

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: P929332

Luminaire Tested: DFN2DIP-HX4F0-090D070US940-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P929332  
REPORT IS A COMBINATION OF REPORTS P900883 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D070US940-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

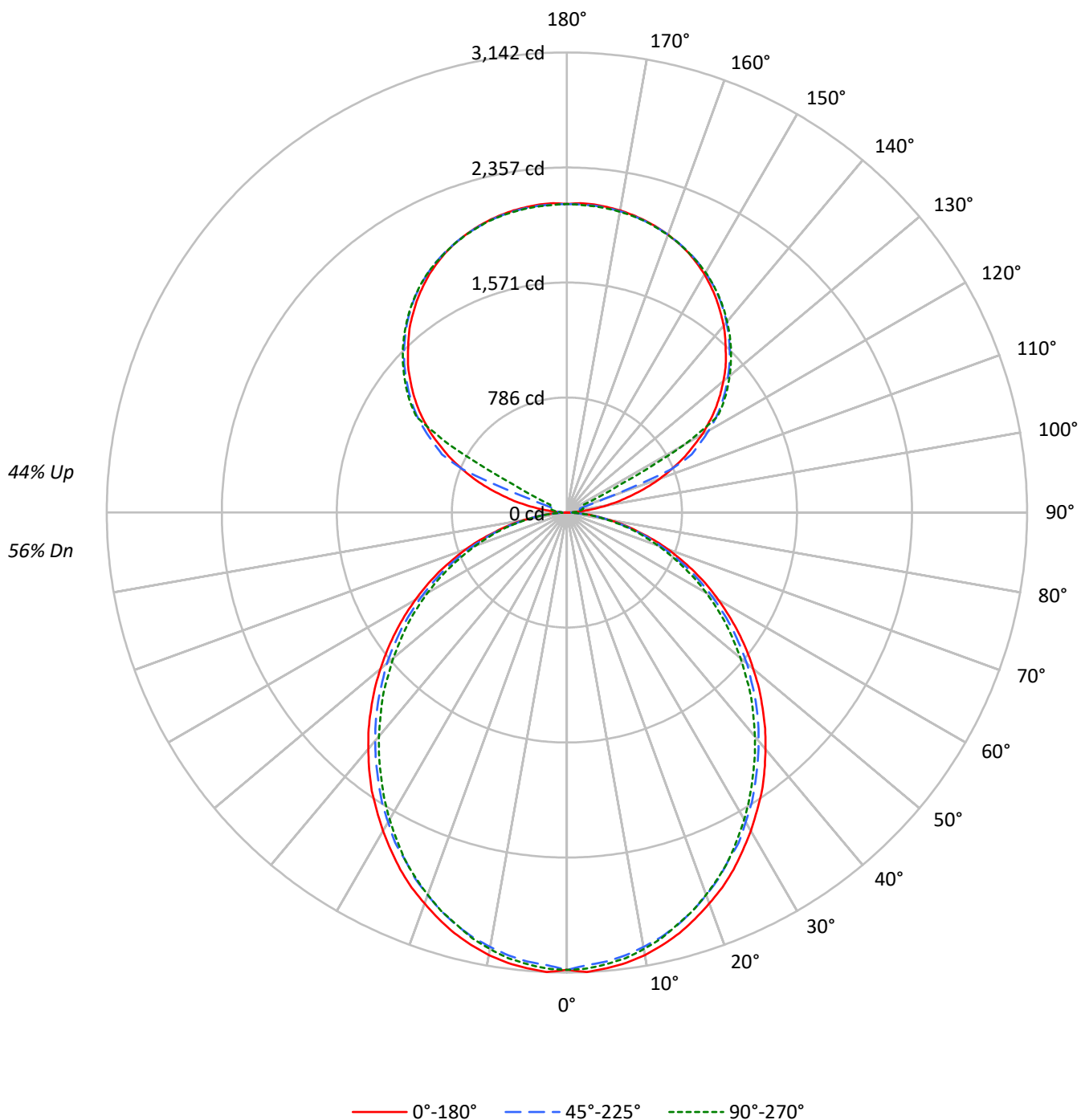
Lumens per Lamp: N/A  
Luminaire Lumens: 14129.3 lumens  
Efficiency: N/A  
Efficacy: 100.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 140.7  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9821  
Total Harmonic Distortion (THDi): 0.08  
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   | 109 | 109 | 109 | 109 | 101 | 101 | 101 | 101 | 87 | 87 | 87 | 74 | 74 | 74 | 62 | 62 | 62 |
| 1   | 99  | 95  | 91  | 87  | 92  | 88  | 85  | 82  | 76 | 74 | 71 | 65 | 63 | 62 | 55 | 53 | 52 |
| 2   | 90  | 83  | 77  | 71  | 84  | 77  | 72  | 67  | 67 | 63 | 59 | 57 | 54 | 51 | 48 | 46 | 44 |
| 3   | 82  | 73  | 65  | 59  | 76  | 68  | 61  | 56  | 59 | 54 | 50 | 51 | 47 | 44 | 43 | 40 | 38 |
| 4   | 75  | 64  | 56  | 50  | 70  | 60  | 53  | 48  | 52 | 47 | 42 | 45 | 41 | 37 | 38 | 35 | 32 |
| 5   | 69  | 58  | 49  | 43  | 64  | 54  | 46  | 41  | 47 | 41 | 37 | 40 | 36 | 32 | 34 | 31 | 28 |
| 6   | 64  | 52  | 43  | 38  | 59  | 48  | 41  | 36  | 42 | 36 | 32 | 37 | 32 | 28 | 31 | 28 | 25 |
| 7   | 59  | 47  | 39  | 33  | 55  | 44  | 37  | 31  | 38 | 33 | 28 | 33 | 29 | 25 | 29 | 25 | 22 |
| 8   | 55  | 42  | 35  | 29  | 51  | 40  | 33  | 28  | 35 | 29 | 25 | 30 | 26 | 22 | 26 | 23 | 20 |
| 9   | 51  | 39  | 31  | 26  | 48  | 36  | 30  | 25  | 32 | 26 | 23 | 28 | 23 | 20 | 24 | 21 | 18 |
| 10  | 48  | 36  | 28  | 23  | 44  | 34  | 27  | 22  | 30 | 24 | 20 | 26 | 21 | 18 | 22 | 19 | 16 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2323 | 2323 | 2323 |
| 5°  | 2327 | 2291 | 2306 |
| 10° | 2308 | 2260 | 2275 |
| 15° | 2274 | 2223 | 2226 |
| 20° | 2229 | 2171 | 2176 |
| 25° | 2183 | 2110 | 2119 |
| 30° | 2126 | 2053 | 2045 |
| 35° | 2072 | 1985 | 1968 |
| 40° | 2006 | 1917 | 1894 |
| 45° | 1939 | 1848 | 1819 |
| 50° | 1867 | 1776 | 1731 |
| 55° | 1791 | 1693 | 1651 |
| 60° | 1705 | 1595 | 1559 |
| 65° | 1612 | 1493 | 1450 |
| 70° | 1493 | 1368 | 1334 |
| 75° | 1328 | 1219 | 1226 |
| 80° | 1130 | 1029 | 1020 |
| 85° | 820  | 702  | 678  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1939 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 294.0   | 2.1       |
| 10°-20°   | 827.2   | 5.9       |
| 20°-30°   | 1215.7  | 8.6       |
| 30°-40°   | 1412.0  | 10.0      |
| 40°-50°   | 1410.2  | 10.0      |
| 50°-60°   | 1229.7  | 8.7       |
| 60°-70°   | 909.0   | 6.4       |
| 70°-80°   | 514.3   | 3.6       |
| 80°-90°   | 139.4   | 1.0       |
| 90°-100°  | 69.5    | 0.5       |
| 100°-110° | 259.0   | 1.8       |
| 110°-120° | 687.0   | 4.9       |
| 120°-130° | 1139.4  | 8.1       |
| 130°-140° | 1210.3  | 8.6       |
| 140°-150° | 1124.9  | 8.0       |
| 150°-160° | 904.4   | 6.4       |
| 160°-170° | 582.7   | 4.1       |
| 170°-180° | 200.6   | 1.4       |
| 0°-30°    | 2336.9  | 16.5      |
| 0°-40°    | 3748.9  | 26.5      |
| 0°-60°    | 6388.7  | 45.2      |
| 0°-90°    | 7951.4  | 56.3      |
| 90°-120°  | 1015.5  | 7.2       |
| 90°-150°  | 4490.2  | 31.8      |
| 90°-180°  | 6178.0  | 43.7      |
| 0°-180°   | 14129.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3124 | 3124  | 3124 | 3124  | 3124 |      |
| 5°   | 3124 | 3112  | 3079 | 3103  | 3097 | 297  |
| 15°  | 2974 | 2956  | 2917 | 2929  | 2914 | 837  |
| 25°  | 2691 | 2667  | 2616 | 2622  | 2616 | 1238 |
| 35°  | 2322 | 2292  | 2244 | 2226  | 2211 | 1450 |
| 45°  | 1889 | 1868  | 1823 | 1790  | 1778 | 1458 |
| 55°  | 1430 | 1412  | 1376 | 1340  | 1325 | 1278 |
| 65°  | 964  | 946   | 916  | 889   | 874  | 953  |
| 75°  | 504  | 499   | 484  | 466   | 472  | 539  |
| 85°  | 123  | 120   | 117  | 108   | 105  | 137  |
| 90°  | 1    | 18    | 30   | 38    | 41   | 13   |
| 95°  | 99   | 49    | 59   | 67    | 66   | 117  |
| 105° | 464  | 509   | 93   | 110   | 116  | 495  |
| 115° | 877  | 903   | 941  | 235   | 125  | 863  |
| 125° | 1240 | 1260  | 1288 | 1299  | 1304 | 1106 |
| 135° | 1534 | 1558  | 1572 | 1587  | 1584 | 1185 |
| 145° | 1780 | 1778  | 1804 | 1814  | 1807 | 1113 |
| 155° | 1959 | 1946  | 1964 | 1973  | 1961 | 903  |
| 165° | 2064 | 2056  | 2060 | 2071  | 2060 | 583  |
| 175° | 2112 | 2101  | 2104 | 2115  | 2100 | 201  |
| 180° | 2107 | 2107  | 2107 | 2107  | 2107 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3123.7 | 3123.7 | 3123.7 | 3123.7 | 3123.7 |
| 2.5°   | 3141.9 | 3126.9 | 3093.8 | 3123.7 | 3118.0 |
| 5°     | 3123.7 | 3111.9 | 3078.8 | 3102.7 | 3096.9 |
| 7.5°   | 3102.7 | 3084.9 | 3051.7 | 3076.0 | 3069.9 |
| 10°    | 3069.9 | 3048.9 | 3012.8 | 3036.7 | 3027.8 |
| 12.5°  | 3024.6 | 3006.8 | 2970.8 | 2985.7 | 2979.7 |
| 15°    | 2973.7 | 2955.8 | 2916.6 | 2928.7 | 2913.7 |
| 17.5°  | 2910.5 | 2892.7 | 2853.5 | 2868.5 | 2853.5 |
| 20°    | 2841.4 | 2823.5 | 2781.4 | 2790.4 | 2778.6 |
| 22.5°  | 2772.5 | 2745.5 | 2706.2 | 2706.2 | 2700.2 |
| 25°    | 2691.3 | 2667.3 | 2616.4 | 2622.1 | 2616.4 |
| 27.5°  | 2601.1 | 2580.0 | 2541.2 | 2532.3 | 2517.3 |
| 30°    | 2511.2 | 2487.0 | 2442.0 | 2433.1 | 2421.1 |
| 32.5°  | 2415.0 | 2397.2 | 2349.0 | 2330.9 | 2318.8 |
| 35°    | 2322.0 | 2292.0 | 2243.8 | 2225.7 | 2210.7 |
| 37.5°  | 2216.8 | 2189.7 | 2141.5 | 2120.6 | 2105.6 |
| 40°    | 2108.7 | 2084.5 | 2036.3 | 2009.6 | 1997.5 |
| 42.5°  | 2003.5 | 1979.3 | 1931.5 | 1901.3 | 1883.5 |
| 45°    | 1889.4 | 1868.5 | 1823.2 | 1790.3 | 1778.3 |
| 47.5°  | 1778.3 | 1757.2 | 1709.1 | 1676.0 | 1658.1 |
| 50°    | 1661.0 | 1646.0 | 1603.9 | 1561.9 | 1546.9 |
| 52.5°  | 1546.9 | 1525.9 | 1487.0 | 1453.9 | 1432.8 |
| 55°    | 1430.0 | 1411.8 | 1375.7 | 1339.8 | 1324.8 |
| 57.5°  | 1312.7 | 1297.7 | 1258.5 | 1222.5 | 1210.4 |
| 60°    | 1195.4 | 1183.6 | 1141.5 | 1108.4 | 1099.5 |
| 62.5°  | 1081.3 | 1060.2 | 1030.3 | 1000.4 | 988.2  |
| 65°    | 964.3  | 946.1  | 916.2  | 889.1  | 874.2  |
| 67.5°  | 844.2  | 828.9  | 802.1  | 781.1  | 769.0  |
| 70°    | 733.0  | 720.8  | 693.8  | 672.7  | 661.0  |
| 72.5°  | 618.9  | 606.7  | 591.8  | 570.8  | 561.9  |
| 75°    | 504.5  | 498.7  | 483.5  | 465.6  | 471.7  |
| 77.5°  | 402.5  | 390.4  | 384.4  | 375.4  | 366.5  |
| 80°    | 300.5  | 297.3  | 291.2  | 282.3  | 276.3  |
| 82.5°  | 204.3  | 204.3  | 201.4  | 189.3  | 189.3  |
| 85°    | 123.0  | 120.2  | 117.3  | 108.0  | 105.2  |
| 87.5°  | 54.1   | 48.1   | 42.1   | 33.2   | 30.0   |
| 90°    | 1.4    | 18.3   | 30.4   | 38.2   | 41.1   |
| 92.5°  | 38.2   | 32.0   | 36.6   | 39.7   | 41.1   |
| 95°    | 99.0   | 48.7   | 59.4   | 67.2   | 65.6   |
| 97.5°  | 178.3  | 53.4   | 77.7   | 82.4   | 83.8   |
| 100°   | 270.0  | 61.0   | 86.9   | 99.0   | 102.1  |
| 102.5° | 370.4  | 367.6  | 90.0   | 106.7  | 111.3  |
| 105°   | 463.6  | 509.3  | 93.0   | 109.7  | 115.9  |
| 107.5° | 571.8  | 609.9  | 96.2   | 112.8  | 119.0  |
| 110°   | 675.6  | 707.4  | 266.9  | 114.4  | 120.4  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 773.2  | 800.5  | 774.6  | 117.3  | 122.0  |
| 115°   | 876.7  | 902.6  | 940.8  | 234.9  | 125.1  |
| 117.5° | 966.7  | 997.2  | 1023.2 | 805.0  | 405.6  |
| 120°   | 1067.4 | 1090.2 | 1117.8 | 1136.1 | 930.2  |
| 122.5° | 1152.6 | 1177.1 | 1207.8 | 1216.8 | 1218.4 |
| 125°   | 1239.6 | 1259.5 | 1288.5 | 1299.2 | 1303.7 |
| 127.5° | 1318.9 | 1340.2 | 1363.2 | 1378.5 | 1379.9 |
| 130°   | 1393.7 | 1418.1 | 1434.8 | 1451.6 | 1450.2 |
| 132.5° | 1469.9 | 1489.8 | 1506.5 | 1520.2 | 1518.8 |
| 135°   | 1534.0 | 1558.4 | 1572.1 | 1587.4 | 1584.4 |
| 137.5° | 1601.0 | 1619.3 | 1634.7 | 1649.9 | 1645.4 |
| 140°   | 1666.5 | 1678.8 | 1695.5 | 1709.3 | 1701.7 |
| 142.5° | 1721.6 | 1732.3 | 1752.0 | 1764.1 | 1756.5 |
| 145°   | 1779.5 | 1777.9 | 1803.8 | 1814.5 | 1806.9 |
| 147.5° | 1829.7 | 1825.2 | 1851.1 | 1858.7 | 1852.7 |
| 150°   | 1878.6 | 1867.9 | 1892.4 | 1901.4 | 1893.8 |
| 152.5° | 1919.7 | 1907.5 | 1930.4 | 1939.6 | 1929.0 |
| 155°   | 1959.4 | 1945.7 | 1964.0 | 1973.1 | 1961.0 |
| 157.5° | 1991.4 | 1979.3 | 1993.0 | 2003.7 | 1991.4 |
| 160°   | 2019.0 | 2009.7 | 2019.0 | 2028.0 | 2017.3 |
| 162.5° | 2043.2 | 2034.1 | 2041.7 | 2052.4 | 2038.7 |
| 165°   | 2064.5 | 2055.5 | 2060.0 | 2070.7 | 2060.0 |
| 167.5° | 2081.4 | 2072.1 | 2076.8 | 2087.5 | 2073.8 |
| 170°   | 2095.1 | 2085.9 | 2089.0 | 2099.7 | 2085.9 |
| 172.5° | 2104.2 | 2095.1 | 2098.3 | 2108.9 | 2095.1 |
| 175°   | 2111.8 | 2101.1 | 2104.2 | 2114.8 | 2099.7 |
| 177.5° | 2114.8 | 2104.2 | 2105.8 | 2116.5 | 2102.7 |
| 180°   | 2107.3 | 2107.3 | 2107.3 | 2107.3 | 2107.3 |

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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 | 10.76            | 11.68 | 11.66 | 12.60 | 13.78 | 10.33          | 11.25 | 11.23 | 12.17 | 13.35 |
|                 | 3H   | 12.43            | 13.25 | 13.34 | 14.18 | 15.39 | 11.95          | 12.78 | 12.87 | 13.71 | 14.91 |
|                 | 4H   | 13.02            | 13.80 | 13.95 | 14.73 | 15.95 | 12.54          | 13.33 | 13.47 | 14.26 | 15.47 |
|                 | 6H   | 13.42            | 14.14 | 14.36 | 15.08 | 16.31 | 12.95          | 13.67 | 13.89 | 14.61 | 15.83 |
|                 | 8H   | 13.53            | 14.21 | 14.48 | 15.17 | 16.40 | 13.05          | 13.74 | 14.00 | 14.70 | 15.92 |
|                 | 12H  | 13.58            | 14.23 | 14.53 | 15.18 | 16.43 | 13.10          | 13.75 | 14.05 | 14.70 | 15.95 |
| 4H              | 2H   | 11.23            | 12.01 | 12.16 | 12.95 | 14.16 | 10.89          | 11.67 | 11.82 | 12.60 | 13.82 |
|                 | 3H   | 13.10            | 13.76 | 14.05 | 14.72 | 15.95 | 12.71          | 13.36 | 13.65 | 14.33 | 15.56 |
|                 | 4H   | 13.82            | 14.42 | 14.77 | 15.38 | 16.63 | 13.41          | 14.01 | 14.37 | 14.97 | 16.22 |
|                 | 6H   | 14.34            | 14.85 | 15.31 | 15.84 | 17.09 | 13.93          | 14.44 | 14.90 | 15.43 | 16.68 |
|                 | 8H   | 14.49            | 14.97 | 15.46 | 15.95 | 17.21 | 14.08          | 14.56 | 15.05 | 15.54 | 16.80 |
|                 | 12H  | 14.57            | 15.00 | 15.56 | 16.00 | 17.27 | 14.15          | 14.58 | 15.13 | 15.57 | 16.84 |
| 8H              | 4H   | 14.02            | 14.50 | 14.99 | 15.48 | 16.75 | 13.66          | 14.14 | 14.63 | 15.12 | 16.39 |
|                 | 6H   | 14.66            | 15.06 | 15.65 | 16.07 | 17.34 | 14.29          | 14.69 | 15.29 | 15.71 | 16.98 |
|                 | 8H   | 14.88            | 15.23 | 15.88 | 16.24 | 17.52 | 14.51          | 14.86 | 15.51 | 15.87 | 17.15 |
|                 | 12H  | 15.02            | 15.32 | 16.02 | 16.33 | 17.65 | 14.63          | 14.94 | 15.64 | 15.94 | 17.27 |
| 12H             | 4H   | 14.01            | 14.44 | 15.00 | 15.44 | 16.71 | 13.66          | 14.09 | 14.65 | 15.09 | 16.36 |
|                 | 6H   | 14.69            | 15.04 | 15.69 | 16.05 | 17.33 | 14.34          | 14.69 | 15.34 | 15.70 | 16.98 |
|                 | 8H   | 14.93            | 15.24 | 15.94 | 16.24 | 17.57 | 14.58          | 14.89 | 15.58 | 15.89 | 17.21 |

END OF REPORT