

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: P918382

Luminaire Tested: DFN2DIP-TR4F0-090D090US930-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P918382  
REPORT IS A COMBINATION OF REPORTS P900469 AND P897293  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-090D090US930-FLLFLL  
Description: 4 foot, Triangle Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

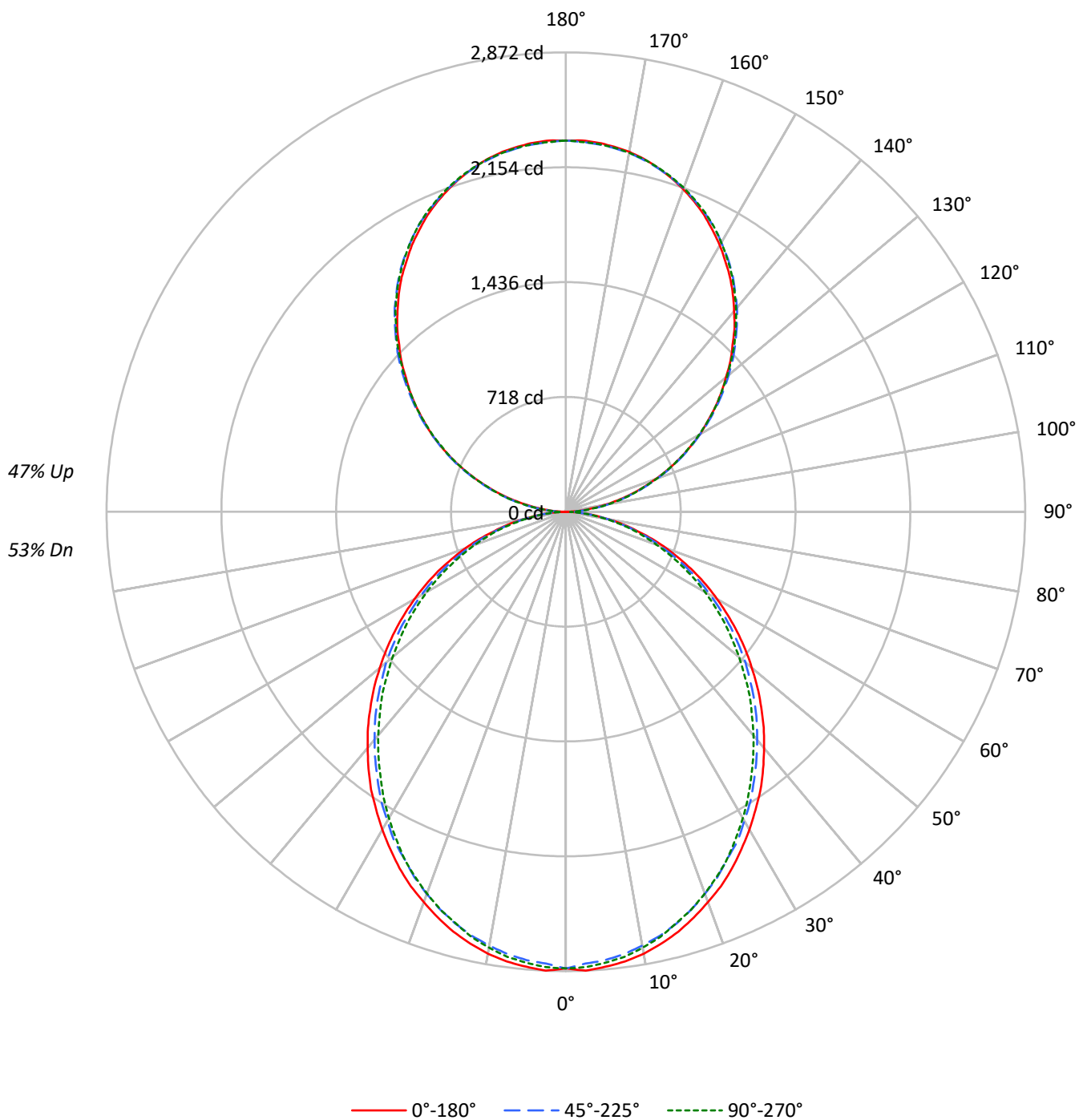
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 13758.1 lumens  
Efficiency: N/A  
Efficacy: 88.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: General Diffuse  
  
Input Watts (W): 155.1  
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



TEST NUMBER: P918382

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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   | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 71 | 71 | 71 | 59 | 59 | 59 |
| 1   | 98  | 94  | 90  | 87  | 91  | 87  | 84  | 81  | 74 | 72 | 70 | 63 | 61 | 59 | 52 | 51 | 50 |
| 2   | 90  | 82  | 76  | 71  | 83  | 76  | 71  | 66  | 65 | 61 | 58 | 55 | 52 | 50 | 46 | 44 | 42 |
| 3   | 82  | 72  | 65  | 59  | 75  | 67  | 61  | 55  | 58 | 53 | 49 | 49 | 45 | 42 | 41 | 38 | 36 |
| 4   | 75  | 64  | 56  | 50  | 69  | 60  | 52  | 47  | 51 | 46 | 41 | 43 | 39 | 36 | 36 | 33 | 31 |
| 5   | 69  | 57  | 49  | 43  | 63  | 53  | 46  | 40  | 46 | 40 | 36 | 39 | 35 | 31 | 33 | 29 | 27 |
| 6   | 63  | 51  | 43  | 37  | 58  | 48  | 40  | 35  | 41 | 36 | 31 | 35 | 31 | 27 | 30 | 26 | 24 |
| 7   | 59  | 46  | 38  | 33  | 54  | 43  | 36  | 31  | 37 | 32 | 28 | 32 | 28 | 24 | 27 | 24 | 21 |
| 8   | 54  | 42  | 34  | 29  | 50  | 39  | 32  | 27  | 34 | 29 | 24 | 29 | 25 | 22 | 25 | 21 | 19 |
| 9   | 51  | 38  | 31  | 26  | 47  | 36  | 29  | 24  | 31 | 26 | 22 | 27 | 23 | 19 | 23 | 20 | 17 |
| 10  | 47  | 35  | 28  | 23  | 44  | 33  | 26  | 22  | 29 | 23 | 20 | 25 | 21 | 18 | 21 | 18 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2268 | 2268 | 2268 |
| 5°  | 2272 | 2237 | 2252 |
| 10° | 2253 | 2206 | 2221 |
| 15° | 2220 | 2170 | 2173 |
| 20° | 2176 | 2120 | 2125 |
| 25° | 2131 | 2059 | 2068 |
| 30° | 2075 | 2003 | 1996 |
| 35° | 2022 | 1937 | 1920 |
| 40° | 1957 | 1870 | 1848 |
| 45° | 1892 | 1803 | 1774 |
| 50° | 1821 | 1732 | 1689 |
| 55° | 1747 | 1651 | 1610 |
| 60° | 1663 | 1554 | 1520 |
| 65° | 1572 | 1454 | 1413 |
| 70° | 1455 | 1332 | 1299 |
| 75° | 1293 | 1186 | 1193 |
| 80° | 1099 | 1000 | 991  |
| 85° | 795  | 678  | 657  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1892 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 268.7   | 2.0       |
| 10°-20°   | 756.1   | 5.5       |
| 20°-30°   | 1111.2  | 8.1       |
| 30°-40°   | 1290.5  | 9.4       |
| 40°-50°   | 1288.9  | 9.4       |
| 50°-60°   | 1123.9  | 8.2       |
| 60°-70°   | 830.8   | 6.0       |
| 70°-80°   | 470.1   | 3.4       |
| 80°-90°   | 130.6   | 0.9       |
| 90°-100°  | 143.6   | 1.0       |
| 100°-110° | 456.3   | 3.3       |
| 110°-120° | 780.8   | 5.7       |
| 120°-130° | 1026.9  | 7.5       |
| 130°-140° | 1152.6  | 8.4       |
| 140°-150° | 1130.3  | 8.2       |
| 150°-160° | 948.2   | 6.9       |
| 160°-170° | 628.8   | 4.6       |
| 170°-180° | 219.8   | 1.6       |
| 0°-30°    | 2136.0  | 15.5      |
| 0°-40°    | 3426.5  | 24.9      |
| 0°-60°    | 5839.4  | 42.4      |
| 0°-90°    | 7270.9  | 52.8      |
| 90°-120°  | 1380.7  | 10.0      |
| 90°-150°  | 4690.5  | 34.1      |
| 90°-180°  | 6487.0  | 47.2      |
| 0°-180°   | 13758.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2855 | 2855  | 2855 | 2855  | 2855 |      |
| 5°   | 2855 | 2844  | 2814 | 2836  | 2831 | 271  |
| 15°  | 2718 | 2702  | 2666 | 2677  | 2663 | 765  |
| 25°  | 2460 | 2438  | 2391 | 2397  | 2391 | 1132 |
| 35°  | 2122 | 2095  | 2051 | 2034  | 2021 | 1325 |
| 45°  | 1727 | 1708  | 1666 | 1636  | 1625 | 1333 |
| 55°  | 1307 | 1290  | 1257 | 1225  | 1211 | 1169 |
| 65°  | 881  | 865   | 837  | 813   | 799  | 871  |
| 75°  | 461  | 456   | 442  | 426   | 431  | 492  |
| 85°  | 112  | 110   | 107  | 99    | 96   | 125  |
| 90°  | 2    | 25    | 69   | 64    | 66   | 13   |
| 95°  | 102  | 122   | 125  | 125   | 122  | 114  |
| 105° | 421  | 427   | 431  | 434   | 434  | 444  |
| 115° | 784  | 795   | 791  | 789   | 784  | 775  |
| 125° | 1140 | 1157  | 1152 | 1145  | 1143 | 1018 |
| 135° | 1474 | 1496  | 1500 | 1498  | 1492 | 1139 |
| 145° | 1790 | 1804  | 1815 | 1817  | 1809 | 1118 |
| 155° | 2046 | 2052  | 2058 | 2068  | 2062 | 942  |
| 165° | 2226 | 2224  | 2224 | 2238  | 2228 | 628  |
| 175° | 2316 | 2311  | 2307 | 2321  | 2309 | 220  |
| 180° | 2321 | 2321  | 2321 | 2321  | 2321 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2855.1 | 2855.1 | 2855.1 | 2855.1 | 2855.1 |
| 2.5°   | 2871.7 | 2858.0 | 2827.8 | 2855.1 | 2849.9 |
| 5°     | 2855.1 | 2844.3 | 2814.1 | 2835.9 | 2830.6 |
| 7.5°   | 2835.9 | 2819.6 | 2789.3 | 2811.5 | 2805.9 |
| 10°    | 2805.9 | 2786.7 | 2753.8 | 2775.6 | 2767.4 |
| 12.5°  | 2764.5 | 2748.2 | 2715.4 | 2729.0 | 2723.5 |
| 15°    | 2718.0 | 2701.7 | 2665.8 | 2676.9 | 2663.2 |
| 17.5°  | 2660.2 | 2643.9 | 2608.1 | 2621.8 | 2608.1 |
| 20°    | 2597.1 | 2580.7 | 2542.3 | 2550.4 | 2539.7 |
| 22.5°  | 2534.1 | 2509.4 | 2473.5 | 2473.5 | 2468.0 |
| 25°    | 2459.8 | 2438.0 | 2391.4 | 2396.7 | 2391.4 |
| 27.5°  | 2377.4 | 2358.2 | 2322.7 | 2314.6 | 2300.9 |
| 30°    | 2295.3 | 2273.1 | 2232.0 | 2223.9 | 2212.9 |
| 32.5°  | 2207.3 | 2191.0 | 2147.0 | 2130.5 | 2119.4 |
| 35°    | 2122.3 | 2094.9 | 2050.9 | 2034.3 | 2020.6 |
| 37.5°  | 2026.2 | 2001.4 | 1957.4 | 1938.2 | 1924.5 |
| 40°    | 1927.4 | 1905.3 | 1861.2 | 1836.8 | 1825.8 |
| 42.5°  | 1831.2 | 1809.1 | 1765.4 | 1737.8 | 1721.5 |
| 45°    | 1727.0 | 1707.8 | 1666.4 | 1636.4 | 1625.4 |
| 47.5°  | 1625.4 | 1606.1 | 1562.1 | 1531.9 | 1515.6 |
| 50°    | 1518.2 | 1504.5 | 1466.0 | 1427.6 | 1413.9 |
| 52.5°  | 1413.9 | 1394.6 | 1359.1 | 1328.9 | 1309.6 |
| 55°    | 1307.0 | 1290.4 | 1257.4 | 1224.6 | 1210.9 |
| 57.5°  | 1199.8 | 1186.1 | 1150.3 | 1117.4 | 1106.3 |
| 60°    | 1092.6 | 1081.8 | 1043.3 | 1013.1 | 1004.9 |
| 62.5°  | 988.3  | 969.1  | 941.7  | 914.4  | 903.3  |
| 65°    | 881.4  | 864.8  | 837.4  | 812.7  | 799.0  |
| 67.5°  | 771.6  | 757.7  | 733.1  | 714.0  | 702.9  |
| 70°    | 669.9  | 658.8  | 634.1  | 614.9  | 604.1  |
| 72.5°  | 565.7  | 554.6  | 540.9  | 521.7  | 513.6  |
| 75°    | 461.1  | 455.8  | 441.9  | 425.6  | 431.1  |
| 77.5°  | 367.9  | 356.9  | 351.3  | 343.2  | 335.0  |
| 80°    | 274.7  | 271.7  | 266.2  | 258.0  | 252.6  |
| 82.5°  | 186.7  | 186.7  | 184.1  | 173.0  | 173.0  |
| 85°    | 112.4  | 109.8  | 107.2  | 98.7   | 96.1   |
| 87.5°  | 49.5   | 43.9   | 38.5   | 30.3   | 27.4   |
| 90°    | 2.1    | 25.2   | 68.6   | 64.3   | 66.4   |
| 92.5°  | 43.4   | 58.8   | 60.9   | 62.9   | 62.9   |
| 95°    | 102.2  | 121.7  | 125.2  | 125.2  | 121.7  |
| 97.5°  | 170.0  | 188.2  | 195.9  | 195.9  | 195.9  |
| 100°   | 248.3  | 264.5  | 270.0  | 270.0  | 268.0  |
| 102.5° | 330.9  | 342.8  | 350.5  | 352.6  | 350.5  |
| 105°   | 421.2  | 426.7  | 431.0  | 434.5  | 434.5  |
| 107.5° | 510.7  | 519.1  | 519.1  | 520.5  | 510.7  |
| 110°   | 597.5  | 608.7  | 608.7  | 608.7  | 603.1  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 691.2  | 703.1  | 701.0  | 695.4  | 691.2  |
| 115°   | 783.6  | 794.8  | 791.2  | 789.2  | 783.6  |
| 117.5° | 875.2  | 890.6  | 880.8  | 875.2  | 869.6  |
| 120°   | 967.6  | 982.9  | 967.6  | 967.6  | 961.2  |
| 122.5° | 1051.5 | 1071.1 | 1061.4 | 1055.7 | 1051.5 |
| 125°   | 1139.7 | 1157.2 | 1151.6 | 1145.2 | 1143.2 |
| 127.5° | 1225.7 | 1247.4 | 1239.7 | 1231.3 | 1225.7 |
| 130°   | 1306.2 | 1331.4 | 1327.9 | 1323.6 | 1316.0 |
| 132.5° | 1396.4 | 1416.0 | 1417.4 | 1407.6 | 1402.1 |
| 135°   | 1474.1 | 1495.7 | 1500.0 | 1497.9 | 1492.3 |
| 137.5° | 1560.8 | 1578.3 | 1581.8 | 1580.5 | 1572.1 |
| 140°   | 1637.1 | 1654.6 | 1664.3 | 1664.3 | 1656.7 |
| 142.5° | 1715.5 | 1732.9 | 1738.5 | 1740.7 | 1732.9 |
| 145°   | 1789.7 | 1803.6 | 1814.8 | 1816.9 | 1809.2 |
| 147.5° | 1856.1 | 1873.6 | 1882.0 | 1885.5 | 1877.8 |
| 150°   | 1924.7 | 1936.6 | 1944.2 | 1950.5 | 1944.2 |
| 152.5° | 1985.5 | 1997.4 | 2007.2 | 2014.9 | 2007.2 |
| 155°   | 2046.4 | 2051.9 | 2058.3 | 2068.1 | 2061.8 |
| 157.5° | 2098.8 | 2103.1 | 2106.6 | 2120.5 | 2110.7 |
| 160°   | 2145.7 | 2149.9 | 2152.1 | 2163.9 | 2155.5 |
| 162.5° | 2189.1 | 2189.1 | 2191.2 | 2204.5 | 2194.7 |
| 165°   | 2226.2 | 2224.1 | 2224.1 | 2238.1 | 2228.3 |
| 167.5° | 2259.8 | 2253.5 | 2253.5 | 2267.4 | 2257.6 |
| 170°   | 2285.0 | 2279.3 | 2277.3 | 2291.2 | 2279.3 |
| 172.5° | 2302.4 | 2296.9 | 2294.7 | 2308.8 | 2296.9 |
| 175°   | 2316.4 | 2310.8 | 2306.6 | 2320.7 | 2308.8 |
| 177.5° | 2324.1 | 2318.5 | 2314.3 | 2326.2 | 2314.3 |
| 180°   | 2320.7 | 2320.7 | 2320.7 | 2320.7 | 2320.7 |

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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 | 10.37            | 11.26 | 11.30 | 12.21 | 13.44 | 9.94           | 10.83 | 10.87 | 11.78 | 13.01 |
|                 | 3H   | 12.03            | 12.83 | 12.98 | 13.79 | 15.04 | 11.56          | 12.36 | 12.50 | 13.32 | 14.57 |
|                 | 4H   | 12.62            | 13.37 | 13.58 | 14.34 | 15.60 | 12.15          | 12.90 | 13.11 | 13.87 | 15.13 |
|                 | 6H   | 13.02            | 13.72 | 13.99 | 14.69 | 15.96 | 12.55          | 13.24 | 13.52 | 14.21 | 15.49 |
|                 | 8H   | 13.13            | 13.79 | 14.10 | 14.77 | 16.05 | 12.65          | 13.31 | 13.63 | 14.30 | 15.57 |
|                 | 12H  | 13.18            | 13.81 | 14.16 | 14.79 | 16.08 | 12.70          | 13.33 | 13.68 | 14.31 | 15.60 |
| 4H              | 2H   | 10.84            | 11.59 | 11.80 | 12.55 | 13.81 | 10.49          | 11.24 | 11.45 | 12.21 | 13.47 |
|                 | 3H   | 12.70            | 13.33 | 13.68 | 14.33 | 15.60 | 12.31          | 12.94 | 13.28 | 13.93 | 15.21 |
|                 | 4H   | 13.42            | 13.99 | 14.40 | 14.98 | 16.28 | 13.01          | 13.59 | 14.00 | 14.58 | 15.88 |
|                 | 6H   | 13.94            | 14.43 | 14.93 | 15.44 | 16.74 | 13.53          | 14.02 | 14.52 | 15.03 | 16.33 |
|                 | 8H   | 14.09            | 14.55 | 15.08 | 15.55 | 16.86 | 13.67          | 14.14 | 14.67 | 15.14 | 16.45 |
|                 | 12H  | 14.16            | 14.58 | 15.17 | 15.60 | 16.92 | 13.74          | 14.16 | 14.75 | 15.18 | 16.49 |
| 8H              | 4H   | 13.62            | 14.08 | 14.61 | 15.08 | 16.40 | 13.26          | 13.72 | 14.25 | 14.72 | 16.04 |
|                 | 6H   | 14.25            | 14.63 | 15.27 | 15.68 | 16.99 | 13.89          | 14.27 | 14.91 | 15.32 | 16.63 |
|                 | 8H   | 14.47            | 14.81 | 15.50 | 15.84 | 17.17 | 14.10          | 14.44 | 15.13 | 15.47 | 16.80 |
|                 | 12H  | 14.60            | 14.90 | 15.64 | 15.93 | 17.30 | 14.22          | 14.52 | 15.25 | 15.54 | 16.92 |
| 12H             | 4H   | 13.60            | 14.02 | 14.62 | 15.04 | 16.36 | 13.25          | 13.67 | 14.27 | 14.69 | 16.01 |
|                 | 6H   | 14.28            | 14.62 | 15.31 | 15.65 | 16.98 | 13.93          | 14.27 | 14.96 | 15.30 | 16.63 |
|                 | 8H   | 14.52            | 14.82 | 15.56 | 15.85 | 17.22 | 14.17          | 14.46 | 15.20 | 15.49 | 16.86 |

END OF REPORT