

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: P908183

Luminaire Tested: DFN2DIP-HX4F0-060D060US840-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P908183  
REPORT IS A COMBINATION OF REPORTS P899340 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-060D060US840-RLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

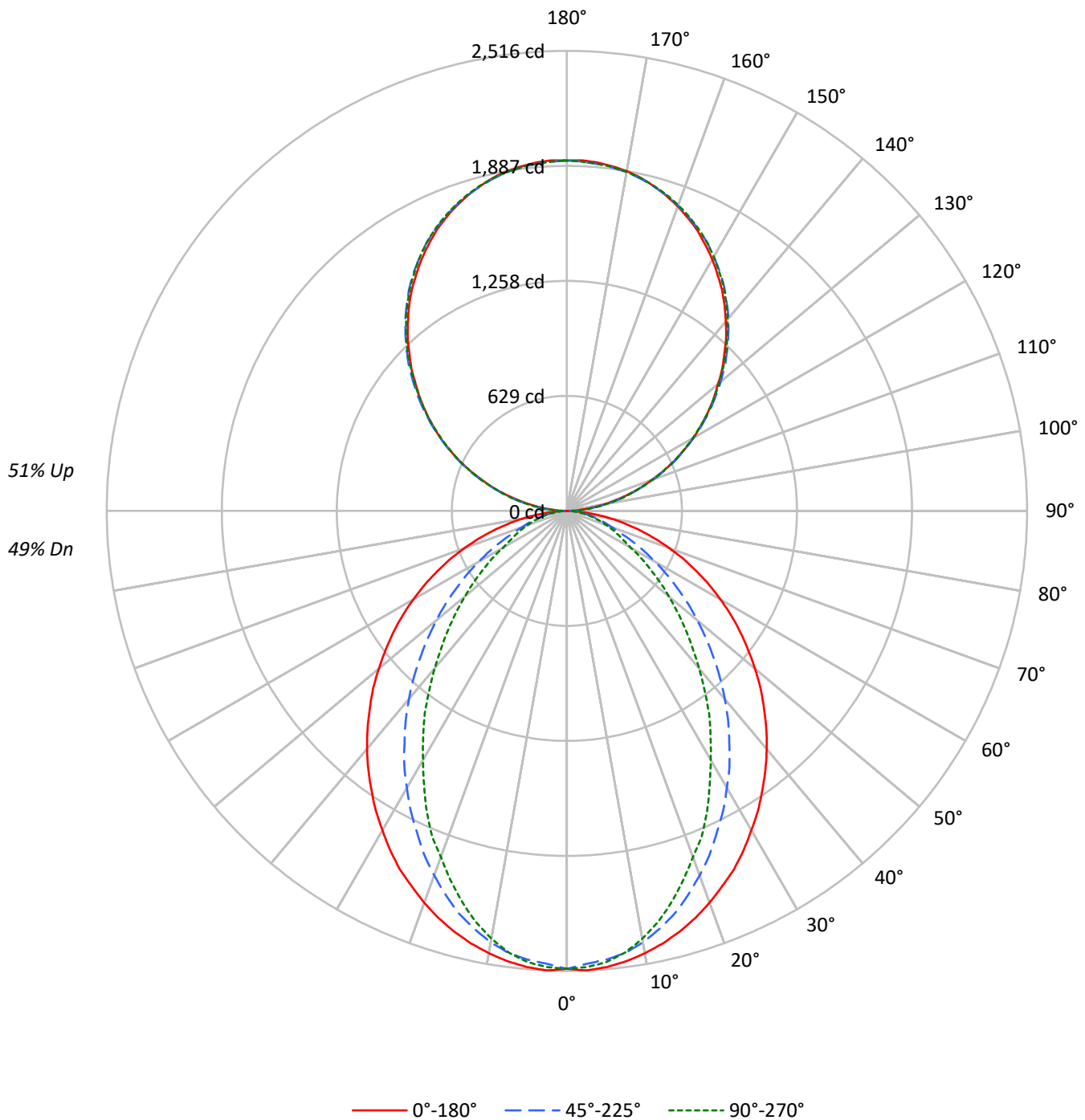
Lumens per Lamp: N/A  
Luminaire Lumens: 10512.7 lumens  
Efficiency: N/A  
Efficacy: 119.2 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 88.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.099  
Total Harmonic Distortion (THDi): 0.979  
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   | 107 | 107 | 107 | 107 | 99 | 99 | 99 | 99 | 83 | 83 | 83 | 68 | 68 | 68 | 55 | 55 | 55 |
| 1   | 98  | 94  | 90  | 87  | 90 | 87 | 84 | 81 | 73 | 71 | 69 | 61 | 59 | 58 | 50 | 49 | 48 |
| 2   | 90  | 83  | 77  | 72  | 82 | 76 | 71 | 67 | 65 | 61 | 58 | 54 | 51 | 49 | 44 | 42 | 41 |
| 3   | 82  | 73  | 66  | 60  | 75 | 68 | 61 | 57 | 58 | 53 | 49 | 48 | 45 | 42 | 40 | 37 | 35 |
| 4   | 75  | 65  | 57  | 51  | 69 | 60 | 54 | 48 | 51 | 46 | 42 | 43 | 40 | 36 | 36 | 33 | 31 |
| 5   | 69  | 58  | 50  | 44  | 64 | 54 | 47 | 42 | 46 | 41 | 37 | 39 | 35 | 32 | 32 | 29 | 27 |
| 6   | 64  | 52  | 44  | 39  | 59 | 49 | 42 | 37 | 42 | 36 | 32 | 35 | 31 | 28 | 30 | 26 | 24 |
| 7   | 59  | 47  | 40  | 34  | 55 | 44 | 37 | 32 | 38 | 33 | 29 | 32 | 28 | 25 | 27 | 24 | 22 |
| 8   | 55  | 43  | 36  | 30  | 51 | 40 | 33 | 29 | 35 | 29 | 26 | 30 | 26 | 23 | 25 | 22 | 20 |
| 9   | 51  | 39  | 32  | 27  | 47 | 37 | 30 | 26 | 32 | 27 | 23 | 27 | 23 | 20 | 23 | 20 | 18 |
| 10  | 48  | 36  | 29  | 24  | 44 | 34 | 28 | 23 | 30 | 24 | 21 | 25 | 21 | 19 | 22 | 18 | 16 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1862 | 1862 | 1862 |
| 5°  | 1865 | 1833 | 1844 |
| 10° | 1847 | 1797 | 1784 |
| 15° | 1822 | 1738 | 1692 |
| 20° | 1788 | 1656 | 1578 |
| 25° | 1754 | 1564 | 1468 |
| 30° | 1708 | 1470 | 1329 |
| 35° | 1663 | 1369 | 1206 |
| 40° | 1617 | 1265 | 1066 |
| 45° | 1563 | 1149 | 939  |
| 50° | 1508 | 1032 | 814  |
| 55° | 1451 | 907  | 695  |
| 60° | 1384 | 776  | 572  |
| 65° | 1307 | 643  | 515  |
| 70° | 1214 | 518  | 466  |
| 75° | 1098 | 457  | 424  |
| 80° | 928  | 384  | 368  |
| 85° | 649  | 257  | 277  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 1563 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 234.7   | 2.2       |
| 10°-20°   | 644.3   | 6.1       |
| 20°-30°   | 904.6   | 8.6       |
| 30°-40°   | 986.1   | 9.4       |
| 40°-50°   | 906.3   | 8.6       |
| 50°-60°   | 711.7   | 6.8       |
| 60°-70°   | 463.3   | 4.4       |
| 70°-80°   | 238.5   | 2.3       |
| 80°-90°   | 66.3    | 0.6       |
| 90°-100°  | 118.6   | 1.1       |
| 100°-110° | 376.8   | 3.6       |
| 110°-120° | 644.8   | 6.1       |
| 120°-130° | 848.0   | 8.1       |
| 130°-140° | 951.8   | 9.1       |
| 140°-150° | 933.4   | 8.9       |
| 150°-160° | 783.0   | 7.4       |
| 160°-170° | 519.2   | 4.9       |
| 170°-180° | 181.5   | 1.7       |
| 0°-30°    | 1783.6  | 17.0      |
| 0°-40°    | 2769.6  | 26.3      |
| 0°-60°    | 4387.7  | 41.7      |
| 0°-90°    | 5155.8  | 49.0      |
| 90°-120°  | 1140.1  | 10.8      |
| 90°-150°  | 3873.3  | 36.8      |
| 90°-180°  | 5357.0  | 51.0      |
| 0°-180°   | 10512.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2504 | 2504  | 2504 | 2504  | 2504 |      |
| 5°   | 2504 | 2493  | 2463 | 2484  | 2477 | 237  |
| 15°  | 2382 | 2357  | 2280 | 2237  | 2214 | 671  |
| 25°  | 2162 | 2090  | 1940 | 1847  | 1813 | 994  |
| 35°  | 1863 | 1747  | 1548 | 1405  | 1355 | 1166 |
| 45°  | 1523 | 1371  | 1133 | 972   | 918  | 1176 |
| 55°  | 1158 | 981   | 736  | 601   | 558  | 1035 |
| 65°  | 782  | 598   | 394  | 317   | 310  | 775  |
| 75°  | 417  | 258   | 181  | 165   | 163  | 441  |
| 85°  | 97   | 50    | 43   | 43    | 43   | 112  |
| 90°  | 2    | 21    | 57   | 53    | 55   | 10   |
| 95°  | 84   | 100   | 103  | 103   | 100  | 94   |
| 105° | 348  | 352   | 356  | 359   | 359  | 367  |
| 115° | 647  | 656   | 653  | 652   | 647  | 640  |
| 125° | 941  | 956   | 951  | 946   | 944  | 841  |
| 135° | 1217 | 1235  | 1239 | 1237  | 1232 | 941  |
| 145° | 1478 | 1489  | 1499 | 1500  | 1494 | 923  |
| 155° | 1690 | 1694  | 1700 | 1708  | 1702 | 778  |
| 165° | 1838 | 1836  | 1836 | 1848  | 1840 | 519  |
| 175° | 1913 | 1908  | 1905 | 1916  | 1906 | 182  |
| 180° | 1916 | 1916  | 1916 | 1916  | 1916 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2504.3 | 2504.3 | 2504.3 | 2504.3 | 2504.3 |
| 2.5°   | 2515.6 | 2504.3 | 2479.2 | 2502.0 | 2497.5 |
| 5°     | 2504.3 | 2493.0 | 2463.4 | 2483.9 | 2477.1 |
| 7.5°   | 2483.9 | 2470.3 | 2438.6 | 2447.5 | 2436.2 |
| 10°    | 2456.6 | 2440.7 | 2395.6 | 2388.6 | 2375.1 |
| 12.5°  | 2422.8 | 2402.3 | 2341.0 | 2327.5 | 2302.5 |
| 15°    | 2381.9 | 2356.8 | 2279.9 | 2236.9 | 2214.2 |
| 17.5°  | 2334.3 | 2297.9 | 2202.7 | 2152.9 | 2116.7 |
| 20°    | 2279.9 | 2234.4 | 2121.2 | 2064.7 | 2014.7 |
| 22.5°  | 2221.0 | 2168.8 | 2037.3 | 1960.4 | 1926.4 |
| 25°    | 2162.1 | 2089.5 | 1940.0 | 1847.1 | 1813.0 |
| 27.5°  | 2091.9 | 2014.7 | 1849.3 | 1742.7 | 1690.6 |
| 30°    | 2017.1 | 1930.8 | 1749.5 | 1634.1 | 1572.8 |
| 32.5°  | 1944.5 | 1840.2 | 1654.6 | 1518.4 | 1461.7 |
| 35°    | 1863.0 | 1747.4 | 1548.0 | 1405.1 | 1355.1 |
| 37.5°  | 1783.6 | 1658.8 | 1448.2 | 1291.7 | 1235.2 |
| 40°    | 1699.7 | 1563.9 | 1343.8 | 1183.0 | 1124.1 |
| 42.5°  | 1613.7 | 1468.6 | 1239.7 | 1071.9 | 1015.4 |
| 45°    | 1523.0 | 1371.0 | 1133.3 | 972.1  | 917.8  |
| 47.5°  | 1436.9 | 1276.1 | 1031.3 | 870.2  | 820.4  |
| 50°    | 1341.7 | 1180.8 | 931.5  | 775.0  | 727.6  |
| 52.5°  | 1248.6 | 1078.6 | 836.3  | 686.7  | 643.7  |
| 55°    | 1158.0 | 981.3  | 736.5  | 600.7  | 557.5  |
| 57.5°  | 1065.2 | 883.8  | 648.2  | 521.3  | 484.9  |
| 60°    | 970.0  | 788.7  | 555.2  | 439.8  | 403.4  |
| 62.5°  | 877.2  | 695.9  | 475.8  | 367.2  | 349.1  |
| 65°    | 781.9  | 598.2  | 394.4  | 317.4  | 310.4  |
| 67.5°  | 691.3  | 507.6  | 317.4  | 278.7  | 272.0  |
| 70°    | 596.0  | 419.3  | 262.8  | 240.2  | 231.1  |
| 72.5°  | 505.4  | 337.6  | 219.7  | 201.8  | 197.1  |
| 75°    | 417.0  | 258.2  | 181.3  | 165.4  | 163.3  |
| 77.5°  | 328.7  | 183.5  | 142.8  | 133.7  | 129.2  |
| 80°    | 246.9  | 131.5  | 108.7  | 99.8   | 99.8   |
| 82.5°  | 172.2  | 88.5   | 74.7   | 70.2   | 70.2   |
| 85°    | 97.4   | 49.8   | 43.0   | 43.0   | 43.0   |
| 87.5°  | 36.4   | 18.1   | 18.1   | 15.9   | 15.9   |
| 90°    | 1.7    | 20.8   | 56.7   | 53.1   | 54.8   |
| 92.5°  | 35.9   | 48.6   | 50.3   | 52.0   | 52.0   |
| 95°    | 84.3   | 100.5  | 103.4  | 103.4  | 100.5  |
| 97.5°  | 140.4  | 155.4  | 161.8  | 161.8  | 161.8  |
| 100°   | 205.1  | 218.3  | 223.0  | 223.0  | 221.3  |
| 102.5° | 273.3  | 283.1  | 289.4  | 291.1  | 289.4  |
| 105°   | 347.8  | 352.4  | 355.9  | 358.8  | 358.8  |
| 107.5° | 421.7  | 428.7  | 428.7  | 429.8  | 421.7  |
| 110°   | 493.4  | 502.6  | 502.6  | 502.6  | 498.0  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 570.8  | 580.6  | 578.9  | 574.2  | 570.8  |
| 115°   | 647.0  | 656.3  | 653.4  | 651.7  | 647.0  |
| 117.5° | 722.8  | 735.5  | 727.3  | 722.8  | 718.1  |
| 120°   | 799.0  | 811.7  | 799.0  | 799.0  | 793.8  |
| 122.5° | 868.3  | 884.4  | 876.4  | 871.8  | 868.3  |
| 125°   | 941.1  | 955.5  | 950.9  | 945.7  | 944.0  |
| 127.5° | 1012.2 | 1030.1 | 1023.7 | 1016.8 | 1012.2 |
| 130°   | 1078.6 | 1099.4 | 1096.5 | 1093.1 | 1086.7 |
| 132.5° | 1153.2 | 1169.3 | 1170.4 | 1162.4 | 1157.7 |
| 135°   | 1217.3 | 1235.2 | 1238.6 | 1236.9 | 1232.2 |
| 137.5° | 1288.9 | 1303.3 | 1306.3 | 1305.0 | 1298.2 |
| 140°   | 1351.9 | 1366.3 | 1374.4 | 1374.4 | 1368.1 |
| 142.5° | 1416.5 | 1431.0 | 1435.6 | 1437.3 | 1431.0 |
| 145°   | 1477.8 | 1489.3 | 1498.6 | 1500.4 | 1494.0 |
| 147.5° | 1532.7 | 1547.1 | 1554.1 | 1556.9 | 1550.5 |
| 150°   | 1589.3 | 1599.1 | 1605.5 | 1610.6 | 1605.5 |
| 152.5° | 1639.5 | 1649.4 | 1657.5 | 1663.9 | 1657.5 |
| 155°   | 1689.8 | 1694.5 | 1699.6 | 1707.8 | 1702.5 |
| 157.5° | 1733.1 | 1736.7 | 1739.5 | 1751.1 | 1743.0 |
| 160°   | 1771.9 | 1775.3 | 1777.1 | 1786.9 | 1780.0 |
| 162.5° | 1807.7 | 1807.7 | 1809.4 | 1820.4 | 1812.3 |
| 165°   | 1838.3 | 1836.5 | 1836.5 | 1848.2 | 1840.1 |
| 167.5° | 1866.0 | 1860.9 | 1860.9 | 1872.4 | 1864.3 |
| 170°   | 1886.8 | 1882.2 | 1880.5 | 1892.0 | 1882.2 |
| 172.5° | 1901.3 | 1896.6 | 1894.9 | 1906.4 | 1896.6 |
| 175°   | 1912.8 | 1908.2 | 1904.7 | 1916.3 | 1906.4 |
| 177.5° | 1919.1 | 1914.6 | 1911.1 | 1920.9 | 1911.1 |
| 180°   | 1916.3 | 1916.3 | 1916.3 | 1916.3 | 1916.3 |

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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 | 9.22             | 10.04 | 10.19 | 11.02 | 12.31 | 5.19           | 6.01 | 6.16 | 6.99  | 8.28  |
|                 | 3H   | 10.89            | 11.63 | 11.88 | 12.62 | 13.93 | 6.38           | 7.11 | 7.36 | 8.10  | 9.41  |
|                 | 4H   | 11.50            | 12.20 | 12.50 | 13.19 | 14.51 | 6.83           | 7.53 | 7.83 | 8.52  | 9.84  |
|                 | 6H   | 11.92            | 12.56 | 12.93 | 13.56 | 14.89 | 7.15           | 7.79 | 8.16 | 8.79  | 10.12 |
|                 | 8H   | 12.05            | 12.66 | 13.06 | 13.68 | 15.00 | 7.24           | 7.85 | 8.26 | 8.87  | 10.19 |
|                 | 12H  | 12.11            | 12.69 | 13.13 | 13.70 | 15.05 | 7.29           | 7.87 | 8.31 | 8.88  | 10.23 |
| 4H              | 2H   | 9.23             | 9.93  | 10.24 | 10.92 | 12.24 | 5.78           | 6.48 | 6.79 | 7.47  | 8.79  |
|                 | 3H   | 11.06            | 11.64 | 12.07 | 12.66 | 14.00 | 7.14           | 7.71 | 8.15 | 8.74  | 10.07 |
|                 | 4H   | 11.76            | 12.28 | 12.77 | 13.30 | 14.65 | 7.68           | 8.21 | 8.70 | 9.23  | 10.58 |
|                 | 6H   | 12.27            | 12.73 | 13.30 | 13.76 | 15.12 | 8.11           | 8.56 | 9.14 | 9.60  | 10.95 |
|                 | 8H   | 12.45            | 12.87 | 13.48 | 13.90 | 15.27 | 8.24           | 8.66 | 9.27 | 9.69  | 11.06 |
|                 | 12H  | 12.54            | 12.92 | 13.59 | 13.97 | 15.34 | 8.30           | 8.68 | 9.35 | 9.73  | 11.10 |
| 8H              | 4H   | 11.72            | 12.15 | 12.75 | 13.18 | 14.54 | 7.96           | 8.39 | 9.00 | 9.42  | 10.79 |
|                 | 6H   | 12.29            | 12.64 | 13.34 | 13.71 | 15.08 | 8.49           | 8.84 | 9.54 | 9.91  | 11.27 |
|                 | 8H   | 12.51            | 12.82 | 13.57 | 13.87 | 15.26 | 8.68           | 8.99 | 9.74 | 10.04 | 11.43 |
|                 | 12H  | 12.65            | 12.92 | 13.71 | 13.97 | 15.40 | 8.80           | 9.07 | 9.86 | 10.12 | 11.55 |
| 12H             | 4H   | 11.67            | 12.06 | 12.72 | 13.10 | 14.48 | 7.97           | 8.35 | 9.02 | 9.40  | 10.77 |
|                 | 6H   | 12.27            | 12.57 | 13.33 | 13.63 | 15.02 | 8.53           | 8.84 | 9.60 | 9.90  | 11.28 |
|                 | 8H   | 12.49            | 12.76 | 13.55 | 13.81 | 15.24 | 8.75           | 9.02 | 9.81 | 10.07 | 11.50 |

END OF REPORT