

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: P928038

Luminaire Tested: DFN2DIP-HX4F0-090D070US850-RLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928038  
REPORT IS A COMBINATION OF REPORTS P900884 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D070US850-RLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

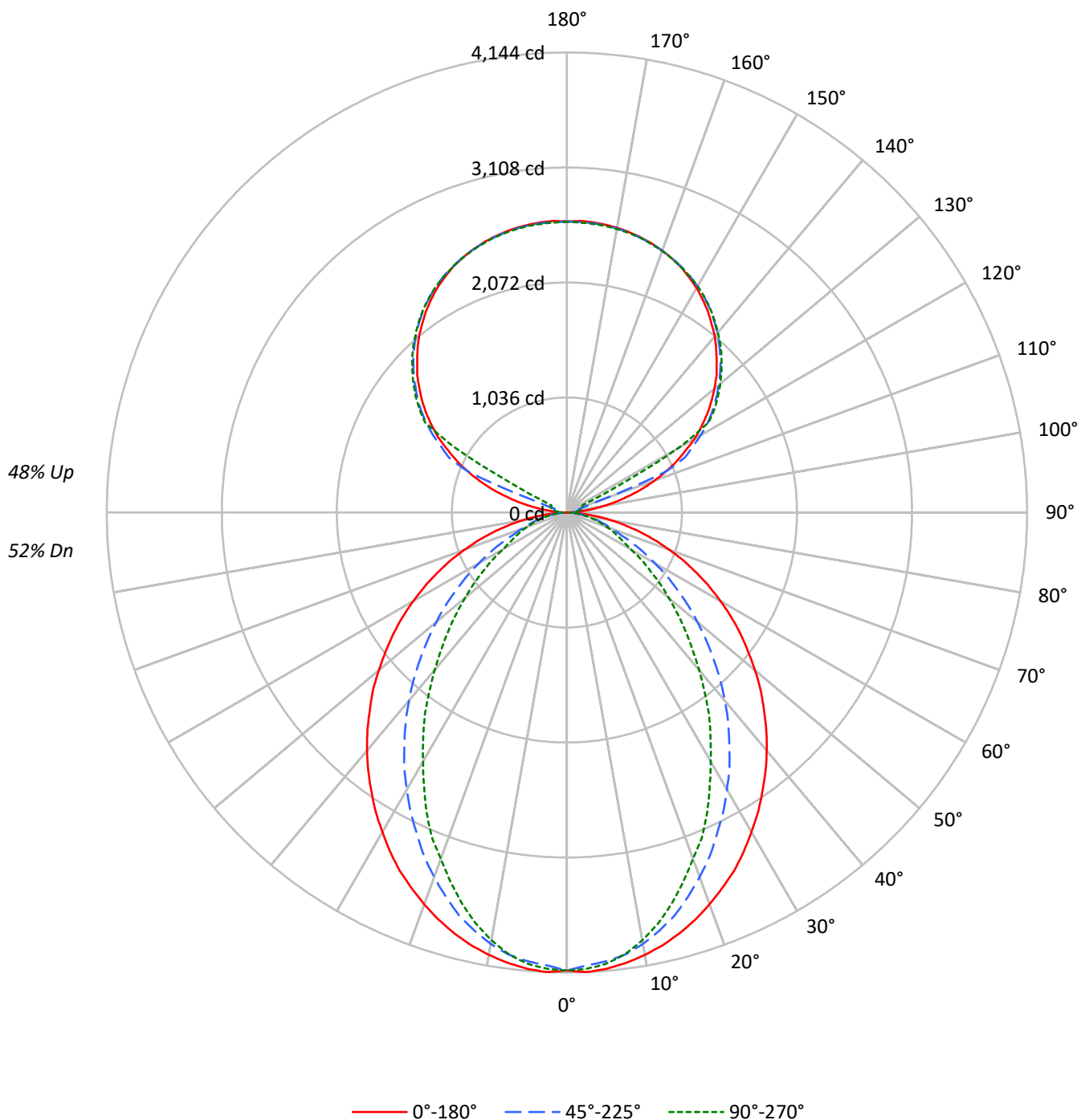
Lumens per Lamp: N/A  
Luminaire Lumens: 16169.3 lumens  
Efficiency: N/A  
Efficacy: 114.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 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   | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 71 | 71 | 71 | 58 | 58 | 58 |
| 1   | 99  | 95  | 91  | 88  | 91  | 88  | 85  | 82  | 75 | 73 | 71 | 63 | 62 | 60 | 52 | 51 | 50 |
| 2   | 90  | 83  | 77  | 72  | 84  | 77  | 72  | 68  | 66 | 63 | 59 | 56 | 53 | 51 | 47 | 45 | 43 |
| 3   | 83  | 74  | 67  | 61  | 76  | 69  | 62  | 57  | 59 | 54 | 50 | 50 | 47 | 44 | 42 | 39 | 37 |
| 4   | 76  | 66  | 58  | 52  | 70  | 61  | 54  | 49  | 53 | 48 | 43 | 45 | 41 | 38 | 38 | 35 | 33 |
| 5   | 70  | 59  | 51  | 45  | 65  | 55  | 48  | 43  | 47 | 42 | 38 | 41 | 36 | 33 | 34 | 31 | 29 |
| 6   | 65  | 53  | 45  | 39  | 60  | 49  | 42  | 37  | 43 | 37 | 33 | 37 | 33 | 29 | 31 | 28 | 26 |
| 7   | 60  | 48  | 40  | 35  | 55  | 45  | 38  | 33  | 39 | 34 | 30 | 34 | 29 | 26 | 29 | 25 | 23 |
| 8   | 56  | 44  | 36  | 31  | 52  | 41  | 34  | 29  | 36 | 30 | 26 | 31 | 27 | 24 | 26 | 23 | 21 |
| 9   | 52  | 40  | 33  | 28  | 48  | 38  | 31  | 26  | 33 | 28 | 24 | 29 | 24 | 21 | 25 | 21 | 19 |
| 10  | 49  | 37  | 30  | 25  | 45  | 35  | 28  | 24  | 30 | 25 | 22 | 27 | 22 | 19 | 23 | 20 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3067 | 3067 | 3067 |
| 5°  | 3072 | 3019 | 3038 |
| 10° | 3042 | 2960 | 2939 |
| 15° | 3001 | 2862 | 2787 |
| 20° | 2946 | 2728 | 2599 |
| 25° | 2889 | 2577 | 2418 |
| 30° | 2813 | 2422 | 2189 |
| 35° | 2739 | 2256 | 1987 |
| 40° | 2663 | 2084 | 1756 |
| 45° | 2575 | 1892 | 1546 |
| 50° | 2484 | 1699 | 1341 |
| 55° | 2389 | 1493 | 1145 |
| 60° | 2279 | 1278 | 942  |
| 65° | 2153 | 1058 | 848  |
| 70° | 2000 | 854  | 768  |
| 75° | 1808 | 753  | 699  |
| 80° | 1530 | 633  | 607  |
| 85° | 1069 | 424  | 457  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2575 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 386.6   | 2.4       |
| 10°-20°   | 1061.3  | 6.6       |
| 20°-30°   | 1490.1  | 9.2       |
| 30°-40°   | 1624.3  | 10.0      |
| 40°-50°   | 1492.9  | 9.2       |
| 50°-60°   | 1172.4  | 7.3       |
| 60°-70°   | 763.1   | 4.7       |
| 70°-80°   | 392.8   | 2.4       |
| 80°-90°   | 104.9   | 0.6       |
| 90°-100°  | 86.4    | 0.5       |
| 100°-110° | 322.1   | 2.0       |
| 110°-120° | 854.1   | 5.3       |
| 120°-130° | 1416.6  | 8.8       |
| 130°-140° | 1504.8  | 9.3       |
| 140°-150° | 1398.5  | 8.6       |
| 150°-160° | 1124.4  | 7.0       |
| 160°-170° | 724.5   | 4.5       |
| 170°-180° | 249.4   | 1.5       |
| 0°-30°    | 2938.0  | 18.2      |
| 0°-40°    | 4562.3  | 28.2      |
| 0°-60°    | 7227.6  | 44.7      |
| 0°-90°    | 8488.5  | 52.5      |
| 90°-120°  | 1262.6  | 7.8       |
| 90°-150°  | 5582.5  | 34.5      |
| 90°-180°  | 7681.0  | 47.5      |
| 0°-180°   | 16169.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4125 | 4125  | 4125 | 4125  | 4125 |      |
| 5°   | 4125 | 4106  | 4058 | 4091  | 4080 | 391  |
| 15°  | 3924 | 3882  | 3756 | 3685  | 3648 | 1106 |
| 25°  | 3562 | 3442  | 3196 | 3043  | 2986 | 1638 |
| 35°  | 3069 | 2878  | 2550 | 2315  | 2232 | 1921 |
| 45°  | 2509 | 2258  | 1867 | 1601  | 1512 | 1937 |
| 55°  | 1908 | 1616  | 1213 | 989   | 918  | 1705 |
| 65°  | 1288 | 986   | 650  | 523   | 511  | 1277 |
| 75°  | 687  | 425   | 299  | 272   | 269  | 726  |
| 85°  | 160  | 82    | 71   | 71    | 71   | 184  |
| 90°  | 2    | 23    | 38   | 48    | 51   | 15   |
| 95°  | 123  | 61    | 74   | 84    | 82   | 146  |
| 105° | 576  | 633   | 116  | 136   | 144  | 616  |
| 115° | 1090 | 1122  | 1170 | 292   | 156  | 1073 |
| 125° | 1541 | 1566  | 1602 | 1615  | 1621 | 1375 |
| 135° | 1907 | 1938  | 1954 | 1974  | 1970 | 1473 |
| 145° | 2212 | 2210  | 2243 | 2256  | 2246 | 1384 |
| 155° | 2436 | 2419  | 2442 | 2453  | 2438 | 1123 |
| 165° | 2567 | 2556  | 2561 | 2574  | 2561 | 725  |
| 175° | 2626 | 2612  | 2616 | 2629  | 2610 | 250  |
| 180° | 2620 | 2620  | 2620 | 2620  | 2620 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4125.1 | 4125.1 | 4125.1 | 4125.1 | 4125.1 |
| 2.5°   | 4143.8 | 4125.1 | 4083.9 | 4121.6 | 4114.1 |
| 5°     | 4125.1 | 4106.5 | 4057.8 | 4091.4 | 4080.3 |
| 7.5°   | 4091.4 | 4069.3 | 4017.0 | 4031.7 | 4013.0 |
| 10°    | 4046.7 | 4020.6 | 3946.2 | 3934.6 | 3912.4 |
| 12.5°  | 3990.8 | 3957.2 | 3856.2 | 3834.0 | 3792.8 |
| 15°    | 3923.5 | 3882.4 | 3755.6 | 3684.7 | 3647.5 |
| 17.5°  | 3845.1 | 3785.3 | 3628.4 | 3546.5 | 3486.7 |
| 20°    | 3755.6 | 3680.8 | 3494.1 | 3401.1 | 3318.7 |
| 22.5°  | 3658.6 | 3572.6 | 3355.9 | 3229.2 | 3173.4 |
| 25°    | 3561.6 | 3441.9 | 3195.6 | 3042.7 | 2986.4 |
| 27.5°  | 3445.9 | 3318.7 | 3046.2 | 2870.8 | 2784.8 |
| 30°    | 3322.7 | 3180.5 | 2881.8 | 2691.8 | 2590.7 |
| 32.5°  | 3203.0 | 3031.1 | 2725.4 | 2501.2 | 2407.7 |
| 35°    | 3068.8 | 2878.3 | 2549.9 | 2314.7 | 2232.3 |
| 37.5°  | 2938.1 | 2732.6 | 2385.6 | 2127.7 | 2034.7 |
| 40°    | 2799.9 | 2576.1 | 2213.7 | 1948.7 | 1851.7 |
| 42.5°  | 2658.1 | 2419.3 | 2042.1 | 1765.7 | 1672.6 |
| 45°    | 2508.8 | 2258.5 | 1866.7 | 1601.3 | 1511.8 |
| 47.5°  | 2366.9 | 2102.0 | 1698.8 | 1433.4 | 1351.4 |
| 50°    | 2210.1 | 1945.1 | 1534.4 | 1276.6 | 1198.5 |
| 52.5°  | 2056.9 | 1776.8 | 1377.6 | 1131.2 | 1060.3 |
| 55°    | 1907.5 | 1616.4 | 1213.1 | 989.4  | 918.5  |
| 57.5°  | 1754.7 | 1456.0 | 1067.9 | 858.7  | 798.9  |
| 60°    | 1597.7 | 1299.1 | 914.6  | 724.4  | 664.6  |
| 62.5°  | 1444.9 | 1146.3 | 783.8  | 604.8  | 575.1  |
| 65°    | 1288.0 | 985.5  | 649.5  | 522.8  | 511.4  |
| 67.5°  | 1138.7 | 836.1  | 522.8  | 459.0  | 447.9  |
| 70°    | 981.9  | 690.8  | 433.0  | 395.7  | 380.6  |
| 72.5°  | 832.5  | 556.1  | 362.0  | 332.3  | 324.8  |
| 75°    | 686.8  | 425.4  | 298.7  | 272.5  | 268.9  |
| 77.5°  | 541.4  | 302.2  | 235.2  | 220.2  | 212.7  |
| 80°    | 406.8  | 216.7  | 179.0  | 164.4  | 164.4  |
| 82.5°  | 283.6  | 145.7  | 123.2  | 115.7  | 115.7  |
| 85°    | 160.4  | 82.0   | 70.9   | 70.9   | 70.9   |
| 87.5°  | 59.8   | 29.7   | 29.7   | 26.2   | 26.2   |
| 90°    | 1.8    | 22.7   | 37.8   | 47.5   | 51.1   |
| 92.5°  | 47.5   | 39.8   | 45.5   | 49.4   | 51.1   |
| 95°    | 123.1  | 60.6   | 73.9   | 83.5   | 81.5   |
| 97.5°  | 221.7  | 66.4   | 96.6   | 102.5  | 104.2  |
| 100°   | 335.7  | 75.9   | 108.0  | 123.1  | 127.0  |
| 102.5° | 460.6  | 457.0  | 111.9  | 132.6  | 138.4  |
| 105°   | 576.3  | 633.2  | 115.7  | 136.4  | 144.1  |
| 107.5° | 710.9  | 758.2  | 119.6  | 140.3  | 147.9  |
| 110°   | 840.0  | 879.5  | 331.8  | 142.3  | 149.7  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 961.3  | 995.2  | 963.1  | 145.8  | 151.7  |
| 115°   | 1090.0 | 1122.2 | 1169.7 | 292.0  | 155.6  |
| 117.5° | 1201.9 | 1239.8 | 1272.1 | 1000.9 | 504.3  |
| 120°   | 1327.0 | 1355.4 | 1389.7 | 1412.4 | 1156.5 |
| 122.5° | 1433.0 | 1463.4 | 1501.6 | 1512.8 | 1514.8 |
| 125°   | 1541.2 | 1565.9 | 1602.0 | 1615.3 | 1620.8 |
| 127.5° | 1639.8 | 1666.3 | 1694.9 | 1713.8 | 1715.6 |
| 130°   | 1732.7 | 1763.1 | 1783.8 | 1804.8 | 1803.0 |
| 132.5° | 1827.5 | 1852.3 | 1873.0 | 1890.1 | 1888.3 |
| 135°   | 1907.1 | 1937.5 | 1954.5 | 1973.6 | 1969.8 |
| 137.5° | 1990.4 | 2013.3 | 2032.4 | 2051.3 | 2045.7 |
| 140°   | 2071.9 | 2087.2 | 2108.0 | 2125.1 | 2115.6 |
| 142.5° | 2140.4 | 2153.7 | 2178.2 | 2193.3 | 2183.8 |
| 145°   | 2212.5 | 2210.5 | 2242.6 | 2255.9 | 2246.5 |
| 147.5° | 2274.8 | 2269.2 | 2301.4 | 2310.8 | 2303.4 |
| 150°   | 2335.6 | 2322.4 | 2352.7 | 2363.9 | 2354.5 |
| 152.5° | 2386.7 | 2371.6 | 2400.0 | 2411.4 | 2398.2 |
| 155°   | 2436.0 | 2419.1 | 2441.8 | 2453.1 | 2438.0 |
| 157.5° | 2475.8 | 2460.8 | 2477.8 | 2491.1 | 2475.8 |
| 160°   | 2510.1 | 2498.6 | 2510.1 | 2521.3 | 2508.0 |
| 162.5° | 2540.3 | 2529.0 | 2538.4 | 2551.7 | 2534.6 |
| 165°   | 2566.8 | 2555.6 | 2561.1 | 2574.4 | 2561.1 |
| 167.5° | 2587.7 | 2576.2 | 2582.1 | 2595.4 | 2578.3 |
| 170°   | 2604.8 | 2593.4 | 2597.2 | 2610.5 | 2593.4 |
| 172.5° | 2616.1 | 2604.8 | 2608.7 | 2621.9 | 2604.8 |
| 175°   | 2625.6 | 2612.2 | 2616.1 | 2629.3 | 2610.5 |
| 177.5° | 2629.3 | 2616.1 | 2618.1 | 2631.4 | 2614.2 |
| 180°   | 2619.9 | 2619.9 | 2619.9 | 2619.9 | 2619.9 |

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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 | 11.27            | 12.12 | 12.22 | 13.08 | 14.32 | 7.25           | 8.10  | 8.19  | 9.05  | 10.29 |
|                 | 3H   | 12.95            | 13.71 | 13.91 | 14.68 | 15.94 | 8.44           | 9.20  | 9.39  | 10.16 | 11.42 |
|                 | 4H   | 13.56            | 14.28 | 14.53 | 15.25 | 16.52 | 8.89           | 9.61  | 9.86  | 10.58 | 11.85 |
|                 | 6H   | 13.99            | 14.65 | 14.97 | 15.62 | 16.90 | 9.21           | 9.88  | 10.19 | 10.85 | 12.13 |
|                 | 8H   | 14.11            | 14.74 | 15.10 | 15.73 | 17.01 | 9.31           | 9.94  | 10.29 | 10.93 | 12.21 |
|                 | 12H  | 14.18            | 14.78 | 15.17 | 15.76 | 17.06 | 9.35           | 9.95  | 10.34 | 10.93 | 12.24 |
| 4H              | 2H   | 11.29            | 12.01 | 12.27 | 12.98 | 14.25 | 7.84           | 8.56  | 8.82  | 9.53  | 10.80 |
|                 | 3H   | 13.13            | 13.72 | 14.11 | 14.72 | 16.01 | 9.20           | 9.80  | 10.18 | 10.79 | 12.08 |
|                 | 4H   | 13.82            | 14.37 | 14.81 | 15.36 | 16.66 | 9.75           | 10.29 | 10.74 | 11.28 | 12.59 |
|                 | 6H   | 14.34            | 14.81 | 15.34 | 15.82 | 17.13 | 10.17          | 10.64 | 11.17 | 11.65 | 12.96 |
|                 | 8H   | 14.51            | 14.95 | 15.52 | 15.96 | 17.28 | 10.30          | 10.74 | 11.31 | 11.75 | 13.07 |
|                 | 12H  | 14.61            | 15.00 | 15.63 | 16.03 | 17.35 | 10.37          | 10.76 | 11.39 | 11.79 | 13.11 |
| 8H              | 4H   | 13.79            | 14.23 | 14.79 | 15.23 | 16.55 | 10.03          | 10.47 | 11.04 | 11.48 | 12.80 |
|                 | 6H   | 14.36            | 14.72 | 15.39 | 15.77 | 17.09 | 10.55          | 10.91 | 11.58 | 11.96 | 13.28 |
|                 | 8H   | 14.58            | 14.89 | 15.61 | 15.93 | 17.27 | 10.75          | 11.06 | 11.78 | 12.10 | 13.44 |
|                 | 12H  | 14.72            | 15.00 | 15.76 | 16.03 | 17.41 | 10.87          | 11.15 | 11.91 | 12.18 | 13.56 |
| 12H             | 4H   | 13.74            | 14.14 | 14.77 | 15.16 | 16.49 | 10.04          | 10.43 | 11.06 | 11.45 | 12.78 |
|                 | 6H   | 14.33            | 14.65 | 15.37 | 15.69 | 17.02 | 10.60          | 10.92 | 11.64 | 11.96 | 13.29 |
|                 | 8H   | 14.56            | 14.84 | 15.60 | 15.87 | 17.25 | 10.82          | 11.10 | 11.86 | 12.13 | 13.51 |

END OF REPORT