

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: P928784

Luminaire Tested: DFN2DIP-HX4F0-120D050US930-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928784  
REPORT IS A COMBINATION OF REPORTS P900853 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-120D050US930-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

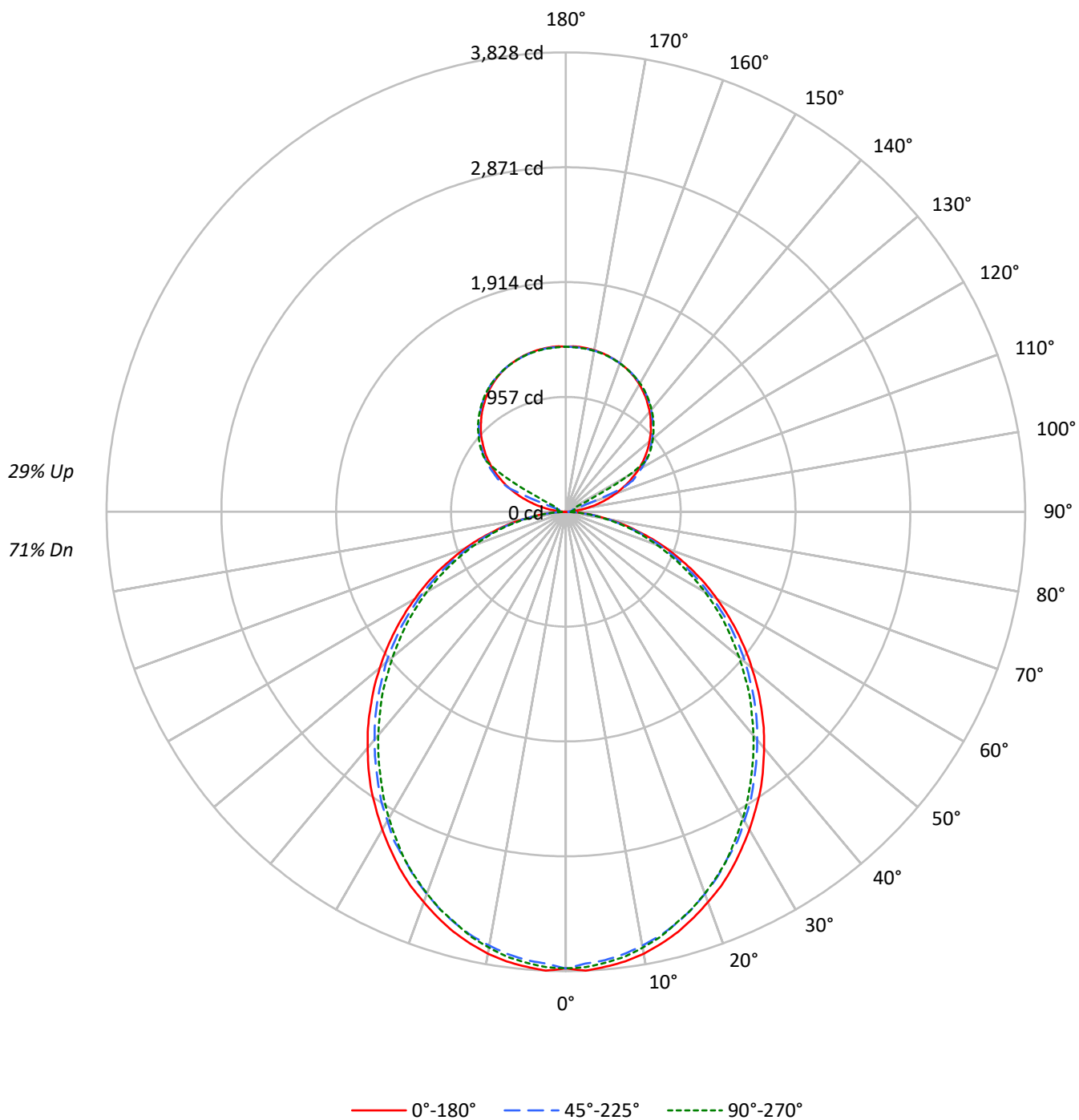
Lumens per Lamp: N/A  
Luminaire Lumens: 13716.5 lumens  
Efficiency: N/A  
Efficacy: 83.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 163.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9954  
Total Harmonic Distortion (THDi): 0.076  
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   | 112 | 112 | 112 | 112 | 106 | 106 | 106 | 106 | 95 | 95 | 95 | 84 | 84 | 84 | 75 | 75 | 75 |
| 1   | 102 | 98  | 94  | 90  | 97  | 93  | 89  | 86  | 83 | 81 | 78 | 74 | 72 | 71 | 66 | 65 | 63 |
| 2   | 93  | 86  | 79  | 74  | 88  | 81  | 76  | 71  | 73 | 69 | 65 | 65 | 62 | 59 | 58 | 56 | 53 |
| 3   | 85  | 75  | 68  | 62  | 80  | 72  | 65  | 59  | 64 | 59 | 54 | 58 | 54 | 50 | 52 | 48 | 46 |
| 4   | 78  | 67  | 59  | 52  | 73  | 64  | 56  | 50  | 57 | 51 | 47 | 52 | 47 | 43 | 46 | 42 | 39 |
| 5   | 72  | 60  | 51  | 45  | 68  | 57  | 49  | 43  | 51 | 45 | 40 | 46 | 41 | 37 | 42 | 38 | 34 |
| 6   | 66  | 54  | 45  | 39  | 62  | 51  | 43  | 38  | 46 | 40 | 35 | 42 | 37 | 33 | 38 | 34 | 30 |
| 7   | 61  | 49  | 40  | 35  | 58  | 46  | 39  | 33  | 42 | 36 | 31 | 38 | 33 | 29 | 35 | 30 | 27 |
| 8   | 57  | 44  | 36  | 31  | 54  | 42  | 35  | 30  | 39 | 32 | 28 | 35 | 30 | 26 | 32 | 27 | 24 |
| 9   | 53  | 40  | 33  | 28  | 50  | 39  | 32  | 27  | 35 | 29 | 25 | 32 | 27 | 23 | 29 | 25 | 22 |
| 10  | 50  | 37  | 30  | 25  | 47  | 36  | 29  | 24  | 33 | 27 | 23 | 30 | 25 | 21 | 27 | 23 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2830 | 2830 | 2830 |
| 5°  | 2834 | 2790 | 2809 |
| 10° | 2812 | 2753 | 2771 |
| 15° | 2770 | 2708 | 2712 |
| 20° | 2715 | 2645 | 2651 |
| 25° | 2660 | 2570 | 2581 |
| 30° | 2590 | 2501 | 2492 |
| 35° | 2524 | 2418 | 2397 |
| 40° | 2443 | 2335 | 2307 |
| 45° | 2363 | 2252 | 2216 |
| 50° | 2274 | 2164 | 2109 |
| 55° | 2182 | 2063 | 2011 |
| 60° | 2078 | 1943 | 1899 |
| 65° | 1964 | 1818 | 1767 |
| 70° | 1819 | 1667 | 1624 |
| 75° | 1618 | 1485 | 1493 |
| 80° | 1377 | 1255 | 1242 |
| 85° | 999  | 855  | 826  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2363 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 358.2   | 2.6       |
| 10°-20°   | 1007.7  | 7.3       |
| 20°-30°   | 1481.0  | 10.8      |
| 30°-40°   | 1720.1  | 12.5      |
| 40°-50°   | 1718.0  | 12.5      |
| 50°-60°   | 1498.0  | 10.9      |
| 60°-70°   | 1107.4  | 8.1       |
| 70°-80°   | 626.5   | 4.6       |
| 80°-90°   | 167.8   | 1.2       |
| 90°-100°  | 45.4    | 0.3       |
| 100°-110° | 169.1   | 1.2       |
| 110°-120° | 448.4   | 3.3       |
| 120°-130° | 743.6   | 5.4       |
| 130°-140° | 789.9   | 5.8       |
| 140°-150° | 734.1   | 5.4       |
| 150°-160° | 590.2   | 4.3       |
| 160°-170° | 380.3   | 2.8       |
| 170°-180° | 130.9   | 1.0       |
| 0°-30°    | 2846.9  | 20.8      |
| 0°-40°    | 4567.0  | 33.3      |
| 0°-60°    | 7783.0  | 56.7      |
| 0°-90°    | 9684.6  | 70.6      |
| 90°-120°  | 662.8   | 4.8       |
| 90°-150°  | 2930.4  | 21.4      |
| 90°-180°  | 4032.0  | 29.4      |
| 0°-180°   | 13716.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3806 | 3806  | 3806 | 3806  | 3806 |      |
| 5°   | 3806 | 3791  | 3751 | 3780  | 3773 | 361  |
| 15°  | 3623 | 3601  | 3553 | 3568  | 3550 | 1020 |
| 25°  | 3279 | 3250  | 3187 | 3194  | 3187 | 1509 |
| 35°  | 2829 | 2792  | 2734 | 2711  | 2693 | 1766 |
| 45°  | 2302 | 2276  | 2221 | 2181  | 2166 | 1776 |
| 55°  | 1742 | 1720  | 1676 | 1632  | 1614 | 1557 |
| 65°  | 1175 | 1153  | 1116 | 1083  | 1065 | 1162 |
| 75°  | 615  | 608   | 589  | 567   | 575  | 656  |
| 85°  | 150  | 146   | 143  | 132   | 128  | 167  |
| 90°  | 1    | 12    | 20   | 25    | 27   | 13   |
| 95°  | 65   | 32    | 39   | 44    | 43   | 77   |
| 105° | 302  | 332   | 61   | 72    | 76   | 323  |
| 115° | 572  | 589   | 614  | 153   | 82   | 563  |
| 125° | 809  | 822   | 841  | 848   | 851  | 721  |
| 135° | 1001 | 1017  | 1026 | 1036  | 1034 | 773  |
| 145° | 1161 | 1160  | 1177 | 1184  | 1179 | 726  |
| 155° | 1279 | 1270  | 1282 | 1288  | 1280 | 589  |
| 165° | 1347 | 1342  | 1344 | 1351  | 1344 | 381  |
| 175° | 1378 | 1371  | 1373 | 1380  | 1370 | 131  |
| 180° | 1375 | 1375  | 1375 | 1375  | 1375 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3805.5 | 3805.5 | 3805.5 | 3805.5 | 3805.5 |
| 2.5°   | 3827.6 | 3809.3 | 3769.0 | 3805.5 | 3798.5 |
| 5°     | 3805.5 | 3791.1 | 3750.7 | 3779.8 | 3772.8 |
| 7.5°   | 3779.8 | 3758.0 | 3717.7 | 3747.2 | 3739.9 |
| 10°    | 3739.9 | 3714.2 | 3670.4 | 3699.4 | 3688.6 |
| 12.5°  | 3684.7 | 3662.9 | 3619.1 | 3637.3 | 3629.9 |
| 15°    | 3622.6 | 3600.8 | 3553.1 | 3567.8 | 3549.6 |
| 17.5°  | 3545.7 | 3524.0 | 3476.2 | 3494.5 | 3476.2 |
| 20°    | 3461.5 | 3439.7 | 3388.5 | 3399.4 | 3385.0 |
| 22.5°  | 3377.6 | 3344.6 | 3296.8 | 3296.8 | 3289.5 |
| 25°    | 3278.6 | 3249.5 | 3187.4 | 3194.4 | 3187.4 |
| 27.5°  | 3168.7 | 3143.1 | 3095.8 | 3084.9 | 3066.7 |
| 30°    | 3059.3 | 3029.8 | 2975.0 | 2964.2 | 2949.4 |
| 32.5°  | 2942.0 | 2920.3 | 2861.6 | 2839.5 | 2824.8 |
| 35°    | 2828.6 | 2792.2 | 2733.5 | 2711.4 | 2693.2 |
| 37.5°  | 2700.5 | 2667.6 | 2608.9 | 2583.3 | 2565.0 |
| 40°    | 2569.0 | 2539.5 | 2480.8 | 2448.2 | 2433.4 |
| 42.5°  | 2440.8 | 2411.3 | 2353.1 | 2316.2 | 2294.5 |
| 45°    | 2301.8 | 2276.2 | 2221.0 | 2181.1 | 2166.4 |
| 47.5°  | 2166.4 | 2140.7 | 2082.1 | 2041.7 | 2020.0 |
| 50°    | 2023.5 | 2005.2 | 1954.0 | 1902.7 | 1884.4 |
| 52.5°  | 1884.4 | 1858.9 | 1811.5 | 1771.1 | 1745.5 |
| 55°    | 1742.0 | 1719.9 | 1676.0 | 1632.1 | 1613.9 |
| 57.5°  | 1599.1 | 1580.9 | 1533.1 | 1489.2 | 1474.5 |
| 60°    | 1456.2 | 1441.9 | 1390.6 | 1350.3 | 1339.4 |
| 62.5°  | 1317.3 | 1291.6 | 1255.2 | 1218.7 | 1203.9 |
| 65°    | 1174.8 | 1152.7 | 1116.1 | 1083.1 | 1065.0 |
| 67.5°  | 1028.4 | 1009.8 | 977.2  | 951.6  | 936.8  |
| 70°    | 892.9  | 878.2  | 845.2  | 819.6  | 805.2  |
| 72.5°  | 754.0  | 739.2  | 720.9  | 695.4  | 684.4  |
| 75°    | 614.6  | 607.6  | 588.9  | 567.2  | 574.6  |
| 77.5°  | 490.3  | 475.6  | 468.2  | 457.3  | 446.5  |
| 80°    | 366.1  | 362.2  | 354.9  | 344.0  | 336.6  |
| 82.5°  | 248.8  | 248.8  | 245.4  | 230.6  | 230.6  |
| 85°    | 149.9  | 146.4  | 142.9  | 131.6  | 128.1  |
| 87.5°  | 66.0   | 58.6   | 51.3   | 40.3   | 36.5   |
| 90°    | 1.0    | 11.9   | 19.9   | 24.9   | 26.8   |
| 92.5°  | 24.9   | 20.9   | 23.9   | 25.9   | 26.8   |
| 95°    | 64.6   | 31.8   | 38.8   | 43.8   | 42.8   |
| 97.5°  | 116.4  | 34.9   | 50.7   | 53.8   | 54.7   |
| 100°   | 176.2  | 39.9   | 56.7   | 64.6   | 66.7   |
| 102.5° | 241.8  | 239.9  | 58.8   | 69.6   | 72.7   |
| 105°   | 302.5  | 332.4  | 60.7   | 71.6   | 75.6   |
| 107.5° | 373.2  | 398.0  | 62.8   | 73.6   | 77.7   |
| 110°   | 440.9  | 461.7  | 174.2  | 74.7   | 78.6   |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 504.6  | 522.4  | 505.5  | 76.6   | 79.6   |
| 115°   | 572.2  | 589.1  | 614.0  | 153.3  | 81.7   |
| 117.5° | 630.9  | 650.8  | 667.8  | 525.3  | 264.7  |
| 120°   | 696.6  | 711.5  | 729.4  | 741.4  | 607.0  |
| 122.5° | 752.2  | 768.2  | 788.2  | 794.1  | 795.2  |
| 125°   | 809.0  | 822.0  | 840.9  | 847.8  | 850.9  |
| 127.5° | 860.7  | 874.7  | 889.7  | 899.6  | 900.6  |
| 130°   | 909.5  | 925.5  | 936.4  | 947.4  | 946.5  |
| 132.5° | 959.3  | 972.3  | 983.1  | 992.2  | 991.2  |
| 135°   | 1001.1 | 1017.1 | 1025.9 | 1036.0 | 1034.0 |
| 137.5° | 1044.8 | 1056.8 | 1066.8 | 1076.8 | 1073.8 |
| 140°   | 1087.6 | 1095.7 | 1106.5 | 1115.5 | 1110.6 |
| 142.5° | 1123.6 | 1130.6 | 1143.4 | 1151.4 | 1146.4 |
| 145°   | 1161.4 | 1160.3 | 1177.2 | 1184.2 | 1179.2 |
| 147.5° | 1194.1 | 1191.1 | 1208.1 | 1213.0 | 1209.1 |
| 150°   | 1226.0 | 1219.1 | 1235.0 | 1240.9 | 1235.9 |
| 152.5° | 1252.8 | 1244.9 | 1259.8 | 1265.9 | 1258.8 |
| 155°   | 1278.7 | 1269.9 | 1281.8 | 1287.7 | 1279.8 |
| 157.5° | 1299.6 | 1291.7 | 1300.7 | 1307.7 | 1299.6 |
| 160°   | 1317.6 | 1311.6 | 1317.6 | 1323.5 | 1316.6 |
| 162.5° | 1333.4 | 1327.6 | 1332.4 | 1339.5 | 1330.5 |
| 165°   | 1347.4 | 1341.5 | 1344.4 | 1351.4 | 1344.4 |
| 167.5° | 1358.4 | 1352.3 | 1355.4 | 1362.4 | 1353.4 |
| 170°   | 1367.3 | 1361.3 | 1363.3 | 1370.3 | 1361.3 |
| 172.5° | 1373.3 | 1367.3 | 1369.4 | 1376.3 | 1367.3 |
| 175°   | 1378.2 | 1371.2 | 1373.3 | 1380.2 | 1370.3 |
| 177.5° | 1380.2 | 1373.3 | 1374.3 | 1381.3 | 1372.3 |
| 180°   | 1375.2 | 1375.2 | 1375.2 | 1375.2 | 1375.2 |

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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 | 12.60            | 13.68 | 13.36 | 14.46 | 15.41 | 12.17          | 13.25 | 12.93 | 14.03 | 14.98 |
|                 | 3H   | 14.28            | 15.25 | 15.05 | 16.04 | 17.02 | 13.81          | 14.78 | 14.58 | 15.57 | 16.54 |
|                 | 4H   | 14.88            | 15.80 | 15.67 | 16.59 | 17.58 | 14.40          | 15.32 | 15.19 | 16.12 | 17.11 |
|                 | 6H   | 15.29            | 16.14 | 16.09 | 16.94 | 17.94 | 14.81          | 15.66 | 15.62 | 16.47 | 17.47 |
|                 | 8H   | 15.40            | 16.21 | 16.21 | 17.03 | 18.03 | 14.93          | 15.73 | 15.74 | 16.56 | 17.56 |
|                 | 12H  | 15.46            | 16.23 | 16.27 | 17.05 | 18.07 | 14.98          | 15.75 | 15.79 | 16.57 | 17.59 |
| 4H              | 2H   | 13.09            | 14.01 | 13.88 | 14.81 | 15.79 | 12.75          | 13.66 | 13.54 | 14.46 | 15.45 |
|                 | 3H   | 14.98            | 15.74 | 15.78 | 16.58 | 17.58 | 14.58          | 15.35 | 15.39 | 16.18 | 17.19 |
|                 | 4H   | 15.70            | 16.40 | 16.52 | 17.23 | 18.26 | 15.30          | 15.99 | 16.11 | 16.83 | 17.85 |
|                 | 6H   | 16.23            | 16.83 | 17.07 | 17.69 | 18.72 | 15.82          | 16.42 | 16.66 | 17.28 | 18.31 |
|                 | 8H   | 16.39            | 16.95 | 17.22 | 17.80 | 18.85 | 15.97          | 16.54 | 16.81 | 17.39 | 18.44 |
|                 | 12H  | 16.47            | 16.98 | 17.33 | 17.85 | 18.90 | 16.05          | 16.56 | 16.91 | 17.43 | 18.48 |
| 8H              | 4H   | 15.92            | 16.48 | 16.76 | 17.33 | 18.38 | 15.56          | 16.12 | 16.40 | 16.97 | 18.02 |
|                 | 6H   | 16.56            | 17.03 | 17.43 | 17.92 | 18.97 | 16.20          | 16.66 | 17.06 | 17.56 | 18.60 |
|                 | 8H   | 16.78            | 17.20 | 17.66 | 18.09 | 19.15 | 16.41          | 16.83 | 17.29 | 17.72 | 18.78 |
|                 | 12H  | 16.92            | 17.29 | 17.81 | 18.17 | 19.29 | 16.54          | 16.91 | 17.42 | 17.79 | 18.90 |
| 12H             | 4H   | 15.91            | 16.42 | 16.77 | 17.29 | 18.35 | 15.56          | 16.07 | 16.42 | 16.94 | 17.99 |
|                 | 6H   | 16.59            | 17.01 | 17.47 | 17.90 | 18.96 | 16.24          | 16.65 | 17.12 | 17.54 | 18.61 |
|                 | 8H   | 16.84            | 17.21 | 17.73 | 18.09 | 19.21 | 16.49          | 16.85 | 17.37 | 17.73 | 18.85 |

END OF REPORT