

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: P905522

Luminaire Tested: DFN2DIP-HX4F0-100D040US835-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P905522  
REPORT IS A COMBINATION OF REPORTS P899311 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-100D040US835-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

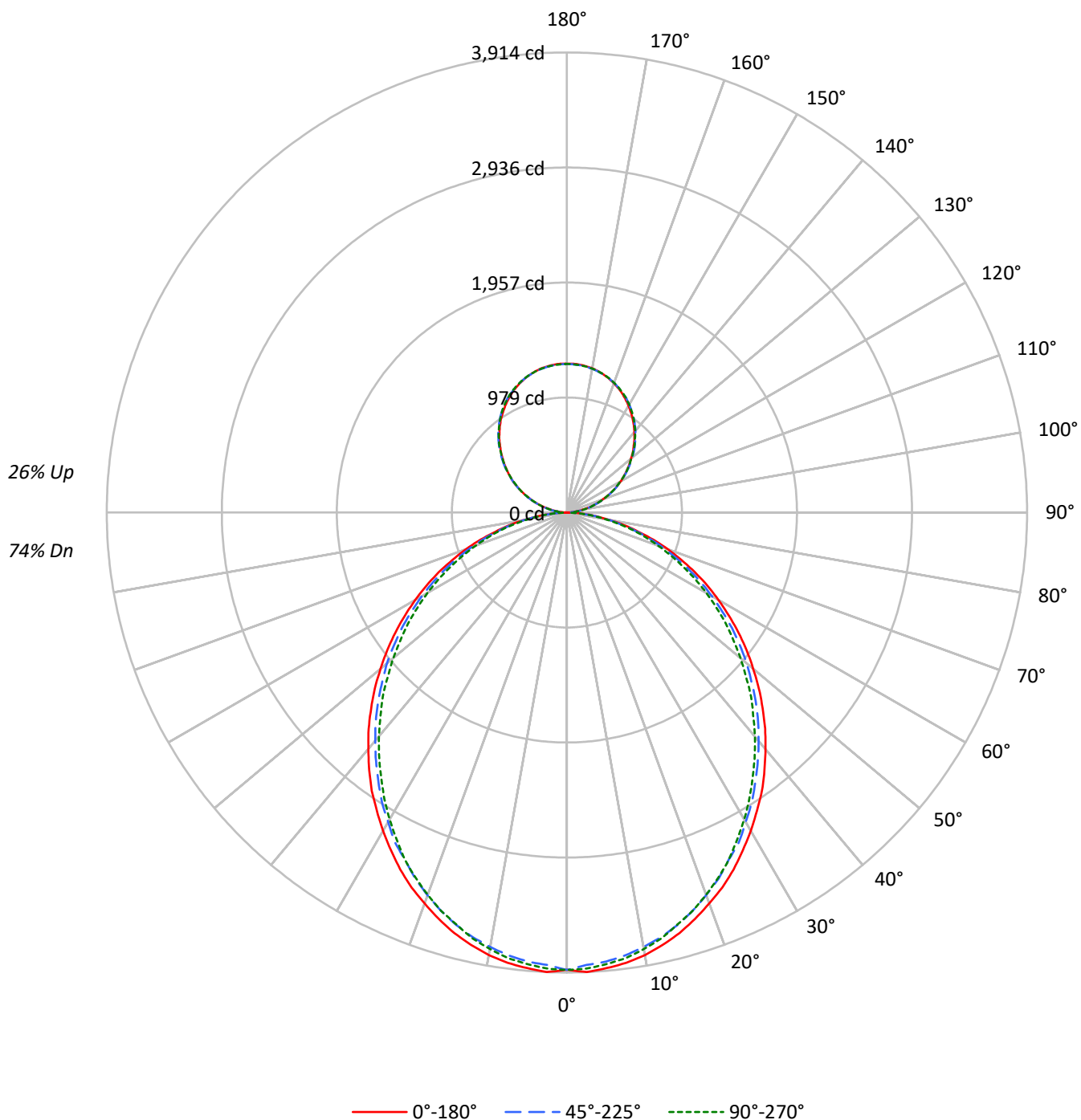
Lumens per Lamp: N/A  
Luminaire Lumens: 13440.0 lumens  
Efficiency: N/A  
Efficacy: 109.2 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 123.1  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.946  
Total Harmonic Distortion (THDi): 0.132  
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



TEST NUMBER: P905522

CATALOG NUMBER: DFN2DIP-HX4F0-100D040US835-FLLFL

**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   | 113 | 113 | 113 | 113 | 107 | 107 | 107 | 107 | 96 | 96 | 96 | 87 | 87 | 87 | 78 | 78 | 78 |
| 1   | 103 | 99  | 95  | 91  | 98  | 94  | 90  | 87  | 85 | 82 | 80 | 77 | 74 | 72 | 69 | 67 | 66 |
| 2   | 94  | 86  | 80  | 74  | 89  | 82  | 76  | 71  | 74 | 70 | 66 | 67 | 64 | 61 | 61 | 58 | 55 |
| 3   | 86  | 76  | 68  | 62  | 81  | 72  | 65  | 60  | 66 | 60 | 55 | 59 | 55 | 51 | 54 | 50 | 47 |
| 4   | 79  | 67  | 59  | 53  | 74  | 64  | 57  | 51  | 58 | 52 | 47 | 53 | 48 | 44 | 48 | 44 | 41 |
| 5   | 72  | 60  | 52  | 45  | 68  | 57  | 50  | 44  | 52 | 46 | 41 | 48 | 42 | 38 | 43 | 39 | 36 |
| 6   | 67  | 54  | 46  | 40  | 63  | 52  | 44  | 38  | 47 | 41 | 36 | 43 | 38 | 34 | 39 | 35 | 31 |
| 7   | 62  | 49  | 41  | 35  | 58  | 47  | 39  | 34  | 43 | 37 | 32 | 39 | 34 | 30 | 36 | 31 | 28 |
| 8   | 57  | 45  | 37  | 31  | 54  | 43  | 35  | 30  | 39 | 33 | 28 | 36 | 31 | 27 | 33 | 29 | 25 |
| 9   | 54  | 41  | 33  | 28  | 51  | 39  | 32  | 27  | 36 | 30 | 26 | 33 | 28 | 24 | 31 | 26 | 23 |
| 10  | 50  | 38  | 30  | 25  | 48  | 36  | 29  | 24  | 33 | 27 | 23 | 31 | 26 | 22 | 28 | 24 | 21 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2893 | 2893 | 2893 |
| 5°  | 2898 | 2853 | 2872 |
| 10° | 2875 | 2815 | 2834 |
| 15° | 2833 | 2769 | 2773 |
| 20° | 2776 | 2705 | 2711 |
| 25° | 2719 | 2628 | 2639 |
| 30° | 2648 | 2557 | 2548 |
| 35° | 2581 | 2473 | 2451 |
| 40° | 2498 | 2388 | 2359 |
| 45° | 2416 | 2302 | 2265 |
| 50° | 2326 | 2213 | 2156 |
| 55° | 2231 | 2109 | 2056 |
| 60° | 2124 | 1986 | 1942 |
| 65° | 2008 | 1859 | 1806 |
| 70° | 1860 | 1704 | 1661 |
| 75° | 1654 | 1519 | 1527 |
| 80° | 1408 | 1282 | 1270 |
| 85° | 1021 | 874  | 845  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2416 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 366.2   | 2.7       |
| 10°-20°   | 1030.4  | 7.7       |
| 20°-30°   | 1514.3  | 11.3      |
| 30°-40°   | 1758.8  | 13.1      |
| 40°-50°   | 1756.6  | 13.1      |
| 50°-60°   | 1531.7  | 11.4      |
| 60°-70°   | 1132.3  | 8.4       |
| 70°-80°   | 640.6   | 4.8       |
| 80°-90°   | 172.7   | 1.3       |
| 90°-100°  | 78.3    | 0.6       |
| 100°-110° | 248.7   | 1.9       |
| 110°-120° | 425.6   | 3.2       |
| 120°-130° | 559.8   | 4.2       |
| 130°-140° | 628.3   | 4.7       |
| 140°-150° | 616.2   | 4.6       |
| 150°-160° | 516.9   | 3.8       |
| 160°-170° | 342.8   | 2.6       |
| 170°-180° | 119.8   | 0.9       |
| 0°-30°    | 2911.0  | 21.7      |
| 0°-40°    | 4669.7  | 34.7      |
| 0°-60°    | 7958.0  | 59.2      |
| 0°-90°    | 9903.6  | 73.7      |
| 90°-120°  | 752.7   | 5.6       |
| 90°-150°  | 2556.9  | 19.0      |
| 90°-180°  | 3536.0  | 26.3      |
| 0°-180°   | 13440.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3891 | 3891  | 3891 | 3891  | 3891 |      |
| 5°   | 3891 | 3876  | 3835 | 3865  | 3858 | 369  |
| 15°  | 3704 | 3682  | 3633 | 3648  | 3630 | 1043 |
| 25°  | 3352 | 3323  | 3259 | 3266  | 3259 | 1543 |
| 35°  | 2892 | 2855  | 2795 | 2772  | 2754 | 1806 |
| 45°  | 2354 | 2327  | 2271 | 2230  | 2215 | 1816 |
| 55°  | 1781 | 1759  | 1714 | 1669  | 1650 | 1592 |
| 65°  | 1201 | 1179  | 1141 | 1108  | 1089 | 1188 |
| 75°  | 628  | 621   | 602  | 580   | 588  | 671  |
| 85°  | 153  | 150   | 146  | 135   | 131  | 171  |
| 90°  | 1    | 14    | 37   | 35    | 36   | 13   |
| 95°  | 56   | 66    | 68   | 68    | 66   | 62   |
| 105° | 230  | 233   | 235  | 237   | 237  | 242  |
| 115° | 427  | 433   | 431  | 430   | 427  | 422  |
| 125° | 621  | 631   | 628  | 624   | 623  | 555  |
| 135° | 804  | 815   | 818  | 816   | 814  | 621  |
| 145° | 976  | 983   | 989  | 990   | 986  | 610  |
| 155° | 1116 | 1119  | 1122 | 1127  | 1124 | 513  |
| 165° | 1214 | 1212  | 1212 | 1220  | 1215 | 342  |
| 175° | 1263 | 1260  | 1257 | 1265  | 1259 | 120  |
| 180° | 1265 | 1265  | 1265 | 1265  | 1265 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3891.1 | 3891.1 | 3891.1 | 3891.1 | 3891.1 |
| 2.5°   | 3913.7 | 3895.0 | 3853.7 | 3891.1 | 3883.9 |
| 5°     | 3891.1 | 3876.4 | 3835.1 | 3864.9 | 3857.7 |
| 7.5°   | 3864.9 | 3842.6 | 3801.3 | 3831.5 | 3824.0 |
| 10°    | 3824.0 | 3797.8 | 3752.9 | 3782.7 | 3771.6 |
| 12.5°  | 3767.6 | 3745.4 | 3700.5 | 3719.2 | 3711.6 |
| 15°    | 3704.1 | 3681.9 | 3633.0 | 3648.1 | 3629.5 |
| 17.5°  | 3625.5 | 3603.3 | 3554.4 | 3573.1 | 3554.4 |
| 20°    | 3539.3 | 3517.1 | 3464.7 | 3475.8 | 3461.1 |
| 22.5°  | 3453.6 | 3419.9 | 3371.0 | 3371.0 | 3363.5 |
| 25°    | 3352.4 | 3322.6 | 3259.1 | 3266.2 | 3259.1 |
| 27.5°  | 3240.0 | 3213.8 | 3165.4 | 3154.3 | 3135.6 |
| 30°    | 3128.1 | 3097.9 | 3041.9 | 3030.8 | 3015.7 |
| 32.5°  | 3008.2 | 2986.0 | 2926.0 | 2903.4 | 2888.3 |
| 35°    | 2892.3 | 2855.0 | 2795.0 | 2772.4 | 2753.7 |
| 37.5°  | 2761.3 | 2727.5 | 2667.6 | 2641.4 | 2622.7 |
| 40°    | 2626.7 | 2596.5 | 2536.6 | 2503.3 | 2488.2 |
| 42.5°  | 2495.7 | 2465.5 | 2406.0 | 2368.3 | 2346.1 |
| 45°    | 2353.6 | 2327.4 | 2271.0 | 2230.1 | 2215.1 |
| 47.5°  | 2215.1 | 2188.9 | 2128.9 | 2087.6 | 2065.4 |
| 50°    | 2069.0 | 2050.3 | 1997.9 | 1945.5 | 1926.9 |
| 52.5°  | 1926.9 | 1900.7 | 1852.2 | 1811.0 | 1784.8 |
| 55°    | 1781.2 | 1758.6 | 1713.7 | 1668.8 | 1650.2 |
| 57.5°  | 1635.1 | 1616.4 | 1567.6 | 1522.8 | 1507.7 |
| 60°    | 1489.0 | 1474.3 | 1421.9 | 1380.6 | 1369.5 |
| 62.5°  | 1346.9 | 1320.7 | 1283.4 | 1246.1 | 1231.0 |
| 65°    | 1201.2 | 1178.6 | 1141.3 | 1107.5 | 1088.9 |
| 67.5°  | 1051.6 | 1032.5 | 999.2  | 973.0  | 957.9  |
| 70°    | 913.0  | 897.9  | 864.2  | 838.0  | 823.3  |
| 72.5°  | 770.9  | 755.8  | 737.2  | 711.0  | 699.8  |
| 75°    | 628.4  | 621.3  | 602.2  | 580.0  | 587.5  |
| 77.5°  | 501.4  | 486.3  | 478.7  | 467.6  | 456.5  |
| 80°    | 374.3  | 370.4  | 362.8  | 351.7  | 344.2  |
| 82.5°  | 254.5  | 254.5  | 250.9  | 235.8  | 235.8  |
| 85°    | 153.2  | 149.7  | 146.1  | 134.6  | 131.0  |
| 87.5°  | 67.5   | 59.9   | 52.4   | 41.3   | 37.3   |
| 90°    | 1.1    | 13.7   | 37.4   | 35.1   | 36.2   |
| 92.5°  | 23.6   | 32.0   | 33.2   | 34.3   | 34.3   |
| 95°    | 55.7   | 66.4   | 68.3   | 68.3   | 66.4   |
| 97.5°  | 92.7   | 102.6  | 106.8  | 106.8  | 106.8  |
| 100°   | 135.4  | 144.2  | 147.2  | 147.2  | 146.1  |
| 102.5° | 180.4  | 186.9  | 191.1  | 192.2  | 191.1  |
| 105°   | 229.6  | 232.6  | 234.9  | 236.8  | 236.8  |
| 107.5° | 278.4  | 283.0  | 283.0  | 283.7  | 278.4  |
| 110°   | 325.7  | 331.8  | 331.8  | 331.8  | 328.8  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 376.8  | 383.3  | 382.1  | 379.1  | 376.8  |
| 115°   | 427.1  | 433.3  | 431.3  | 430.2  | 427.1  |
| 117.5° | 477.1  | 485.5  | 480.2  | 477.1  | 474.1  |
| 120°   | 527.5  | 535.8  | 527.5  | 527.5  | 524.0  |
| 122.5° | 573.2  | 583.9  | 578.6  | 575.5  | 573.2  |
| 125°   | 621.3  | 630.8  | 627.8  | 624.3  | 623.2  |
| 127.5° | 668.2  | 680.0  | 675.8  | 671.2  | 668.2  |
| 130°   | 712.0  | 725.8  | 723.9  | 721.6  | 717.4  |
| 132.5° | 761.2  | 771.9  | 772.7  | 767.3  | 764.3  |
| 135°   | 803.6  | 815.4  | 817.7  | 816.5  | 813.5  |
| 137.5° | 850.9  | 860.4  | 862.3  | 861.5  | 857.0  |
| 140°   | 892.4  | 902.0  | 907.3  | 907.3  | 903.1  |
| 142.5° | 935.2  | 944.7  | 947.7  | 948.9  | 944.7  |
| 145°   | 975.6  | 983.2  | 989.3  | 990.5  | 986.3  |
| 147.5° | 1011.8 | 1021.3 | 1025.9 | 1027.8 | 1023.6 |
| 150°   | 1049.2 | 1055.7 | 1059.9 | 1063.3 | 1059.9 |
| 152.5° | 1082.4 | 1088.8 | 1094.2 | 1098.4 | 1094.2 |
| 155°   | 1115.5 | 1118.6 | 1122.0 | 1127.4 | 1123.9 |
| 157.5° | 1144.2 | 1146.4 | 1148.3 | 1156.0 | 1150.6 |
| 160°   | 1169.7 | 1172.0 | 1173.1 | 1179.6 | 1175.0 |
| 162.5° | 1193.3 | 1193.3 | 1194.5 | 1201.7 | 1196.4 |
| 165°   | 1213.6 | 1212.4 | 1212.4 | 1220.0 | 1214.7 |
| 167.5° | 1231.9 | 1228.4 | 1228.4 | 1236.1 | 1230.7 |
| 170°   | 1245.6 | 1242.5 | 1241.4 | 1249.0 | 1242.5 |
| 172.5° | 1255.1 | 1252.1 | 1250.9 | 1258.6 | 1252.1 |
| 175°   | 1262.8 | 1259.7 | 1257.4 | 1265.0 | 1258.6 |
| 177.5° | 1267.0 | 1263.9 | 1261.6 | 1268.1 | 1261.6 |
| 180°   | 1265.0 | 1265.0 | 1265.0 | 1265.0 | 1265.0 |

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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 | 12.91            | 14.03 | 13.63 | 14.78 | 15.67 | 12.48          | 13.60 | 13.20 | 14.35 | 15.23 |
|                 | 3H   | 14.59            | 15.60 | 15.33 | 16.36 | 17.27 | 14.12          | 15.13 | 14.86 | 15.88 | 16.80 |
|                 | 4H   | 15.19            | 16.14 | 15.95 | 16.91 | 17.84 | 14.72          | 15.67 | 15.47 | 16.44 | 17.37 |
|                 | 6H   | 15.61            | 16.49 | 16.37 | 17.26 | 18.20 | 15.13          | 16.01 | 15.90 | 16.78 | 17.73 |
|                 | 8H   | 15.72            | 16.56 | 16.50 | 17.35 | 18.30 | 15.24          | 16.08 | 16.02 | 16.87 | 17.82 |
|                 | 12H  | 15.78            | 16.58 | 16.56 | 17.36 | 18.34 | 15.29          | 16.09 | 16.08 | 16.88 | 17.85 |
| 4H              | 2H   | 13.40            | 14.36 | 14.16 | 15.12 | 16.05 | 13.06          | 14.01 | 13.82 | 14.78 | 15.71 |
|                 | 3H   | 15.29            | 16.09 | 16.07 | 16.89 | 17.84 | 14.90          | 15.70 | 15.67 | 16.50 | 17.45 |
|                 | 4H   | 16.02            | 16.74 | 16.81 | 17.54 | 18.52 | 15.61          | 16.34 | 16.40 | 17.14 | 18.11 |
|                 | 6H   | 16.55            | 17.18 | 17.36 | 18.00 | 18.99 | 16.14          | 16.77 | 16.95 | 17.59 | 18.58 |
|                 | 8H   | 16.71            | 17.29 | 17.52 | 18.11 | 19.11 | 16.30          | 16.88 | 17.10 | 17.70 | 18.70 |
|                 | 12H  | 16.79            | 17.32 | 17.62 | 18.16 | 19.16 | 16.37          | 16.90 | 17.20 | 17.74 | 18.74 |
| 8H              | 4H   | 16.24            | 16.83 | 17.05 | 17.64 | 18.64 | 15.88          | 16.47 | 16.69 | 17.28 | 18.28 |
|                 | 6H   | 16.88            | 17.37 | 17.72 | 18.23 | 19.23 | 16.52          | 17.01 | 17.36 | 17.87 | 18.86 |
|                 | 8H   | 17.11            | 17.54 | 17.95 | 18.40 | 19.41 | 16.74          | 17.17 | 17.58 | 18.03 | 19.04 |
|                 | 12H  | 17.25            | 17.63 | 18.10 | 18.48 | 19.55 | 16.87          | 17.25 | 17.72 | 18.10 | 19.17 |
| 12H             | 4H   | 16.24            | 16.77 | 17.07 | 17.61 | 18.61 | 15.89          | 16.41 | 16.71 | 17.25 | 18.26 |
|                 | 6H   | 16.91            | 17.35 | 17.76 | 18.21 | 19.22 | 16.56          | 17.00 | 17.41 | 17.85 | 18.87 |
|                 | 8H   | 17.17            | 17.55 | 18.02 | 18.40 | 19.47 | 16.81          | 17.19 | 17.66 | 18.04 | 19.11 |

END OF REPORT