

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: P917053

Luminaire Tested: DFN2DIP-PN4F0-110D080US930-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P917053  
REPORT IS A COMBINATION OF REPORTS P901215 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-110D080US930-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

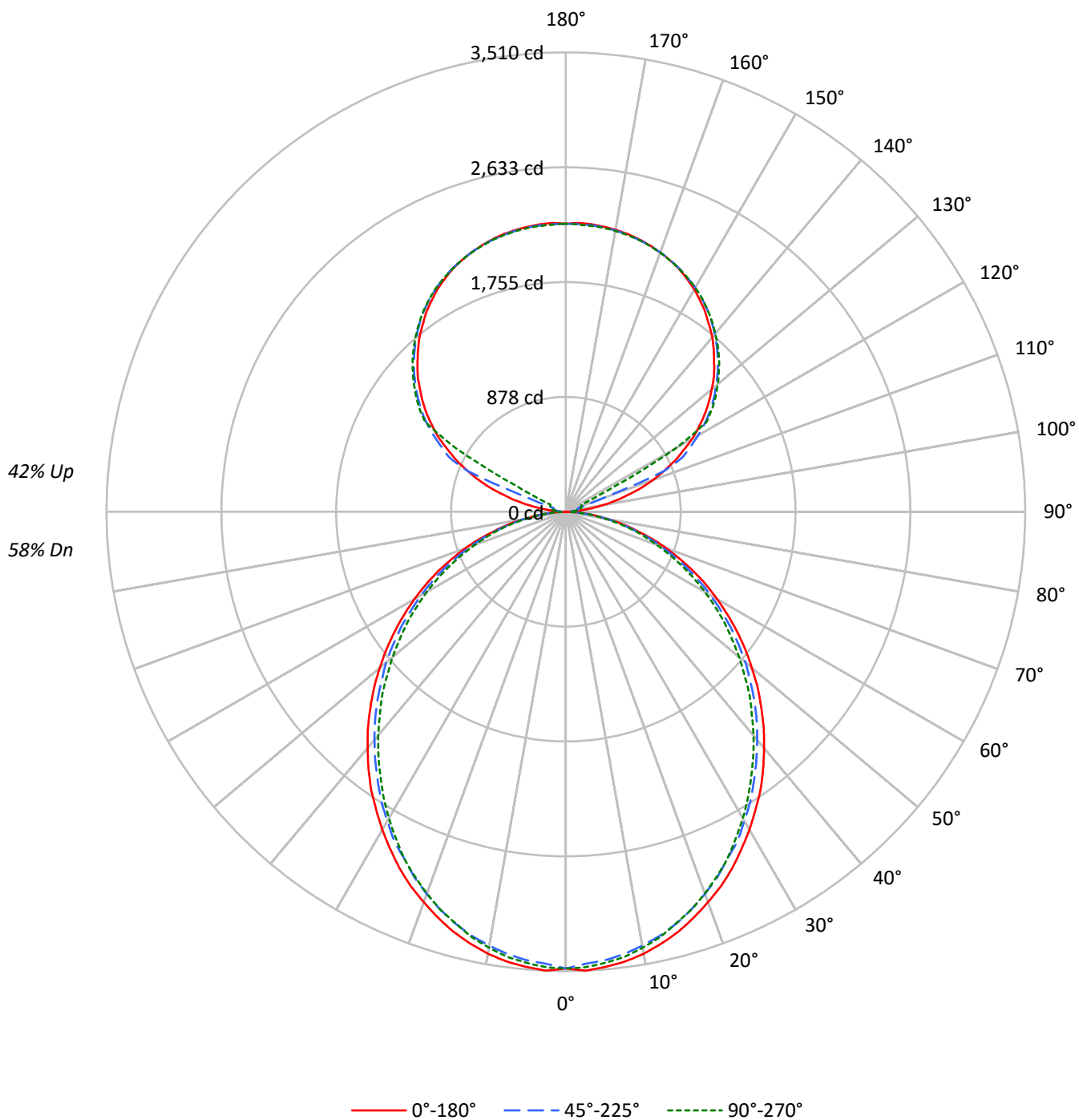
Lumens per Lamp: N/A  
Luminaire Lumens: 15335.8 lumens  
Efficiency: N/A  
Efficacy: 89.1 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 172.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.996  
Total Harmonic Distortion (THDi): 0.064  
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 | 102 | 102 | 102 | 102 | 88 | 88 | 88 | 75 | 75 | 75 | 63 | 63 | 63 |
| 1   | 100 | 95  | 91  | 88  | 93  | 89  | 85  | 82  | 77 | 74 | 72 | 66 | 64 | 63 | 56 | 55 | 54 |
| 2   | 91  | 83  | 77  | 72  | 84  | 78  | 72  | 68  | 67 | 63 | 60 | 58 | 55 | 52 | 49 | 47 | 45 |
| 3   | 83  | 73  | 66  | 60  | 77  | 68  | 62  | 57  | 60 | 54 | 50 | 51 | 47 | 44 | 44 | 41 | 38 |
| 4   | 76  | 65  | 57  | 51  | 70  | 61  | 54  | 48  | 53 | 47 | 43 | 46 | 41 | 38 | 39 | 36 | 33 |
| 5   | 70  | 58  | 50  | 43  | 65  | 54  | 47  | 41  | 47 | 42 | 37 | 41 | 37 | 33 | 35 | 32 | 29 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 41  | 36  | 43 | 37 | 32 | 37 | 32 | 29 | 32 | 28 | 25 |
| 7   | 59  | 47  | 39  | 33  | 55  | 44  | 37  | 32  | 39 | 33 | 29 | 34 | 29 | 26 | 29 | 26 | 23 |
| 8   | 55  | 43  | 35  | 29  | 51  | 40  | 33  | 28  | 35 | 30 | 25 | 31 | 26 | 23 | 27 | 23 | 20 |
| 9   | 51  | 39  | 31  | 26  | 48  | 37  | 30  | 25  | 33 | 27 | 23 | 29 | 24 | 21 | 25 | 21 | 18 |
| 10  | 48  | 36  | 28  | 24  | 45  | 34  | 27  | 23  | 30 | 24 | 21 | 26 | 22 | 19 | 23 | 19 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2547 | 2547 | 2547 |
| 5°  | 2551 | 2512 | 2529 |
| 10° | 2531 | 2479 | 2495 |
| 15° | 2493 | 2438 | 2442 |
| 20° | 2443 | 2382 | 2388 |
| 25° | 2393 | 2314 | 2325 |
| 30° | 2330 | 2252 | 2245 |
| 35° | 2271 | 2177 | 2160 |
| 40° | 2198 | 2103 | 2080 |
| 45° | 2125 | 2028 | 1997 |
| 50° | 2045 | 1949 | 1902 |
| 55° | 1962 | 1858 | 1814 |
| 60° | 1867 | 1750 | 1714 |
| 65° | 1765 | 1638 | 1595 |
| 70° | 1634 | 1502 | 1468 |
| 75° | 1452 | 1339 | 1351 |
| 80° | 1234 | 1131 | 1127 |
| 85° | 893  | 772  | 754  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2125 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 328.4   | 2.1       |
| 10°-20°   | 924.1   | 6.0       |
| 20°-30°   | 1358.1  | 8.9       |
| 30°-40°   | 1577.3  | 10.3      |
| 40°-50°   | 1575.4  | 10.3      |
| 50°-60°   | 1373.7  | 9.0       |
| 60°-70°   | 1015.5  | 6.6       |
| 70°-80°   | 574.5   | 3.7       |
| 80°-90°   | 155.5   | 1.0       |
| 90°-100°  | 72.6    | 0.5       |
| 100°-110° | 270.6   | 1.8       |
| 110°-120° | 717.6   | 4.7       |
| 120°-130° | 1190.2  | 7.8       |
| 130°-140° | 1264.3  | 8.2       |
| 140°-150° | 1175.0  | 7.7       |
| 150°-160° | 944.7   | 6.2       |
| 160°-170° | 608.7   | 4.0       |
| 170°-180° | 209.5   | 1.4       |
| 0°-30°    | 2610.6  | 17.0      |
| 0°-40°    | 4187.9  | 27.3      |
| 0°-60°    | 7137.0  | 46.5      |
| 0°-90°    | 8882.5  | 57.9      |
| 90°-120°  | 1060.8  | 6.9       |
| 90°-150°  | 4690.4  | 30.6      |
| 90°-180°  | 6453.0  | 42.1      |
| 0°-180°   | 15335.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3490 | 3490  | 3490 | 3490  | 3490 |      |
| 5°   | 3490 | 3476  | 3439 | 3466  | 3460 | 331  |
| 15°  | 3322 | 3302  | 3258 | 3272  | 3255 | 936  |
| 25°  | 3006 | 2980  | 2923 | 2929  | 2923 | 1383 |
| 35°  | 2594 | 2560  | 2507 | 2486  | 2470 | 1620 |
| 45°  | 2111 | 2087  | 2037 | 2000  | 1987 | 1629 |
| 55°  | 1597 | 1577  | 1537 | 1497  | 1480 | 1428 |
| 65°  | 1077 | 1057  | 1024 | 993   | 977  | 1065 |
| 75°  | 564  | 557   | 540  | 520   | 527  | 602  |
| 85°  | 138  | 134   | 131  | 121   | 118  | 153  |
| 90°  | 2    | 19    | 32   | 40    | 43   | 14   |
| 95°  | 104  | 51    | 62   | 70    | 68   | 123  |
| 105° | 484  | 532   | 97   | 115   | 121  | 517  |
| 115° | 916  | 943   | 983  | 245   | 131  | 902  |
| 125° | 1295 | 1316  | 1346 | 1357  | 1362 | 1155 |
| 135° | 1602 | 1628  | 1642 | 1658  | 1655 | 1238 |
| 145° | 1859 | 1857  | 1884 | 1895  | 1887 | 1163 |
| 155° | 2047 | 2032  | 2052 | 2061  | 2048 | 943  |
| 165° | 2157 | 2147  | 2152 | 2163  | 2152 | 609  |
| 175° | 2206 | 2195  | 2198 | 2209  | 2193 | 210  |
| 180° | 2201 | 2201  | 2201 | 2201  | 2201 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3489.6 | 3489.6 | 3489.6 | 3489.6 | 3489.6 |
| 2.5°   | 3509.9 | 3493.1 | 3456.1 | 3489.6 | 3483.2 |
| 5°     | 3489.6 | 3476.4 | 3439.4 | 3466.1 | 3459.7 |
| 7.5°   | 3466.1 | 3446.2 | 3409.2 | 3436.2 | 3429.5 |
| 10°    | 3429.5 | 3405.9 | 3365.7 | 3392.4 | 3382.4 |
| 12.5°  | 3378.9 | 3358.9 | 3318.8 | 3335.5 | 3328.7 |
| 15°    | 3321.9 | 3302.0 | 3258.2 | 3271.7 | 3255.0 |
| 17.5°  | 3251.4 | 3231.5 | 3187.7 | 3204.4 | 3187.7 |
| 20°    | 3174.2 | 3154.2 | 3107.3 | 3117.2 | 3104.1 |
| 22.5°  | 3097.3 | 3067.0 | 3023.2 | 3023.2 | 3016.4 |
| 25°    | 3006.5 | 2979.8 | 2922.8 | 2929.3 | 2922.8 |
| 27.5°  | 2905.7 | 2882.2 | 2838.8 | 2828.8 | 2812.1 |
| 30°    | 2805.4 | 2778.3 | 2728.1 | 2718.1 | 2704.6 |
| 32.5°  | 2697.8 | 2677.9 | 2624.1 | 2603.8 | 2590.3 |
| 35°    | 2593.9 | 2560.4 | 2506.6 | 2486.3 | 2469.6 |
| 37.5°  | 2476.4 | 2446.1 | 2392.4 | 2368.8 | 2352.1 |
| 40°    | 2355.7 | 2328.7 | 2274.9 | 2245.0 | 2231.5 |
| 42.5°  | 2238.2 | 2211.2 | 2157.8 | 2123.9 | 2104.0 |
| 45°    | 2110.8 | 2087.2 | 2036.7 | 2000.1 | 1986.6 |
| 47.5°  | 1986.6 | 1963.1 | 1909.3 | 1872.3 | 1852.3 |
| 50°    | 1855.5 | 1838.8 | 1791.8 | 1744.8 | 1728.1 |
| 52.5°  | 1728.1 | 1704.5 | 1661.2 | 1624.1 | 1600.6 |
| 55°    | 1597.4 | 1577.1 | 1536.9 | 1496.6 | 1479.9 |
| 57.5°  | 1466.4 | 1449.7 | 1405.9 | 1365.6 | 1352.1 |
| 60°    | 1335.4 | 1322.3 | 1275.2 | 1238.2 | 1228.2 |
| 62.5°  | 1207.9 | 1184.5 | 1151.0 | 1117.5 | 1104.0 |
| 65°    | 1077.3 | 1057.0 | 1023.5 | 993.3  | 976.6  |
| 67.5°  | 943.1  | 926.0  | 896.1  | 872.6  | 859.1  |
| 70°    | 818.8  | 805.3  | 775.0  | 751.5  | 738.3  |
| 72.5°  | 691.4  | 677.8  | 661.1  | 637.6  | 627.6  |
| 75°    | 563.5  | 557.2  | 540.1  | 520.2  | 526.9  |
| 77.5°  | 449.6  | 436.1  | 429.3  | 419.4  | 409.4  |
| 80°    | 335.7  | 332.2  | 325.4  | 315.4  | 308.7  |
| 82.5°  | 228.2  | 228.2  | 225.0  | 211.5  | 211.5  |
| 85°    | 137.5  | 134.2  | 131.0  | 120.7  | 117.5  |
| 87.5°  | 60.5   | 53.7   | 47.0   | 37.0   | 33.4   |
| 90°    | 1.5    | 19.1   | 31.8   | 39.9   | 43.0   |
| 92.5°  | 39.9   | 33.5   | 38.2   | 41.4   | 43.0   |
| 95°    | 103.5  | 50.9   | 62.0   | 70.2   | 68.5   |
| 97.5°  | 186.3  | 55.8   | 81.1   | 86.1   | 87.6   |
| 100°   | 282.0  | 63.8   | 90.8   | 103.5  | 106.6  |
| 102.5° | 387.0  | 383.9  | 94.0   | 111.4  | 116.3  |
| 105°   | 484.2  | 532.1  | 97.2   | 114.6  | 121.1  |
| 107.5° | 597.3  | 637.0  | 100.4  | 117.8  | 124.3  |
| 110°   | 705.7  | 739.0  | 278.8  | 119.5  | 125.8  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 807.6  | 836.2  | 809.2  | 122.5  | 127.5  |
| 115°   | 915.8  | 942.9  | 982.8  | 245.3  | 130.7  |
| 117.5° | 1009.8 | 1041.6 | 1068.9 | 840.9  | 423.7  |
| 120°   | 1115.0 | 1138.8 | 1167.6 | 1186.7 | 971.6  |
| 122.5° | 1204.0 | 1229.6 | 1261.6 | 1271.0 | 1272.8 |
| 125°   | 1294.9 | 1315.6 | 1345.9 | 1357.1 | 1361.8 |
| 127.5° | 1377.7 | 1400.0 | 1424.1 | 1439.9 | 1441.4 |
| 130°   | 1455.8 | 1481.3 | 1498.8 | 1516.4 | 1514.8 |
| 132.5° | 1535.5 | 1556.2 | 1573.7 | 1588.0 | 1586.5 |
| 135°   | 1602.4 | 1627.9 | 1642.1 | 1658.2 | 1655.0 |
| 137.5° | 1672.4 | 1691.5 | 1707.6 | 1723.5 | 1718.7 |
| 140°   | 1740.8 | 1753.7 | 1771.2 | 1785.5 | 1777.5 |
| 142.5° | 1798.4 | 1809.5 | 1830.1 | 1842.8 | 1834.8 |
| 145°   | 1858.9 | 1857.2 | 1884.2 | 1895.4 | 1887.4 |
| 147.5° | 1911.3 | 1906.6 | 1933.6 | 1941.6 | 1935.3 |
| 150°   | 1962.3 | 1951.2 | 1976.7 | 1986.1 | 1978.2 |
| 152.5° | 2005.3 | 1992.6 | 2016.4 | 2026.1 | 2014.9 |
| 155°   | 2046.7 | 2032.5 | 2051.6 | 2061.1 | 2048.4 |
| 157.5° | 2080.2 | 2067.5 | 2081.9 | 2093.0 | 2080.2 |
| 160°   | 2108.9 | 2099.3 | 2108.9 | 2118.4 | 2107.2 |
| 162.5° | 2134.3 | 2124.8 | 2132.7 | 2143.9 | 2129.6 |
| 165°   | 2156.6 | 2147.2 | 2151.9 | 2163.0 | 2151.9 |
| 167.5° | 2174.2 | 2164.5 | 2169.4 | 2180.6 | 2166.2 |
| 170°   | 2188.6 | 2178.9 | 2182.1 | 2193.3 | 2178.9 |
| 172.5° | 2198.0 | 2188.6 | 2191.8 | 2202.9 | 2188.6 |
| 175°   | 2206.0 | 2194.8 | 2198.0 | 2209.1 | 2193.3 |
| 177.5° | 2209.1 | 2198.0 | 2199.7 | 2210.8 | 2196.5 |
| 180°   | 2201.2 | 2201.2 | 2201.2 | 2201.2 | 2201.2 |

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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 | 11.23            | 12.17 | 12.11 | 13.07 | 14.23 | 10.79          | 11.72 | 11.67 | 12.63 | 13.79 |
|                 | 3H   | 12.90            | 13.74 | 13.80 | 14.65 | 15.83 | 12.41          | 13.25 | 13.31 | 14.17 | 15.35 |
|                 | 4H   | 13.49            | 14.29 | 14.40 | 15.21 | 16.40 | 13.00          | 13.80 | 13.92 | 14.72 | 15.91 |
|                 | 6H   | 13.90            | 14.63 | 14.82 | 15.56 | 16.76 | 13.40          | 14.14 | 14.33 | 15.07 | 16.27 |
|                 | 8H   | 14.00            | 14.70 | 14.94 | 15.65 | 16.85 | 13.51          | 14.21 | 14.44 | 15.16 | 16.35 |
|                 | 12H  | 14.06            | 14.72 | 14.99 | 15.66 | 16.89 | 13.56          | 14.22 | 14.49 | 15.16 | 16.39 |
| 4H              | 2H   | 11.70            | 12.49 | 12.62 | 13.42 | 14.60 | 11.35          | 12.14 | 12.27 | 13.06 | 14.25 |
|                 | 3H   | 13.57            | 14.24 | 14.50 | 15.19 | 16.39 | 13.17          | 13.84 | 14.10 | 14.79 | 15.99 |
|                 | 4H   | 14.29            | 14.90 | 15.23 | 15.85 | 17.08 | 13.88          | 14.48 | 14.82 | 15.43 | 16.66 |
|                 | 6H   | 14.82            | 15.34 | 15.77 | 16.31 | 17.54 | 14.39          | 14.92 | 15.35 | 15.89 | 17.11 |
|                 | 8H   | 14.97            | 15.46 | 15.93 | 16.42 | 17.67 | 14.54          | 15.03 | 15.50 | 15.99 | 17.24 |
|                 | 12H  | 15.05            | 15.49 | 16.02 | 16.47 | 17.72 | 14.61          | 15.05 | 15.58 | 16.03 | 17.28 |
| 8H              | 4H   | 14.50            | 14.99 | 15.45 | 15.95 | 17.19 | 14.13          | 14.62 | 15.08 | 15.58 | 16.82 |
|                 | 6H   | 15.14            | 15.54 | 16.12 | 16.55 | 17.79 | 14.76          | 15.16 | 15.74 | 16.17 | 17.41 |
|                 | 8H   | 15.36            | 15.72 | 16.35 | 16.71 | 17.97 | 14.97          | 15.33 | 15.96 | 16.33 | 17.59 |
|                 | 12H  | 15.50            | 15.81 | 16.49 | 16.80 | 18.11 | 15.09          | 15.41 | 16.09 | 16.40 | 17.70 |
| 12H             | 4H   | 14.49            | 14.93 | 15.46 | 15.91 | 17.16 | 14.12          | 14.57 | 15.10 | 15.55 | 16.79 |
|                 | 6H   | 15.17            | 15.52 | 16.16 | 16.52 | 17.78 | 14.80          | 15.16 | 15.79 | 16.15 | 17.41 |
|                 | 8H   | 15.41            | 15.73 | 16.41 | 16.72 | 18.02 | 15.04          | 15.36 | 16.04 | 16.34 | 17.65 |

END OF REPORT