

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: P922478

Luminaire Tested: DFN2DIP-PN4F0-100D090US940-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P922478  
REPORT IS A COMBINATION OF REPORTS P899712 AND P896497  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-100D090US940-RLLFLL  
Description: 4 foot, Pentagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

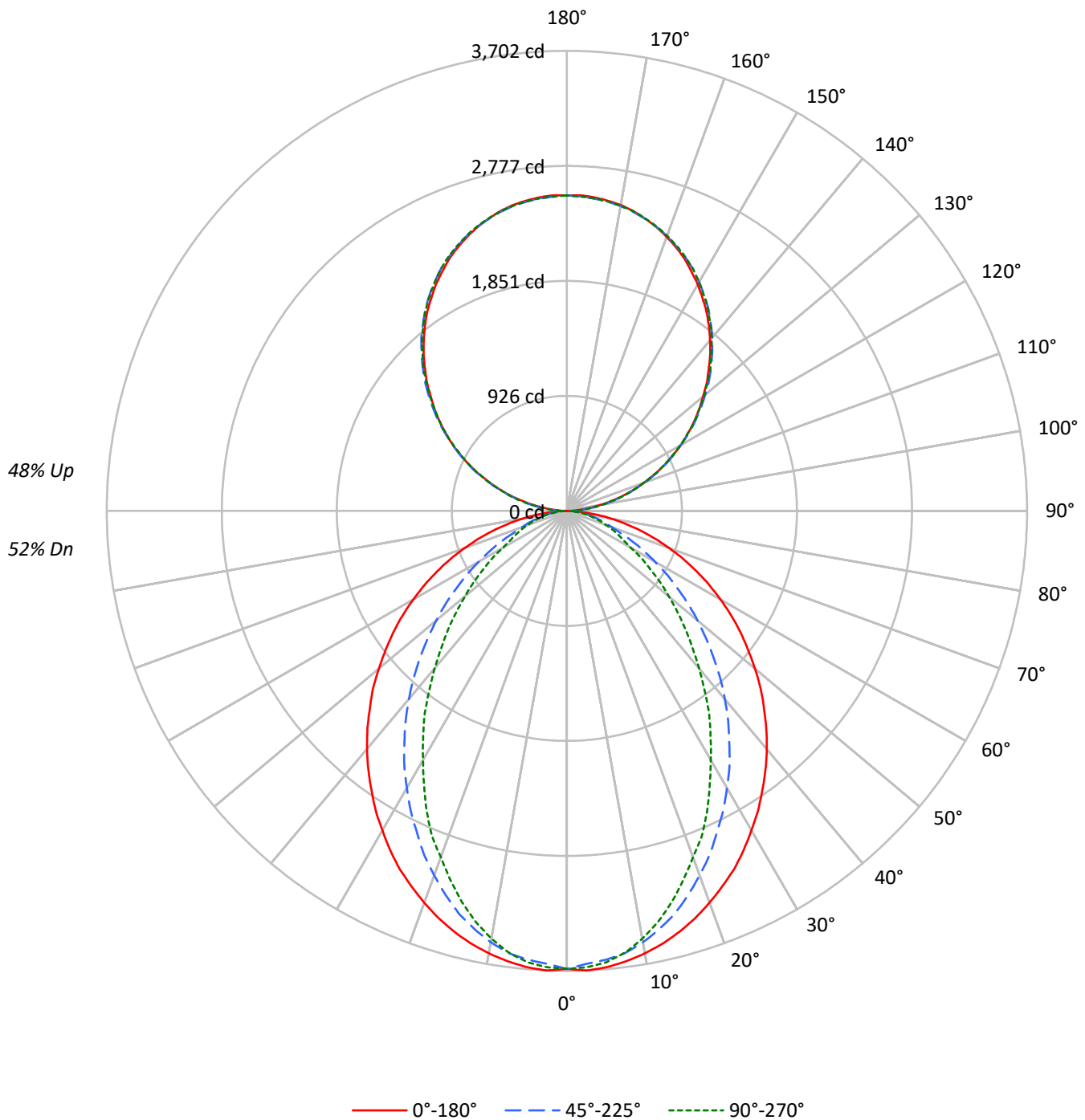
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 14682.0 lumens  
Efficiency: N/A  
Efficacy: 87.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: General Diffuse  
  
Input Watts (W): 167.6  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9952  
Total Harmonic Distortion (THDi): 0.069  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P922478

CATALOG NUMBER: DFN2DIP-PN4F0-100D090US940-RLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P922478

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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 | 99 | 99 | 99 | 99 |  | 84 | 84 | 84 |  | 70 | 70 | 70 |  | 58 | 58 | 58 |
| 1   | 99  | 94  | 91  | 87  | 91 | 88 | 84 | 82 |  | 75 | 72 | 70 |  | 63 | 61 | 60 |  | 52 | 51 | 50 |
| 2   | 90  | 83  | 77  | 72  | 83 | 77 | 72 | 68 |  | 66 | 62 | 59 |  | 56 | 53 | 51 |  | 46 | 44 | 43 |
| 3   | 83  | 73  | 66  | 61  | 76 | 68 | 62 | 57 |  | 59 | 54 | 50 |  | 50 | 46 | 43 |  | 41 | 39 | 37 |
| 4   | 76  | 65  | 58  | 52  | 70 | 61 | 54 | 49 |  | 52 | 47 | 43 |  | 45 | 41 | 38 |  | 37 | 34 | 32 |
| 5   | 70  | 59  | 51  | 45  | 64 | 55 | 48 | 42 |  | 47 | 42 | 38 |  | 40 | 36 | 33 |  | 34 | 31 | 28 |
| 6   | 64  | 53  | 45  | 39  | 60 | 49 | 42 | 37 |  | 43 | 37 | 33 |  | 37 | 32 | 29 |  | 31 | 28 | 25 |
| 7   | 60  | 48  | 40  | 35  | 55 | 45 | 38 | 33 |  | 39 | 33 | 29 |  | 33 | 29 | 26 |  | 28 | 25 | 23 |
| 8   | 56  | 43  | 36  | 31  | 51 | 41 | 34 | 29 |  | 36 | 30 | 26 |  | 31 | 26 | 23 |  | 26 | 23 | 20 |
| 9   | 52  | 40  | 32  | 28  | 48 | 37 | 31 | 26 |  | 33 | 27 | 24 |  | 28 | 24 | 21 |  | 24 | 21 | 19 |
| 10  | 48  | 37  | 30  | 25  | 45 | 34 | 28 | 24 |  | 30 | 25 | 21 |  | 26 | 22 | 19 |  | 23 | 19 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2690 | 2690 | 2690 |
| 5°  | 2694 | 2648 | 2665 |
| 10° | 2668 | 2596 | 2579 |
| 15° | 2631 | 2511 | 2445 |
| 20° | 2582 | 2393 | 2281 |
| 25° | 2533 | 2261 | 2123 |
| 30° | 2466 | 2125 | 1921 |
| 35° | 2400 | 1979 | 1745 |
| 40° | 2334 | 1828 | 1542 |
| 45° | 2256 | 1661 | 1358 |
| 50° | 2176 | 1491 | 1179 |
| 55° | 2093 | 1310 | 1006 |
| 60° | 1996 | 1121 | 829  |
| 65° | 1885 | 929  | 746  |
| 70° | 1750 | 749  | 676  |
| 75° | 1581 | 662  | 616  |
| 80° | 1335 | 556  | 536  |
| 85° | 930  | 373  | 406  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2256 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 345.4   | 2.4       |
| 10°-20°   | 948.2   | 6.5       |
| 20°-30°   | 1331.2  | 9.1       |
| 30°-40°   | 1451.1  | 9.9       |
| 40°-50°   | 1333.8  | 9.1       |
| 50°-60°   | 1047.4  | 7.1       |
| 60°-70°   | 681.8   | 4.6       |
| 70°-80°   | 351.0   | 2.4       |
| 80°-90°   | 96.8    | 0.7       |
| 90°-100°  | 157.1   | 1.1       |
| 100°-110° | 499.0   | 3.4       |
| 110°-120° | 854.0   | 5.8       |
| 120°-130° | 1123.1  | 7.6       |
| 130°-140° | 1260.7  | 8.6       |
| 140°-150° | 1236.2  | 8.4       |
| 150°-160° | 1037.0  | 7.1       |
| 160°-170° | 687.7   | 4.7       |
| 170°-180° | 240.4   | 1.6       |
| 0°-30°    | 2624.8  | 17.9      |
| 0°-40°    | 4076.0  | 27.8      |
| 0°-60°    | 6457.2  | 44.0      |
| 0°-90°    | 7586.7  | 51.7      |
| 90°-120°  | 1510.1  | 10.3      |
| 90°-150°  | 5130.1  | 34.9      |
| 90°-180°  | 7095.0  | 48.3      |
| 0°-180°   | 14682.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3685 | 3685  | 3685 | 3685  | 3685 |      |
| 5°   | 3685 | 3669  | 3625 | 3655  | 3645 | 349  |
| 15°  | 3505 | 3468  | 3355 | 3292  | 3259 | 988  |
| 25°  | 3182 | 3075  | 2855 | 2718  | 2668 | 1463 |
| 35°  | 2742 | 2572  | 2278 | 2068  | 1994 | 1716 |
| 45°  | 2241 | 2018  | 1668 | 1431  | 1351 | 1731 |
| 55°  | 1704 | 1444  | 1084 | 884   | 821  | 1523 |
| 65°  | 1151 | 880   | 580  | 467   | 457  | 1141 |
| 75°  | 614  | 380   | 267  | 243   | 240  | 649  |
| 85°  | 143  | 73    | 63   | 63    | 63   | 164  |
| 90°  | 2    | 28    | 75   | 70    | 73   | 14   |
| 95°  | 112  | 133   | 137  | 137   | 133  | 124  |
| 105° | 461  | 467   | 471  | 475   | 475  | 486  |
| 115° | 857  | 869   | 865  | 863   | 857  | 848  |
| 125° | 1246 | 1266  | 1260 | 1253  | 1250 | 1114 |
| 135° | 1612 | 1636  | 1641 | 1638  | 1632 | 1246 |
| 145° | 1957 | 1973  | 1985 | 1987  | 1979 | 1223 |
| 155° | 2238 | 2244  | 2251 | 2262  | 2255 | 1030 |
| 165° | 2435 | 2432  | 2432 | 2448  | 2437 | 687  |
| 175° | 2534 | 2527  | 2523 | 2538  | 2525 | 241  |
| 180° | 2538 | 2538  | 2538 | 2538  | 2538 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3685.4 | 3685.4 | 3685.4 | 3685.4 | 3685.4 |
| 2.5°   | 3702.0 | 3685.4 | 3648.6 | 3682.2 | 3675.5 |
| 5°     | 3685.4 | 3668.8 | 3625.2 | 3655.4 | 3645.4 |
| 7.5°   | 3655.4 | 3635.5 | 3588.8 | 3601.9 | 3585.3 |
| 10°    | 3615.4 | 3592.0 | 3525.5 | 3515.2 | 3495.4 |
| 12.5°  | 3565.5 | 3535.4 | 3445.1 | 3425.3 | 3388.5 |
| 15°    | 3505.3 | 3468.5 | 3355.2 | 3291.9 | 3258.7 |
| 17.5°  | 3435.2 | 3381.8 | 3241.7 | 3168.4 | 3115.0 |
| 20°    | 3355.2 | 3288.4 | 3121.7 | 3038.6 | 2964.9 |
| 22.5°  | 3268.6 | 3191.8 | 2998.2 | 2885.0 | 2835.1 |
| 25°    | 3181.9 | 3075.1 | 2854.9 | 2718.3 | 2668.1 |
| 27.5°  | 3078.5 | 2964.9 | 2721.5 | 2564.7 | 2488.0 |
| 30°    | 2968.5 | 2841.4 | 2574.6 | 2404.9 | 2314.6 |
| 32.5°  | 2861.7 | 2708.0 | 2434.9 | 2234.6 | 2151.1 |
| 35°    | 2741.7 | 2571.5 | 2278.1 | 2068.0 | 1994.3 |
| 37.5°  | 2624.9 | 2441.2 | 2131.3 | 1900.9 | 1817.8 |
| 40°    | 2501.4 | 2301.5 | 1977.7 | 1741.0 | 1654.3 |
| 42.5°  | 2374.7 | 2161.3 | 1824.5 | 1577.5 | 1494.3 |
| 45°    | 2241.3 | 2017.7 | 1667.8 | 1430.7 | 1350.7 |
| 47.5°  | 2114.7 | 1877.9 | 1517.7 | 1280.6 | 1207.4 |
| 50°    | 1974.5 | 1737.8 | 1370.8 | 1140.5 | 1070.8 |
| 52.5°  | 1837.5 | 1587.4 | 1230.7 | 1010.6 | 947.3  |
| 55°    | 1704.1 | 1444.1 | 1083.9 | 884.0  | 820.6  |
| 57.5°  | 1567.6 | 1300.7 | 954.0  | 767.1  | 713.7  |
| 60°    | 1427.4 | 1160.7 | 817.1  | 647.2  | 593.8  |
| 62.5°  | 1290.8 | 1024.0 | 700.3  | 540.4  | 513.8  |
| 65°    | 1150.8 | 880.4  | 580.3  | 467.1  | 456.8  |
| 67.5°  | 1017.4 | 747.0  | 467.1  | 410.1  | 400.2  |
| 70°    | 877.2  | 617.2  | 386.7  | 353.5  | 340.1  |
| 72.5°  | 743.8  | 496.8  | 323.4  | 296.9  | 290.2  |
| 75°    | 613.6  | 380.0  | 266.8  | 243.4  | 240.2  |
| 77.5°  | 483.8  | 270.0  | 210.2  | 196.7  | 190.0  |
| 80°    | 363.4  | 193.6  | 160.0  | 146.9  | 146.9  |
| 82.5°  | 253.3  | 130.2  | 110.0  | 103.3  | 103.3  |
| 85°    | 143.3  | 73.2   | 63.3   | 63.3   | 63.3   |
| 87.5°  | 53.4   | 26.6   | 26.6   | 23.4   | 23.4   |
| 90°    | 2.3    | 27.6   | 75.0   | 70.4   | 72.7   |
| 92.5°  | 47.4   | 64.3   | 66.6   | 68.8   | 68.8   |
| 95°    | 111.7  | 133.1  | 137.0  | 137.0  | 133.1  |
| 97.5°  | 185.9  | 205.8  | 214.3  | 214.3  | 214.3  |
| 100°   | 271.6  | 289.3  | 295.3  | 295.3  | 293.1  |
| 102.5° | 361.9  | 375.0  | 383.3  | 385.7  | 383.3  |
| 105°   | 460.7  | 466.7  | 471.4  | 475.2  | 475.2  |
| 107.5° | 558.6  | 567.8  | 567.8  | 569.3  | 558.6  |
| 110°   | 653.4  | 665.8  | 665.8  | 665.8  | 659.6  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 756.0  | 769.0  | 766.7  | 760.6  | 756.0  |
| 115°   | 857.0  | 869.2  | 865.4  | 863.2  | 857.0  |
| 117.5° | 957.3  | 974.1  | 963.4  | 957.3  | 951.1  |
| 120°   | 1058.3 | 1075.0 | 1058.3 | 1058.3 | 1051.3 |
| 122.5° | 1150.0 | 1171.5 | 1160.8 | 1154.7 | 1150.0 |
| 125°   | 1246.5 | 1265.6 | 1259.5 | 1252.6 | 1250.4 |
| 127.5° | 1340.6 | 1364.3 | 1355.9 | 1346.8 | 1340.6 |
| 130°   | 1428.6 | 1456.2 | 1452.3 | 1447.7 | 1439.3 |
| 132.5° | 1527.3 | 1548.7 | 1550.2 | 1539.5 | 1533.5 |
| 135°   | 1612.2 | 1635.9 | 1640.6 | 1638.3 | 1632.2 |
| 137.5° | 1707.1 | 1726.3 | 1730.1 | 1728.6 | 1719.4 |
| 140°   | 1790.6 | 1809.6 | 1820.3 | 1820.3 | 1812.0 |
| 142.5° | 1876.2 | 1895.3 | 1901.5 | 1903.8 | 1895.3 |
| 145°   | 1957.4 | 1972.6 | 1984.9 | 1987.2 | 1978.8 |
| 147.5° | 2030.1 | 2049.2 | 2058.3 | 2062.2 | 2053.8 |
| 150°   | 2105.1 | 2118.1 | 2126.5 | 2133.3 | 2126.5 |
| 152.5° | 2171.6 | 2184.6 | 2195.3 | 2203.8 | 2195.3 |
| 155°   | 2238.2 | 2244.3 | 2251.2 | 2261.9 | 2255.0 |
| 157.5° | 2295.5 | 2300.2 | 2304.0 | 2319.2 | 2308.5 |
| 160°   | 2346.8 | 2351.4 | 2353.8 | 2366.7 | 2357.5 |
| 162.5° | 2394.2 | 2394.2 | 2396.6 | 2411.1 | 2400.4 |
| 165°   | 2434.8 | 2432.5 | 2432.5 | 2447.8 | 2437.1 |
| 167.5° | 2471.6 | 2464.7 | 2464.7 | 2479.9 | 2469.2 |
| 170°   | 2499.1 | 2493.0 | 2490.7 | 2506.0 | 2493.0 |
| 172.5° | 2518.2 | 2512.1 | 2509.8 | 2525.1 | 2512.1 |
| 175°   | 2533.5 | 2527.4 | 2522.8 | 2538.2 | 2525.1 |
| 177.5° | 2541.9 | 2535.8 | 2531.2 | 2544.2 | 2531.2 |
| 180°   | 2538.2 | 2538.2 | 2538.2 | 2538.2 | 2538.2 |

TEST NUMBER: P922478

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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 | 10.75            | 11.59 | 11.70 | 12.55 | 13.80 | 6.71           | 7.55  | 7.66  | 8.52  | 9.77  |
|                 | 3H   | 12.43            | 13.18 | 13.39 | 14.15 | 15.43 | 7.90           | 8.66  | 8.86  | 9.63  | 10.90 |
|                 | 4H   | 13.04            | 13.75 | 14.01 | 14.73 | 16.01 | 8.35           | 9.07  | 9.33  | 10.04 | 11.32 |
|                 | 6H   | 13.46            | 14.12 | 14.45 | 15.10 | 16.39 | 8.68           | 9.33  | 9.66  | 10.31 | 11.61 |
|                 | 8H   | 13.59            | 14.22 | 14.58 | 15.21 | 16.50 | 8.77           | 9.39  | 9.76  | 10.39 | 11.68 |
|                 | 12H  | 13.66            | 14.25 | 14.65 | 15.24 | 16.55 | 8.81           | 9.40  | 9.81  | 10.39 | 11.71 |
| 4H              | 2H   | 10.77            | 11.48 | 11.75 | 12.45 | 13.74 | 7.31           | 8.02  | 8.29  | 9.00  | 10.28 |
|                 | 3H   | 12.60            | 13.19 | 13.59 | 14.20 | 15.49 | 8.66           | 9.25  | 9.65  | 10.26 | 11.55 |
|                 | 4H   | 13.29            | 13.84 | 14.29 | 14.83 | 16.15 | 9.21           | 9.75  | 10.21 | 10.75 | 12.07 |
|                 | 6H   | 13.81            | 14.28 | 14.82 | 15.30 | 16.62 | 9.63           | 10.10 | 10.64 | 11.12 | 12.43 |
|                 | 8H   | 13.99            | 14.43 | 15.00 | 15.44 | 16.77 | 9.76           | 10.20 | 10.77 | 11.21 | 12.54 |
|                 | 12H  | 14.09            | 14.48 | 15.12 | 15.51 | 16.84 | 9.83           | 10.22 | 10.86 | 11.25 | 12.59 |
| 8H              | 4H   | 13.26            | 13.70 | 14.27 | 14.71 | 16.04 | 9.49           | 9.93  | 10.51 | 10.94 | 12.27 |
|                 | 6H   | 13.83            | 14.19 | 14.87 | 15.25 | 16.58 | 10.01          | 10.37 | 11.05 | 11.43 | 12.76 |
|                 | 8H   | 14.05            | 14.37 | 15.10 | 15.41 | 16.76 | 10.21          | 10.52 | 11.25 | 11.56 | 12.91 |
|                 | 12H  | 14.19            | 14.47 | 15.24 | 15.51 | 16.90 | 10.33          | 10.60 | 11.37 | 11.64 | 13.03 |
| 12H             | 4H   | 13.22            | 13.61 | 14.25 | 14.64 | 15.97 | 9.50           | 9.89  | 10.53 | 10.92 | 12.26 |
|                 | 6H   | 13.81            | 14.13 | 14.85 | 15.17 | 16.51 | 10.06          | 10.38 | 11.11 | 11.42 | 12.77 |
|                 | 8H   | 14.03            | 14.31 | 15.08 | 15.35 | 16.74 | 10.28          | 10.55 | 11.32 | 11.59 | 12.98 |

END OF REPORT