

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: P909501

Luminaire Tested: DFN2DIP-SQ4F0-090D060US840-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P909501  
REPORT IS A COMBINATION OF REPORTS P901585 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-090D060US840-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

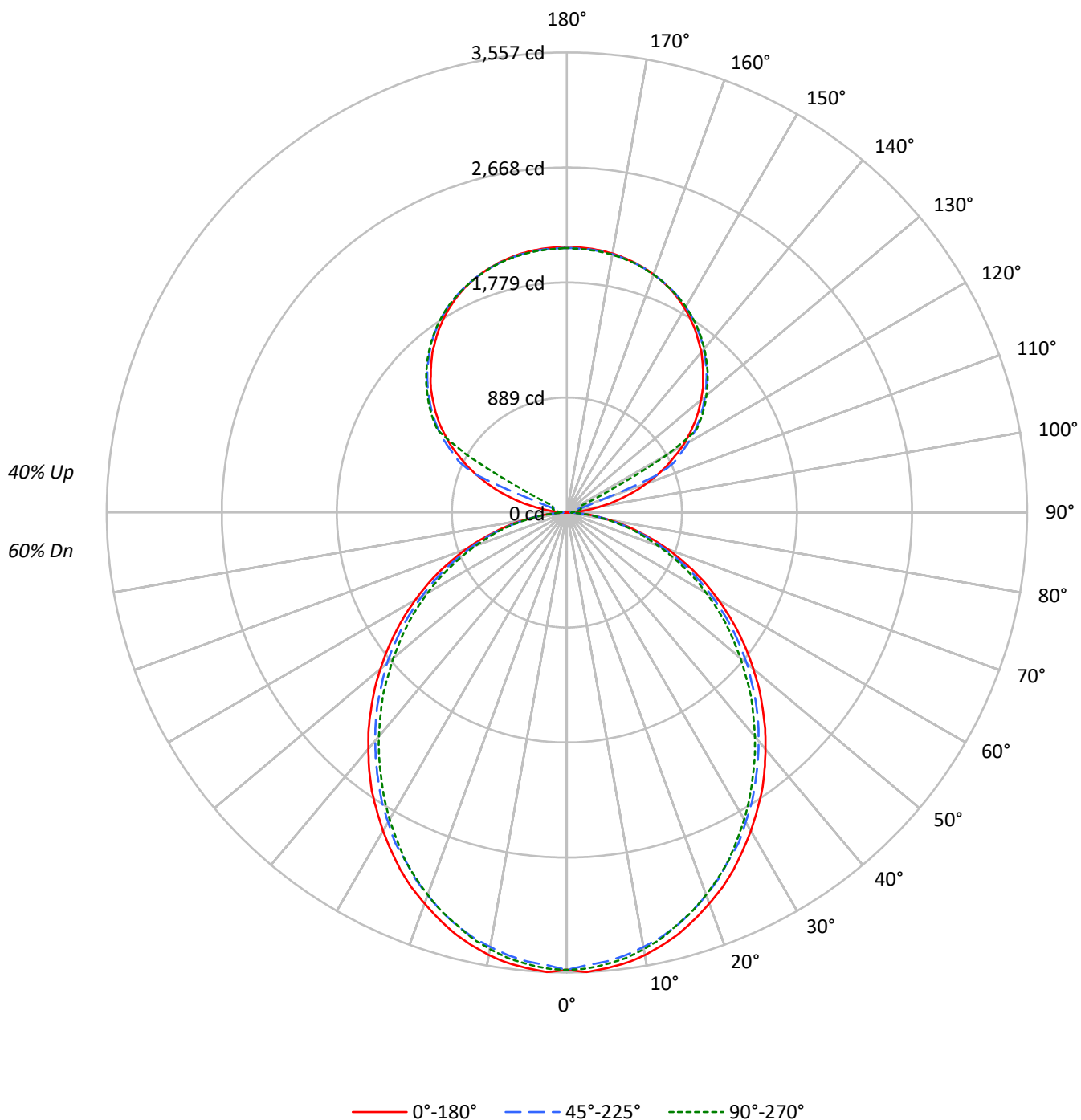
Lumens per Lamp: N/A  
Luminaire Lumens: 14996.5 lumens  
Efficiency: N/A  
Efficacy: 117.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 127.9  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.983  
Total Harmonic Distortion (THDi): 0.073  
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   | 110 | 110 | 110 | 110 | 102 | 102 | 102 | 102 | 89 | 89 | 89 | 77 | 77 | 77 | 65 | 65 | 65 |
| 1   | 100 | 96  | 92  | 88  | 93  | 90  | 86  | 83  | 78 | 75 | 73 | 67 | 66 | 64 | 58 | 56 | 55 |
| 2   | 91  | 84  | 77  | 72  | 85  | 78  | 73  | 68  | 68 | 64 | 61 | 59 | 56 | 53 | 51 | 49 | 47 |
| 3   | 83  | 73  | 66  | 60  | 77  | 69  | 62  | 57  | 60 | 55 | 51 | 52 | 48 | 45 | 45 | 42 | 40 |
| 4   | 76  | 65  | 57  | 51  | 71  | 61  | 54  | 48  | 54 | 48 | 44 | 47 | 42 | 39 | 40 | 37 | 34 |
| 5   | 70  | 58  | 50  | 44  | 65  | 55  | 47  | 42  | 48 | 42 | 38 | 42 | 37 | 34 | 36 | 33 | 30 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 42  | 36  | 43 | 37 | 33 | 38 | 33 | 30 | 33 | 29 | 26 |
| 7   | 60  | 47  | 39  | 33  | 56  | 44  | 37  | 32  | 39 | 33 | 29 | 35 | 30 | 26 | 30 | 26 | 23 |
| 8   | 55  | 43  | 35  | 30  | 52  | 40  | 33  | 28  | 36 | 30 | 26 | 32 | 27 | 23 | 28 | 24 | 21 |
| 9   | 52  | 39  | 32  | 26  | 48  | 37  | 30  | 25  | 33 | 27 | 23 | 29 | 24 | 21 | 26 | 22 | 19 |
| 10  | 48  | 36  | 29  | 24  | 45  | 34  | 27  | 23  | 30 | 25 | 21 | 27 | 22 | 19 | 24 | 20 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2481 | 2481 | 2481 |
| 5°  | 2485 | 2447 | 2464 |
| 10° | 2465 | 2415 | 2431 |
| 15° | 2429 | 2376 | 2380 |
| 20° | 2380 | 2321 | 2327 |
| 25° | 2331 | 2255 | 2266 |
| 30° | 2270 | 2194 | 2189 |
| 35° | 2212 | 2122 | 2106 |
| 40° | 2141 | 2050 | 2028 |
| 45° | 2070 | 1977 | 1948 |
| 50° | 1992 | 1900 | 1855 |
| 55° | 1911 | 1812 | 1770 |
| 60° | 1819 | 1707 | 1673 |
| 65° | 1719 | 1598 | 1558 |
| 70° | 1591 | 1466 | 1435 |
| 75° | 1414 | 1308 | 1322 |
| 80° | 1201 | 1106 | 1104 |
| 85° | 868  | 757  | 742  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2070 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 332.9   | 2.2       |
| 10°-20°   | 936.5   | 6.2       |
| 20°-30°   | 1376.3  | 9.2       |
| 30°-40°   | 1598.5  | 10.7      |
| 40°-50°   | 1596.5  | 10.6      |
| 50°-60°   | 1392.1  | 9.3       |
| 60°-70°   | 1029.1  | 6.9       |
| 70°-80°   | 582.2   | 3.9       |
| 80°-90°   | 157.3   | 1.0       |
| 90°-100°  | 67.4    | 0.4       |
| 100°-110° | 251.4   | 1.7       |
| 110°-120° | 666.7   | 4.4       |
| 120°-130° | 1105.7  | 7.4       |
| 130°-140° | 1174.5  | 7.8       |
| 140°-150° | 1091.6  | 7.3       |
| 150°-160° | 877.6   | 5.9       |
| 160°-170° | 565.5   | 3.8       |
| 170°-180° | 194.6   | 1.3       |
| 0°-30°    | 2645.7  | 17.6      |
| 0°-40°    | 4244.2  | 28.3      |
| 0°-60°    | 7232.9  | 48.2      |
| 0°-90°    | 9001.5  | 60.0      |
| 90°-120°  | 985.5   | 6.6       |
| 90°-150°  | 4357.2  | 29.1      |
| 90°-180°  | 5995.0  | 40.0      |
| 0°-180°   | 14996.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3536 | 3536  | 3536 | 3536  | 3536 |      |
| 5°   | 3536 | 3523  | 3486 | 3513  | 3506 | 336  |
| 15°  | 3367 | 3346  | 3302 | 3316  | 3299 | 948  |
| 25°  | 3047 | 3020  | 2962 | 2969  | 2962 | 1402 |
| 35°  | 2629 | 2595  | 2540 | 2520  | 2503 | 1642 |
| 45°  | 2139 | 2115  | 2064 | 2027  | 2013 | 1651 |
| 55°  | 1619 | 1598  | 1558 | 1517  | 1500 | 1447 |
| 65°  | 1092 | 1071  | 1037 | 1007  | 990  | 1079 |
| 75°  | 571  | 565   | 547  | 527   | 534  | 610  |
| 85°  | 139  | 136   | 133  | 122   | 119  | 155  |
| 90°  | 1    | 18    | 30   | 37    | 40   | 14   |
| 95°  | 96   | 47    | 58   | 65    | 64   | 114  |
| 105° | 450  | 494   | 90   | 106   | 112  | 481  |
| 115° | 851  | 876   | 913  | 228   | 121  | 838  |
| 125° | 1203 | 1222  | 1250 | 1261  | 1265 | 1073 |
| 135° | 1489 | 1512  | 1526 | 1540  | 1537 | 1150 |
| 145° | 1727 | 1725  | 1750 | 1761  | 1753 | 1080 |
| 155° | 1901 | 1888  | 1906 | 1915  | 1903 | 876  |
| 165° | 2004 | 1995  | 1999 | 2009  | 1999 | 566  |
| 175° | 2049 | 2039  | 2042 | 2052  | 2038 | 195  |
| 180° | 2045 | 2045  | 2045 | 2045  | 2045 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3536.4 | 3536.4 | 3536.4 | 3536.4 | 3536.4 |
| 2.5°   | 3557.0 | 3540.1 | 3502.6 | 3536.4 | 3530.0 |
| 5°     | 3536.4 | 3523.1 | 3485.7 | 3512.7 | 3506.2 |
| 7.5°   | 3512.7 | 3492.5 | 3455.0 | 3482.4 | 3475.6 |
| 10°    | 3475.6 | 3451.7 | 3410.9 | 3438.0 | 3427.9 |
| 12.5°  | 3424.3 | 3404.1 | 3363.4 | 3380.2 | 3373.5 |
| 15°    | 3366.6 | 3346.4 | 3302.0 | 3315.7 | 3298.7 |
| 17.5°  | 3295.1 | 3274.9 | 3230.6 | 3247.5 | 3230.6 |
| 20°    | 3216.8 | 3196.6 | 3149.0 | 3159.1 | 3145.7 |
| 22.5°  | 3138.9 | 3108.3 | 3063.8 | 3063.8 | 3057.0 |
| 25°    | 3046.9 | 3019.8 | 2962.1 | 2968.6 | 2962.1 |
| 27.5°  | 2944.8 | 2920.9 | 2877.0 | 2866.9 | 2849.9 |
| 30°    | 2843.1 | 2815.6 | 2764.7 | 2754.6 | 2741.0 |
| 32.5°  | 2734.1 | 2713.9 | 2659.4 | 2638.9 | 2625.1 |
| 35°    | 2628.8 | 2594.8 | 2540.3 | 2519.8 | 2502.9 |
| 37.5°  | 2509.7 | 2479.0 | 2424.5 | 2400.8 | 2383.8 |
| 40°    | 2387.3 | 2360.0 | 2305.4 | 2275.1 | 2261.5 |
| 42.5°  | 2268.3 | 2240.9 | 2186.8 | 2152.5 | 2132.3 |
| 45°    | 2139.1 | 2115.4 | 2064.1 | 2026.9 | 2013.3 |
| 47.5°  | 2013.3 | 1989.4 | 1934.9 | 1897.4 | 1877.2 |
| 50°    | 1880.5 | 1863.5 | 1815.8 | 1768.3 | 1751.3 |
| 52.5°  | 1751.3 | 1727.5 | 1683.4 | 1646.0 | 1622.1 |
| 55°    | 1618.9 | 1598.3 | 1557.5 | 1516.8 | 1499.9 |
| 57.5°  | 1486.1 | 1469.2 | 1424.8 | 1384.0 | 1370.3 |
| 60°    | 1353.3 | 1340.0 | 1292.3 | 1254.9 | 1244.8 |
| 62.5°  | 1224.2 | 1200.3 | 1166.4 | 1132.6 | 1118.8 |
| 65°    | 1091.8 | 1071.2 | 1037.2 | 1006.6 | 989.7  |
| 67.5°  | 955.7  | 938.5  | 908.1  | 884.3  | 870.6  |
| 70°    | 829.8  | 816.1  | 785.5  | 761.6  | 748.3  |
| 72.5°  | 700.6  | 686.9  | 669.9  | 646.2  | 636.1  |
| 75°    | 571.2  | 564.6  | 547.3  | 527.1  | 534.0  |
| 77.5°  | 455.7  | 442.0  | 435.2  | 425.1  | 415.0  |
| 80°    | 340.2  | 336.6  | 329.7  | 319.6  | 312.9  |
| 82.5°  | 231.3  | 231.3  | 228.0  | 214.3  | 214.3  |
| 85°    | 139.3  | 136.0  | 132.8  | 122.3  | 119.1  |
| 87.5°  | 61.3   | 54.4   | 47.7   | 37.6   | 33.9   |
| 90°    | 1.4    | 17.8   | 29.5   | 37.1   | 39.9   |
| 92.5°  | 37.1   | 31.1   | 35.4   | 38.5   | 39.9   |
| 95°    | 96.1   | 47.3   | 57.7   | 65.2   | 63.6   |
| 97.5°  | 173.1  | 51.8   | 75.3   | 80.0   | 81.4   |
| 100°   | 262.0  | 59.2   | 84.3   | 96.1   | 99.1   |
| 102.5° | 359.5  | 356.7  | 87.4   | 103.5  | 108.1  |
| 105°   | 449.8  | 494.2  | 90.3   | 106.4  | 112.5  |
| 107.5° | 554.9  | 591.8  | 93.3   | 109.5  | 115.4  |
| 110°   | 655.6  | 686.5  | 259.0  | 111.1  | 116.8  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 750.2  | 776.8  | 751.6  | 113.8  | 118.5  |
| 115°   | 850.8  | 876.0  | 913.0  | 227.9  | 121.4  |
| 117.5° | 938.1  | 967.7  | 992.9  | 781.2  | 393.5  |
| 120°   | 1035.8 | 1057.9 | 1084.7 | 1102.4 | 902.6  |
| 122.5° | 1118.5 | 1142.3 | 1171.9 | 1180.7 | 1182.4 |
| 125°   | 1203.0 | 1222.2 | 1250.3 | 1260.7 | 1265.1 |
| 127.5° | 1279.9 | 1300.6 | 1322.9 | 1337.7 | 1339.1 |
| 130°   | 1352.4 | 1376.1 | 1392.3 | 1408.7 | 1407.2 |
| 132.5° | 1426.4 | 1445.7 | 1461.9 | 1475.2 | 1473.8 |
| 135°   | 1488.6 | 1512.4 | 1525.5 | 1540.4 | 1537.4 |
| 137.5° | 1553.6 | 1571.4 | 1586.3 | 1601.0 | 1596.7 |
| 140°   | 1617.2 | 1629.2 | 1645.4 | 1658.7 | 1651.3 |
| 142.5° | 1670.6 | 1681.0 | 1700.2 | 1711.9 | 1704.6 |
| 145°   | 1726.9 | 1725.3 | 1750.4 | 1760.8 | 1753.4 |
| 147.5° | 1775.5 | 1771.1 | 1796.2 | 1803.6 | 1797.9 |
| 150°   | 1823.0 | 1812.6 | 1836.3 | 1845.1 | 1837.8 |
| 152.5° | 1862.9 | 1851.1 | 1873.2 | 1882.2 | 1871.8 |
| 155°   | 1901.4 | 1888.1 | 1905.9 | 1914.7 | 1902.9 |
| 157.5° | 1932.5 | 1920.7 | 1934.0 | 1944.4 | 1932.5 |
| 160°   | 1959.1 | 1950.2 | 1959.1 | 1967.9 | 1957.6 |
| 162.5° | 1982.7 | 1973.9 | 1981.3 | 1991.7 | 1978.3 |
| 165°   | 2003.5 | 1994.7 | 1999.0 | 2009.4 | 1999.0 |
| 167.5° | 2019.7 | 2010.8 | 2015.4 | 2025.8 | 2012.4 |
| 170°   | 2033.2 | 2024.2 | 2027.2 | 2037.5 | 2024.2 |
| 172.5° | 2041.9 | 2033.2 | 2036.1 | 2046.5 | 2033.2 |
| 175°   | 2049.3 | 2038.9 | 2041.9 | 2052.2 | 2037.5 |
| 177.5° | 2052.2 | 2041.9 | 2043.5 | 2053.9 | 2040.5 |
| 180°   | 2044.9 | 2044.9 | 2044.9 | 2044.9 | 2044.9 |

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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 | 11.32            | 12.28 | 12.19 | 13.17 | 14.29 | 10.87          | 11.83 | 11.74 | 12.72 | 13.84 |
|                 | 3H   | 12.99            | 13.85 | 13.87 | 14.75 | 15.90 | 12.50          | 13.36 | 13.38 | 14.26 | 15.40 |
|                 | 4H   | 13.59            | 14.40 | 14.48 | 15.30 | 16.46 | 13.09          | 13.91 | 13.99 | 14.81 | 15.96 |
|                 | 6H   | 13.99            | 14.75 | 14.90 | 15.65 | 16.82 | 13.49          | 14.24 | 14.40 | 15.15 | 16.32 |
|                 | 8H   | 14.10            | 14.82 | 15.02 | 15.75 | 16.91 | 13.60          | 14.32 | 14.52 | 15.24 | 16.41 |
|                 | 12H  | 14.16            | 14.84 | 15.08 | 15.76 | 16.95 | 13.65          | 14.33 | 14.57 | 15.25 | 16.44 |
| 4H              | 2H   | 11.79            | 12.61 | 12.69 | 13.51 | 14.67 | 11.44          | 12.25 | 12.34 | 13.15 | 14.31 |
|                 | 3H   | 13.67            | 14.35 | 14.58 | 15.29 | 16.46 | 13.26          | 13.94 | 14.17 | 14.88 | 16.05 |
|                 | 4H   | 14.39            | 15.01 | 15.31 | 15.94 | 17.14 | 13.97          | 14.59 | 14.89 | 15.52 | 16.72 |
|                 | 6H   | 14.92            | 15.45 | 15.85 | 16.41 | 17.60 | 14.49          | 15.02 | 15.42 | 15.97 | 17.17 |
|                 | 8H   | 15.07            | 15.57 | 16.01 | 16.52 | 17.73 | 14.64          | 15.14 | 15.57 | 16.08 | 17.29 |
|                 | 12H  | 15.15            | 15.60 | 16.11 | 16.57 | 17.79 | 14.70          | 15.15 | 15.66 | 16.12 | 17.34 |
| 8H              | 4H   | 14.60            | 15.10 | 15.54 | 16.05 | 17.26 | 14.22          | 14.72 | 15.16 | 15.67 | 16.88 |
|                 | 6H   | 15.24            | 15.65 | 16.20 | 16.64 | 17.85 | 14.86          | 15.27 | 15.82 | 16.26 | 17.47 |
|                 | 8H   | 15.46            | 15.83 | 16.44 | 16.81 | 18.04 | 15.07          | 15.44 | 16.04 | 16.42 | 17.64 |
|                 | 12H  | 15.60            | 15.92 | 16.58 | 16.90 | 18.17 | 15.19          | 15.51 | 16.17 | 16.49 | 17.76 |
| 12H             | 4H   | 14.59            | 15.04 | 15.55 | 16.01 | 17.22 | 14.22          | 14.67 | 15.18 | 15.64 | 16.85 |
|                 | 6H   | 15.27            | 15.64 | 16.24 | 16.61 | 17.84 | 14.90          | 15.26 | 15.87 | 16.24 | 17.47 |
|                 | 8H   | 15.52            | 15.84 | 16.50 | 16.81 | 18.09 | 15.14          | 15.46 | 16.12 | 16.43 | 17.71 |

END OF REPORT