
| 70°-80°   | 305.5   | 1.3       |
| 80°-90°   | 88.5    | 0.4       |
| 90°-100°  | 197.5   | 0.8       |
| 100°-110° | 736.1   | 3.0       |
| 110°-120° | 1952.3  | 8.1       |
| 120°-130° | 3238.0  | 13.4      |
| 130°-140° | 3439.5  | 14.2      |
| 140°-150° | 3196.6  | 13.2      |
| 150°-160° | 2570.0  | 10.6      |
| 160°-170° | 1656.0  | 6.9       |
| 170°-180° | 570.0   | 2.4       |
| 0°-30°    | 2285.1  | 9.5       |
| 0°-40°    | 3548.4  | 14.7      |
| 0°-60°    | 5621.4  | 23.3      |
| 0°-90°    | 6609.0  | 27.3      |
| 90°-120°  | 2885.9  | 11.9      |
| 90°-150°  | 12760.0 | 52.8      |
| 90°-180°  | 17556.0 | 72.7      |
| 0°-180°   | 24165.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3208 | 3208  | 3208 | 3208  | 3208 |      |
| 5°   | 3208 | 3194  | 3156 | 3182  | 3174 | 304  |
| 15°  | 3052 | 3020  | 2921 | 2866  | 2837 | 860  |
| 25°  | 2770 | 2677  | 2485 | 2366  | 2323 | 1274 |
| 35°  | 2387 | 2239  | 1983 | 1800  | 1736 | 1494 |
| 45°  | 1951 | 1756  | 1452 | 1246  | 1176 | 1507 |
| 55°  | 1484 | 1257  | 944  | 770   | 714  | 1326 |
| 65°  | 1002 | 766   | 505  | 407   | 398  | 993  |
| 75°  | 534  | 331   | 232  | 212   | 209  | 565  |
| 85°  | 125  | 64    | 55   | 55    | 55   | 143  |
| 90°  | 4    | 52    | 86   | 109   | 117  | 22   |
| 95°  | 282  | 138   | 169  | 191   | 186  | 333  |
| 105° | 1317 | 1448  | 264  | 312   | 329  | 1407 |
| 115° | 2492 | 2565  | 2674 | 667   | 356  | 2453 |
| 125° | 3523 | 3579  | 3662 | 3692  | 3705 | 3142 |
| 135° | 4359 | 4429  | 4467 | 4511  | 4502 | 3367 |
| 145° | 5057 | 5052  | 5126 | 5156  | 5135 | 3163 |
| 155° | 5568 | 5529  | 5581 | 5607  | 5573 | 2566 |
| 165° | 5867 | 5841  | 5854 | 5884  | 5854 | 1658 |
| 175° | 6001 | 5971  | 5980 | 6010  | 5967 | 571  |
| 180° | 5988 | 5988  | 5988 | 5988  | 5988 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3208.4 | 3208.4 | 3208.4 | 3208.4 | 3208.4 |
| 2.5°   | 3222.9 | 3208.4 | 3176.4 | 3205.7 | 3199.8 |
| 5°     | 3208.4 | 3193.9 | 3156.1 | 3182.3 | 3173.6 |
| 7.5°   | 3182.3 | 3165.0 | 3124.4 | 3135.7 | 3121.3 |
| 10°    | 3147.5 | 3127.2 | 3069.2 | 3060.3 | 3043.0 |
| 12.5°  | 3104.0 | 3077.8 | 2999.3 | 2982.0 | 2949.9 |
| 15°    | 3051.6 | 3019.6 | 2921.0 | 2865.9 | 2836.9 |
| 17.5°  | 2990.6 | 2944.2 | 2822.2 | 2758.3 | 2711.8 |
| 20°    | 2921.0 | 2862.8 | 2717.7 | 2645.3 | 2581.2 |
| 22.5°  | 2845.6 | 2778.7 | 2610.1 | 2511.6 | 2468.2 |
| 25°    | 2770.1 | 2677.0 | 2485.4 | 2366.5 | 2322.8 |
| 27.5°  | 2680.1 | 2581.2 | 2369.3 | 2232.9 | 2166.0 |
| 30°    | 2584.3 | 2473.7 | 2241.4 | 2093.6 | 2015.1 |
| 32.5°  | 2491.3 | 2357.6 | 2119.7 | 1945.4 | 1872.7 |
| 35°    | 2386.8 | 2238.6 | 1983.3 | 1800.4 | 1736.3 |
| 37.5°  | 2285.2 | 2125.3 | 1855.5 | 1654.8 | 1582.5 |
| 40°    | 2177.6 | 2003.6 | 1721.7 | 1515.7 | 1440.1 |
| 42.5°  | 2067.4 | 1881.6 | 1588.3 | 1373.3 | 1301.0 |
| 45°    | 1951.3 | 1756.5 | 1451.9 | 1245.5 | 1175.9 |
| 47.5°  | 1840.9 | 1634.9 | 1321.3 | 1114.9 | 1051.1 |
| 50°    | 1719.0 | 1512.9 | 1193.4 | 992.9  | 932.2  |
| 52.5°  | 1599.7 | 1381.9 | 1071.4 | 879.8  | 824.7  |
| 55°    | 1483.6 | 1257.2 | 943.5  | 769.5  | 714.4  |
| 57.5°  | 1364.7 | 1132.4 | 830.5  | 667.8  | 621.4  |
| 60°    | 1242.7 | 1010.4 | 711.3  | 563.5  | 516.9  |
| 62.5°  | 1123.7 | 891.5  | 609.6  | 470.4  | 447.3  |
| 65°    | 1001.8 | 766.4  | 505.3  | 406.7  | 397.7  |
| 67.5°  | 885.6  | 650.3  | 406.7  | 357.0  | 348.4  |
| 70°    | 763.7  | 537.2  | 336.7  | 307.7  | 296.0  |
| 72.5°  | 647.5  | 432.5  | 281.6  | 258.5  | 252.6  |
| 75°    | 534.2  | 330.8  | 232.2  | 211.9  | 209.2  |
| 77.5°  | 421.1  | 235.0  | 183.0  | 171.2  | 165.5  |
| 80°    | 316.4  | 168.5  | 139.3  | 127.9  | 127.9  |
| 82.5°  | 220.6  | 113.3  | 95.8   | 89.9   | 89.9   |
| 85°    | 124.8  | 63.8   | 55.1   | 55.1   | 55.1   |
| 87.5°  | 46.5   | 23.1   | 23.1   | 20.3   | 20.3   |
| 90°    | 4.1    | 52.0   | 86.4   | 108.6  | 116.8  |
| 92.5°  | 108.6  | 91.0   | 103.9  | 112.7  | 116.8  |
| 95°    | 281.5  | 138.4  | 168.8  | 190.9  | 186.3  |
| 97.5°  | 506.8  | 151.8  | 220.7  | 234.1  | 238.2  |
| 100°   | 767.2  | 173.4  | 247.0  | 281.5  | 290.2  |
| 102.5° | 1052.8 | 1044.6 | 255.7  | 303.1  | 316.4  |
| 105°   | 1317.3 | 1447.5 | 264.5  | 311.9  | 329.3  |
| 107.5° | 1624.9 | 1733.0 | 273.3  | 320.6  | 338.0  |
| 110°   | 1919.8 | 2010.4 | 758.4  | 325.2  | 342.1  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 2197.2 | 2274.9 | 2201.3 | 333.5  | 346.8  |
| 115°   | 2491.5 | 2565.0 | 2673.6 | 667.4  | 355.5  |
| 117.5° | 2747.2 | 2833.6 | 2907.8 | 2287.8 | 1152.6 |
| 120°   | 3033.3 | 3098.1 | 3176.3 | 3228.3 | 2643.3 |
| 122.5° | 3275.7 | 3345.1 | 3432.0 | 3457.8 | 3462.4 |
| 125°   | 3522.6 | 3579.2 | 3661.6 | 3692.0 | 3704.8 |
| 127.5° | 3748.0 | 3808.7 | 3874.1 | 3917.3 | 3921.4 |
| 130°   | 3960.6 | 4030.0 | 4077.3 | 4125.1 | 4121.0 |
| 132.5° | 4177.2 | 4233.7 | 4281.1 | 4320.2 | 4316.1 |
| 135°   | 4359.3 | 4428.8 | 4467.4 | 4511.1 | 4502.3 |
| 137.5° | 4549.7 | 4601.7 | 4645.4 | 4688.6 | 4675.8 |
| 140°   | 4736.0 | 4770.9 | 4818.3 | 4857.4 | 4835.8 |
| 142.5° | 4892.4 | 4922.7 | 4978.9 | 5013.3 | 4991.7 |
| 145°   | 5057.0 | 5052.4 | 5126.0 | 5156.3 | 5134.8 |
| 147.5° | 5199.5 | 5186.7 | 5260.3 | 5281.9 | 5264.9 |
| 150°   | 5338.5 | 5308.1 | 5377.7 | 5403.4 | 5381.8 |
| 152.5° | 5455.3 | 5420.8 | 5485.7 | 5512.0 | 5481.6 |
| 155°   | 5568.0 | 5529.4 | 5581.4 | 5607.1 | 5572.6 |
| 157.5° | 5659.1 | 5624.6 | 5663.7 | 5694.0 | 5659.1 |
| 160°   | 5737.3 | 5711.0 | 5737.3 | 5763.0 | 5732.6 |
| 162.5° | 5806.3 | 5780.6 | 5802.1 | 5832.5 | 5793.4 |
| 165°   | 5866.9 | 5841.2 | 5854.1 | 5884.5 | 5854.1 |
| 167.5° | 5914.9 | 5888.6 | 5902.0 | 5932.3 | 5893.2 |
| 170°   | 5953.9 | 5927.7 | 5936.4 | 5966.8 | 5927.7 |
| 172.5° | 5979.6 | 5953.9 | 5962.6 | 5993.0 | 5953.9 |
| 175°   | 6001.2 | 5970.9 | 5979.6 | 6010.0 | 5966.8 |
| 177.5° | 6010.0 | 5979.6 | 5984.3 | 6014.7 | 5975.5 |
| 180°   | 5988.4 | 5988.4 | 5988.4 | 5988.4 | 5988.4 |

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**CIE UGR TABLE:**

| Reflectances:   |      |                  |       |       |       |       |                |      |      |      |      |
|-----------------|------|------------------|-------|-------|-------|-------|----------------|------|------|------|------|
| Ceiling         |      | 0.7              | 0.7   | 0.5   | 0.5   | 0.3   | 0.7            | 0.7  | 0.5  | 0.5  | 0.3  |
| Wall            |      | 0.5              | 0.3   | 0.5   | 0.3   | 0.3   | 0.5            | 0.3  | 0.5  | 0.3  | 0.3  |
| Reference plane |      | 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 |      |      |      |      |
| X=2H            | Y=2H | 7.37             | 8.04  | 8.50  | 9.17  | 10.73 | 3.33           | 4.00 | 4.46 | 5.13 | 6.69 |
|                 | 3H   | 9.04             | 9.64  | 10.18 | 10.77 | 12.35 | 4.51           | 5.11 | 5.65 | 6.24 | 7.82 |
|                 | 4H   | 9.64             | 10.22 | 10.79 | 11.35 | 12.93 | 4.95           | 5.52 | 6.10 | 6.65 | 8.24 |
|                 | 6H   | 10.06            | 10.59 | 11.22 | 11.72 | 13.32 | 5.26           | 5.79 | 6.42 | 6.92 | 8.52 |
|                 | 8H   | 10.18            | 10.68 | 11.35 | 11.83 | 13.42 | 5.35           | 5.85 | 6.51 | 7.00 | 8.59 |
|                 | 12H  | 10.24            | 10.72 | 11.41 | 11.86 | 13.47 | 5.39           | 5.86 | 6.55 | 7.01 | 8.62 |
| 4H              | 2H   | 7.37             | 7.94  | 8.53  | 9.07  | 10.66 | 3.91           | 4.48 | 5.07 | 5.61 | 7.20 |
|                 | 3H   | 9.19             | 9.66  | 10.35 | 10.82 | 12.42 | 5.24           | 5.72 | 6.41 | 6.88 | 8.47 |
|                 | 4H   | 9.88             | 10.31 | 11.04 | 11.46 | 13.08 | 5.79           | 6.23 | 6.95 | 7.37 | 8.99 |
|                 | 6H   | 10.39            | 10.76 | 11.56 | 11.93 | 13.54 | 6.20           | 6.57 | 7.37 | 7.74 | 9.35 |
|                 | 8H   | 10.56            | 10.91 | 11.73 | 12.07 | 13.69 | 6.33           | 6.67 | 7.50 | 7.83 | 9.46 |
|                 | 12H  | 10.65            | 10.97 | 11.84 | 12.14 | 13.77 | 6.38           | 6.70 | 7.57 | 7.87 | 9.50 |
| 8H              | 4H   | 9.83             | 10.18 | 11.00 | 11.34 | 12.96 | 6.06           | 6.41 | 7.23 | 7.57 | 9.19 |
|                 | 6H   | 10.40            | 10.69 | 11.59 | 11.89 | 13.51 | 6.57           | 6.86 | 7.76 | 8.06 | 9.68 |
|                 | 8H   | 10.62            | 10.87 | 11.81 | 12.05 | 13.69 | 6.76           | 7.01 | 7.96 | 8.19 | 9.83 |
|                 | 12H  | 10.75            | 10.97 | 11.95 | 12.15 | 13.82 | 6.88           | 7.10 | 8.07 | 8.27 | 9.95 |
| 12H             | 4H   | 9.78             | 10.09 | 10.96 | 11.27 | 12.89 | 6.06           | 6.37 | 7.24 | 7.54 | 9.17 |
|                 | 6H   | 10.37            | 10.62 | 11.57 | 11.80 | 13.44 | 6.62           | 6.87 | 7.82 | 8.05 | 9.69 |
|                 | 8H   | 10.59            | 10.81 | 11.79 | 11.99 | 13.66 | 6.83           | 7.05 | 8.03 | 8.22 | 9.90 |

END OF REPORT