

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: P907710

Luminaire Tested: DFN2DIP-4P3F0-060D020US840-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P907710  
REPORT IS A COMBINATION OF REPORTS P899037 AND P895917  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P3F0-060D020US840-FLLFLL  
Description: 3 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

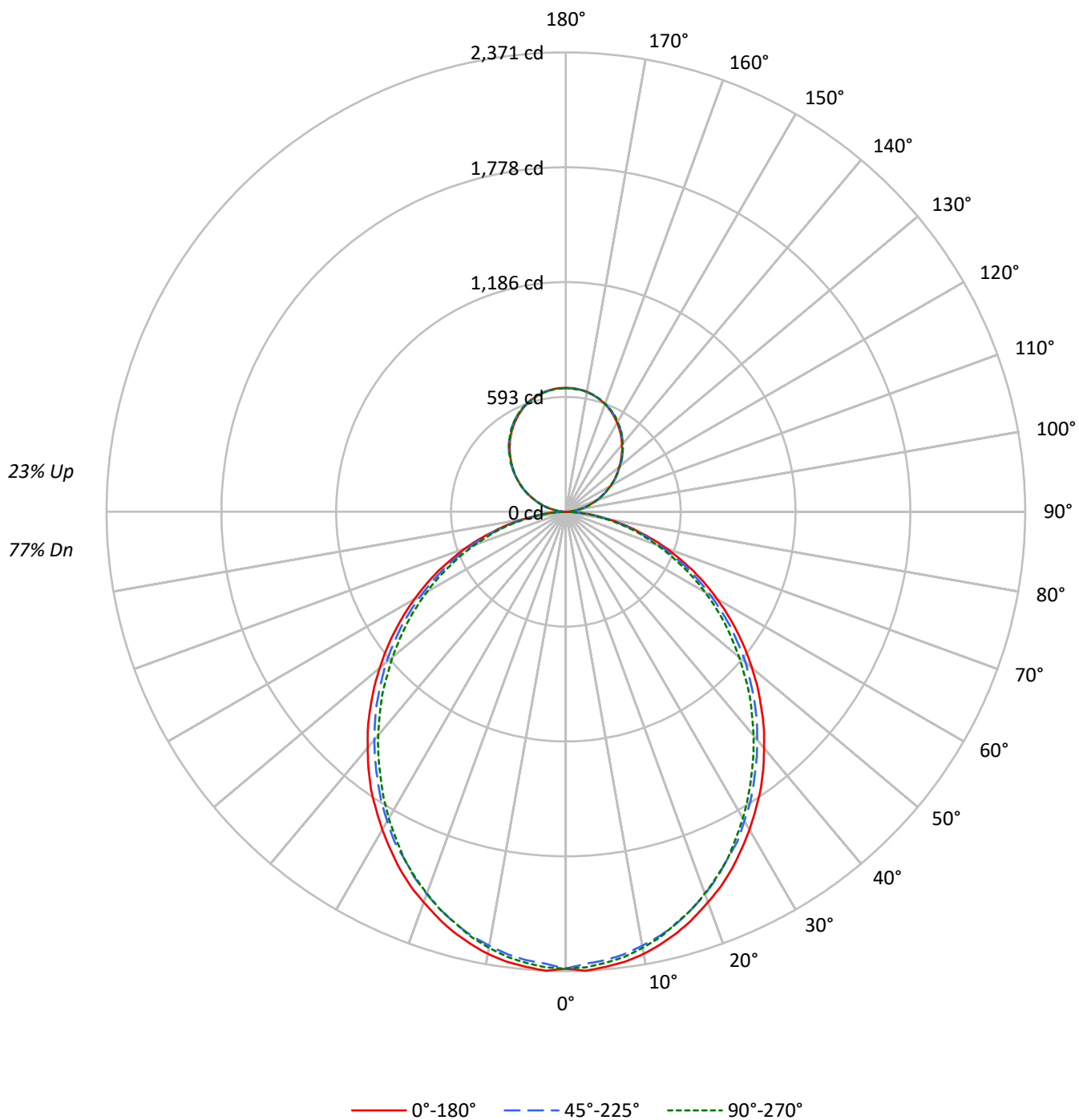
Lumens per Lamp: N/A  
Luminaire Lumens: 7786.1 lumens  
Efficiency: N/A  
Efficacy: 100.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.07' x L: 3.07' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 77.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9963  
Total Harmonic Distortion (THDi): 0.065  
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   | 114 | 114 | 114 | 114 | 108 | 108 | 108 | 108 | 98 | 98 | 98 | 89 | 89 | 89 | 81 | 81 | 81 |
| 1   | 104 | 99  | 95  | 92  | 99  | 95  | 91  | 88  | 86 | 84 | 81 | 79 | 77 | 75 | 72 | 70 | 68 |
| 2   | 95  | 87  | 80  | 75  | 90  | 83  | 77  | 72  | 76 | 71 | 67 | 69 | 66 | 62 | 63 | 60 | 58 |
| 3   | 86  | 76  | 69  | 63  | 82  | 73  | 66  | 61  | 67 | 61 | 57 | 61 | 57 | 53 | 56 | 52 | 49 |
| 4   | 79  | 68  | 59  | 53  | 75  | 65  | 57  | 52  | 60 | 53 | 48 | 55 | 50 | 45 | 50 | 46 | 42 |
| 5   | 73  | 61  | 52  | 46  | 69  | 58  | 50  | 44  | 53 | 47 | 42 | 49 | 44 | 39 | 45 | 41 | 37 |
| 6   | 67  | 55  | 46  | 40  | 64  | 52  | 45  | 39  | 48 | 42 | 37 | 45 | 39 | 35 | 41 | 36 | 33 |
| 7   | 62  | 49  | 41  | 35  | 59  | 48  | 40  | 34  | 44 | 37 | 33 | 41 | 35 | 31 | 37 | 33 | 29 |
| 8   | 58  | 45  | 37  | 31  | 55  | 43  | 36  | 31  | 40 | 34 | 29 | 37 | 32 | 28 | 34 | 30 | 26 |
| 9   | 54  | 41  | 33  | 28  | 52  | 40  | 32  | 27  | 37 | 31 | 26 | 34 | 29 | 25 | 32 | 27 | 24 |
| 10  | 51  | 38  | 30  | 25  | 48  | 37  | 30  | 25  | 34 | 28 | 24 | 32 | 26 | 23 | 30 | 25 | 22 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2687 | 2687 | 2687 |
| 5°  | 2689 | 2648 | 2666 |
| 10° | 2666 | 2610 | 2629 |
| 15° | 2625 | 2565 | 2572 |
| 20° | 2570 | 2504 | 2514 |
| 25° | 2516 | 2431 | 2446 |
| 30° | 2448 | 2363 | 2360 |
| 35° | 2384 | 2282 | 2269 |
| 40° | 2305 | 2201 | 2183 |
| 45° | 2226 | 2120 | 2095 |
| 50° | 2140 | 2035 | 1993 |
| 55° | 2049 | 1936 | 1898 |
| 60° | 1947 | 1819 | 1790 |
| 65° | 1835 | 1697 | 1663 |
| 70° | 1692 | 1549 | 1526 |
| 75° | 1495 | 1371 | 1398 |
| 80° | 1257 | 1144 | 1155 |
| 85° | 884  | 758  | 757  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2226 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 221.9  | 2.8       |
| 10°-20°   | 624.4  | 8.0       |
| 20°-30°   | 917.5  | 11.8      |
| 30°-40°   | 1065.7 | 13.7      |
| 40°-50°   | 1064.4 | 13.7      |
| 50°-60°   | 928.1  | 11.9      |
| 60°-70°   | 686.1  | 8.8       |
| 70°-80°   | 388.2  | 5.0       |
| 80°-90°   | 104.3  | 1.3       |
| 90°-100°  | 39.5   | 0.5       |
| 100°-110° | 125.6  | 1.6       |
| 110°-120° | 214.9  | 2.8       |
| 120°-130° | 282.7  | 3.6       |
| 130°-140° | 317.3  | 4.1       |
| 140°-150° | 311.1  | 4.0       |
| 150°-160° | 261.0  | 3.4       |
| 160°-170° | 173.1  | 2.2       |
| 170°-180° | 60.5   | 0.8       |
| 0°-30°    | 1763.8 | 22.7      |
| 0°-40°    | 2829.5 | 36.3      |
| 0°-60°    | 4821.9 | 61.9      |
| 0°-90°    | 6000.4 | 77.1      |
| 90°-120°  | 380.0  | 4.9       |
| 90°-150°  | 1291.1 | 16.6      |
| 90°-180°  | 1786.0 | 22.9      |
| 0°-180°   | 7786.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2358 | 2358  | 2358 | 2358  | 2358 |      |
| 5°   | 2358 | 2349  | 2324 | 2342  | 2337 | 224  |
| 15°  | 2244 | 2231  | 2201 | 2210  | 2199 | 632  |
| 25°  | 2031 | 2013  | 1975 | 1979  | 1975 | 935  |
| 35°  | 1752 | 1730  | 1694 | 1680  | 1668 | 1094 |
| 45°  | 1426 | 1410  | 1376 | 1351  | 1342 | 1101 |
| 55°  | 1079 | 1066  | 1038 | 1011  | 1000 | 965  |
| 65°  | 728  | 714   | 692  | 671   | 660  | 720  |
| 75°  | 381  | 376   | 365  | 351   | 356  | 406  |
| 85°  | 93   | 91    | 88   | 82    | 79   | 104  |
| 90°  | 1    | 7     | 19   | 18    | 18   | 7    |
| 95°  | 28   | 34    | 34   | 34    | 34   | 31   |
| 105° | 116  | 117   | 119  | 120   | 120  | 122  |
| 115° | 216  | 219   | 218  | 217   | 216  | 213  |
| 125° | 314  | 318   | 317  | 315   | 315  | 280  |
| 135° | 406  | 412   | 413  | 412   | 411  | 314  |
| 145° | 493  | 496   | 500  | 500   | 498  | 308  |
| 155° | 563  | 565   | 566  | 569   | 568  | 259  |
| 165° | 613  | 612   | 612  | 616   | 613  | 173  |
| 175° | 638  | 636   | 635  | 639   | 636  | 61   |
| 180° | 639  | 639   | 639  | 639   | 639  |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2357.6 | 2357.6 | 2357.6 | 2357.6 | 2357.6 |
| 2.5°   | 2371.4 | 2360.1 | 2335.0 | 2357.6 | 2353.3 |
| 5°     | 2357.6 | 2348.7 | 2323.7 | 2341.8 | 2337.4 |
| 7.5°   | 2341.8 | 2328.3 | 2303.3 | 2321.6 | 2317.0 |
| 10°    | 2317.0 | 2301.2 | 2273.9 | 2292.0 | 2285.2 |
| 12.5°  | 2282.9 | 2269.4 | 2242.2 | 2253.5 | 2249.0 |
| 15°    | 2244.3 | 2230.9 | 2201.3 | 2210.5 | 2199.2 |
| 17.5°  | 2196.8 | 2183.3 | 2153.7 | 2164.9 | 2153.7 |
| 20°    | 2144.6 | 2131.1 | 2099.3 | 2106.1 | 2097.2 |
| 22.5°  | 2092.6 | 2072.1 | 2042.6 | 2042.6 | 2038.0 |
| 25°    | 2031.2 | 2013.3 | 1974.7 | 1979.0 | 1974.7 |
| 27.5°  | 1963.2 | 1947.3 | 1917.9 | 1911.3 | 1900.0 |
| 30°    | 1895.4 | 1877.0 | 1843.2 | 1836.4 | 1827.3 |
| 32.5°  | 1822.7 | 1809.3 | 1772.9 | 1759.2 | 1750.1 |
| 35°    | 1752.5 | 1729.9 | 1693.5 | 1679.8 | 1668.5 |
| 37.5°  | 1673.1 | 1652.6 | 1616.4 | 1600.4 | 1589.1 |
| 40°    | 1591.5 | 1573.3 | 1537.0 | 1516.8 | 1507.6 |
| 42.5°  | 1512.2 | 1493.9 | 1457.8 | 1435.0 | 1421.5 |
| 45°    | 1426.1 | 1410.2 | 1376.0 | 1351.3 | 1342.1 |
| 47.5°  | 1342.1 | 1326.3 | 1290.0 | 1265.0 | 1251.4 |
| 50°    | 1253.6 | 1242.3 | 1210.6 | 1178.8 | 1167.5 |
| 52.5°  | 1167.5 | 1151.7 | 1122.3 | 1097.3 | 1081.5 |
| 55°    | 1079.2 | 1065.5 | 1038.3 | 1011.2 | 999.9  |
| 57.5°  | 990.8  | 979.5  | 949.9  | 922.7  | 913.5  |
| 60°    | 902.2  | 893.3  | 861.6  | 836.6  | 829.8  |
| 62.5°  | 816.1  | 800.2  | 777.6  | 755.0  | 745.9  |
| 65°    | 727.8  | 714.2  | 691.6  | 671.1  | 659.7  |
| 67.5°  | 637.1  | 625.6  | 605.4  | 589.6  | 580.4  |
| 70°    | 553.2  | 544.1  | 523.6  | 507.8  | 498.9  |
| 72.5°  | 467.1  | 458.0  | 446.7  | 430.8  | 424.0  |
| 75°    | 380.7  | 376.5  | 364.9  | 351.4  | 356.0  |
| 77.5°  | 303.8  | 294.7  | 290.0  | 283.4  | 276.6  |
| 80°    | 226.8  | 224.4  | 219.8  | 213.1  | 208.5  |
| 82.5°  | 154.2  | 154.2  | 152.0  | 142.9  | 142.9  |
| 85°    | 92.8   | 90.7   | 88.5   | 81.5   | 79.4   |
| 87.5°  | 40.9   | 36.4   | 31.7   | 25.0   | 22.6   |
| 90°    | 0.6    | 7.0    | 18.9   | 17.7   | 18.3   |
| 92.5°  | 11.9   | 16.2   | 16.8   | 17.4   | 17.4   |
| 95°    | 28.1   | 33.5   | 34.4   | 34.4   | 33.5   |
| 97.5°  | 46.8   | 51.8   | 53.9   | 53.9   | 53.9   |
| 100°   | 68.4   | 72.8   | 74.3   | 74.3   | 73.7   |
| 102.5° | 91.1   | 94.3   | 96.4   | 97.0   | 96.4   |
| 105°   | 115.9  | 117.4  | 118.7  | 119.6  | 119.6  |
| 107.5° | 140.6  | 142.9  | 142.9  | 143.3  | 140.6  |
| 110°   | 164.5  | 167.5  | 167.5  | 167.5  | 166.0  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 190.3 | 193.5 | 193.0 | 191.4 | 190.3 |
| 115°   | 215.7 | 218.7 | 217.8 | 217.2 | 215.7 |
| 117.5° | 241.0 | 245.2 | 242.5 | 241.0 | 239.3 |
| 120°   | 266.3 | 270.5 | 266.3 | 266.3 | 264.6 |
| 122.5° | 289.4 | 294.8 | 292.2 | 290.6 | 289.4 |
| 125°   | 313.7 | 318.5 | 317.0 | 315.3 | 314.7 |
| 127.5° | 337.4 | 343.4 | 341.2 | 338.9 | 337.4 |
| 130°   | 359.5 | 366.5 | 365.5 | 364.4 | 362.2 |
| 132.5° | 384.4 | 389.8 | 390.1 | 387.5 | 385.9 |
| 135°   | 405.8 | 411.7 | 412.8 | 412.3 | 410.7 |
| 137.5° | 429.6 | 434.4 | 435.5 | 435.1 | 432.7 |
| 140°   | 450.6 | 455.4 | 458.2 | 458.2 | 456.1 |
| 142.5° | 472.2 | 477.0 | 478.6 | 479.1 | 477.0 |
| 145°   | 492.6 | 496.4 | 499.6 | 500.1 | 498.0 |
| 147.5° | 510.9 | 515.7 | 518.1 | 519.0 | 516.8 |
| 150°   | 529.8 | 533.0 | 535.1 | 536.8 | 535.1 |
| 152.5° | 546.5 | 549.8 | 552.5 | 554.6 | 552.5 |
| 155°   | 563.3 | 564.8 | 566.5 | 569.3 | 567.5 |
| 157.5° | 577.7 | 578.9 | 579.9 | 583.7 | 581.0 |
| 160°   | 590.7 | 591.8 | 592.4 | 595.6 | 593.3 |
| 162.5° | 602.6 | 602.6 | 603.1 | 606.8 | 604.1 |
| 165°   | 612.8 | 612.2 | 612.2 | 616.0 | 613.4 |
| 167.5° | 622.0 | 620.3 | 620.3 | 624.1 | 621.5 |
| 170°   | 628.9 | 627.4 | 626.8 | 630.7 | 627.4 |
| 172.5° | 633.8 | 632.2 | 631.7 | 635.5 | 632.2 |
| 175°   | 637.6 | 636.1 | 634.9 | 638.7 | 635.5 |
| 177.5° | 639.7 | 638.2 | 637.0 | 640.3 | 637.0 |
| 180°   | 638.7 | 638.7 | 638.7 | 638.7 | 638.7 |

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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 | 12.87            | 14.04 | 13.55 | 14.74 | 15.57 | 12.43          | 13.60 | 13.11 | 14.30 | 15.12 |
|                 | 3H   | 14.55            | 15.60 | 15.25 | 16.31 | 17.17 | 14.06          | 15.11 | 14.76 | 15.82 | 16.68 |
|                 | 4H   | 15.15            | 16.14 | 15.86 | 16.86 | 17.73 | 14.65          | 15.65 | 15.37 | 16.37 | 17.24 |
|                 | 6H   | 15.56            | 16.48 | 16.29 | 17.21 | 18.09 | 15.06          | 15.98 | 15.79 | 16.71 | 17.59 |
|                 | 8H   | 15.67            | 16.55 | 16.41 | 17.30 | 18.19 | 15.17          | 16.04 | 15.91 | 16.80 | 17.68 |
|                 | 12H  | 15.73            | 16.56 | 16.47 | 17.31 | 18.22 | 15.22          | 16.05 | 15.97 | 16.80 | 17.71 |
| 4H              | 2H   | 13.36            | 14.36 | 14.08 | 15.08 | 15.95 | 13.01          | 14.00 | 13.73 | 14.73 | 15.60 |
|                 | 3H   | 15.25            | 16.08 | 15.98 | 16.84 | 17.73 | 14.84          | 15.67 | 15.58 | 16.43 | 17.32 |
|                 | 4H   | 15.98            | 16.73 | 16.72 | 17.49 | 18.41 | 15.55          | 16.31 | 16.30 | 17.07 | 17.98 |
|                 | 6H   | 16.50            | 17.16 | 17.27 | 17.94 | 18.87 | 16.07          | 16.73 | 16.84 | 17.51 | 18.44 |
|                 | 8H   | 16.66            | 17.27 | 17.43 | 18.05 | 18.99 | 16.22          | 16.83 | 16.99 | 17.61 | 18.55 |
|                 | 12H  | 16.74            | 17.29 | 17.54 | 18.10 | 19.04 | 16.29          | 16.85 | 17.09 | 17.65 | 18.59 |
| 8H              | 4H   | 16.19            | 16.80 | 16.96 | 17.59 | 18.52 | 15.82          | 16.43 | 16.59 | 17.21 | 18.15 |
|                 | 6H   | 16.83            | 17.34 | 17.63 | 18.16 | 19.10 | 16.45          | 16.95 | 17.25 | 17.78 | 18.72 |
|                 | 8H   | 17.05            | 17.50 | 17.86 | 18.33 | 19.28 | 16.66          | 17.11 | 17.47 | 17.93 | 18.89 |
|                 | 12H  | 17.19            | 17.59 | 18.01 | 18.41 | 19.42 | 16.78          | 17.18 | 17.60 | 17.99 | 19.01 |
| 12H             | 4H   | 16.19            | 16.74 | 16.98 | 17.55 | 18.49 | 15.82          | 16.37 | 16.61 | 17.18 | 18.12 |
|                 | 6H   | 16.86            | 17.31 | 17.67 | 18.14 | 19.09 | 16.49          | 16.94 | 17.30 | 17.76 | 18.72 |
|                 | 8H   | 17.11            | 17.51 | 17.93 | 18.33 | 19.34 | 16.73          | 17.13 | 17.55 | 17.94 | 18.96 |

END OF REPORT