

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: P908192

Luminaire Tested: DFN2DIP-HX4F0-060D110US840-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P908192  
REPORT IS A COMBINATION OF REPORTS P899429 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-060D110US840-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

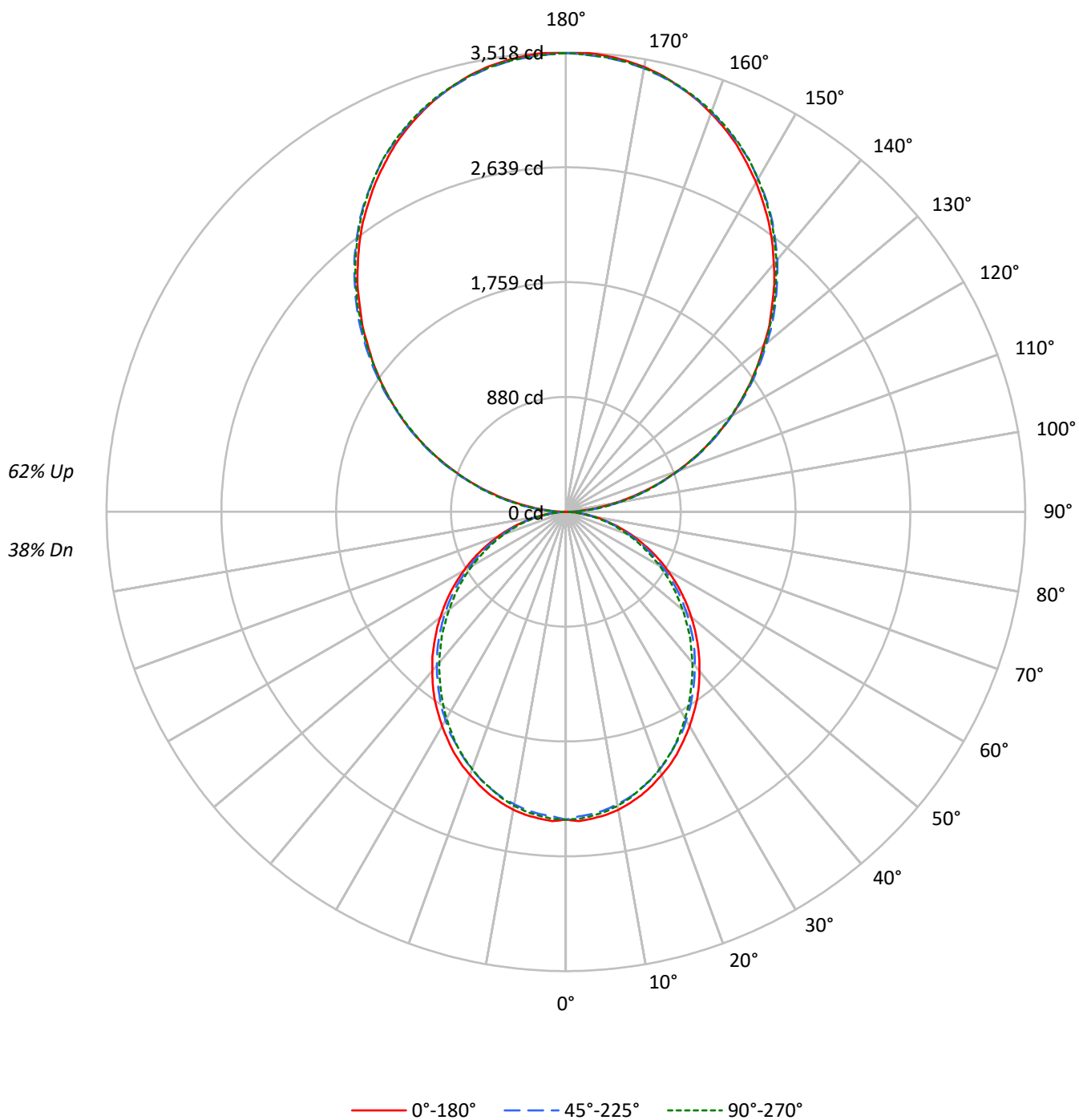
Lumens per Lamp: N/A  
Luminaire Lumens: 15829.6 lumens  
Efficiency: N/A  
Efficacy: 132.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 119.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.099  
Total Harmonic Distortion (THDi): 0.979  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P908192

CATALOG NUMBER: DFN2DIP-HX4F0-060D110US840-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P908192

CATALOG NUMBER: DFN2DIP-HX4F0-060D110US840-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   | 104 | 104 | 104 | 104 | 95 | 95 | 95 | 95 | 77 | 77 | 77 | 60 | 60 | 60 | 45 | 45 | 45 |
| 1   | 95  | 91  | 87  | 84  | 86 | 83 | 79 | 76 | 67 | 65 | 63 | 53 | 51 | 50 | 40 | 39 | 38 |
| 2   | 87  | 79  | 73  | 68  | 78 | 72 | 67 | 63 | 59 | 55 | 52 | 46 | 44 | 42 | 35 | 33 | 32 |
| 3   | 79  | 70  | 62  | 57  | 71 | 63 | 57 | 52 | 52 | 47 | 44 | 41 | 38 | 35 | 31 | 29 | 27 |
| 4   | 72  | 62  | 54  | 48  | 65 | 56 | 49 | 44 | 46 | 41 | 37 | 37 | 33 | 30 | 28 | 25 | 23 |
| 5   | 66  | 55  | 47  | 41  | 60 | 50 | 43 | 38 | 41 | 36 | 32 | 33 | 29 | 26 | 25 | 22 | 20 |
| 6   | 61  | 49  | 41  | 35  | 55 | 45 | 38 | 33 | 37 | 32 | 28 | 30 | 26 | 23 | 23 | 20 | 18 |
| 7   | 56  | 44  | 36  | 31  | 51 | 41 | 34 | 29 | 33 | 28 | 24 | 27 | 23 | 20 | 21 | 18 | 16 |
| 8   | 52  | 40  | 32  | 27  | 47 | 37 | 30 | 25 | 30 | 25 | 22 | 25 | 21 | 18 | 19 | 16 | 14 |
| 9   | 48  | 37  | 29  | 24  | 44 | 34 | 27 | 23 | 28 | 23 | 19 | 23 | 19 | 16 | 17 | 15 | 13 |
| 10  | 45  | 33  | 26  | 22  | 41 | 31 | 24 | 20 | 26 | 21 | 17 | 21 | 17 | 14 | 16 | 14 | 12 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1753 | 1753 | 1753 |
| 5°  | 1756 | 1729 | 1740 |
| 10° | 1742 | 1706 | 1717 |
| 15° | 1716 | 1678 | 1680 |
| 20° | 1682 | 1639 | 1643 |
| 25° | 1648 | 1592 | 1599 |
| 30° | 1605 | 1549 | 1544 |
| 35° | 1564 | 1498 | 1485 |
| 40° | 1514 | 1447 | 1429 |
| 45° | 1464 | 1395 | 1373 |
| 50° | 1409 | 1341 | 1307 |
| 55° | 1352 | 1278 | 1246 |
| 60° | 1287 | 1204 | 1176 |
| 65° | 1217 | 1127 | 1094 |
| 70° | 1127 | 1033 | 1007 |
| 75° | 1002 | 920  | 925  |
| 80° | 853  | 777  | 770  |
| 85° | 619  | 529  | 512  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2649 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 221.9   | 1.4       |
| 10°-20°   | 624.4   | 3.9       |
| 20°-30°   | 917.5   | 5.8       |
| 30°-40°   | 1065.7  | 6.7       |
| 40°-50°   | 1064.4  | 6.7       |
| 50°-60°   | 928.1   | 5.9       |
| 60°-70°   | 686.1   | 4.3       |
| 70°-80°   | 388.2   | 2.5       |
| 80°-90°   | 112.4   | 0.7       |
| 90°-100°  | 217.4   | 1.4       |
| 100°-110° | 690.8   | 4.4       |
| 110°-120° | 1182.1  | 7.5       |
| 120°-130° | 1554.6  | 9.8       |
| 130°-140° | 1745.0  | 11.0      |
| 140°-150° | 1711.2  | 10.8      |
| 150°-160° | 1435.4  | 9.1       |
| 160°-170° | 951.9   | 6.0       |
| 170°-180° | 332.7   | 2.1       |
| 0°-30°    | 1763.8  | 11.1      |
| 0°-40°    | 2829.5  | 17.9      |
| 0°-60°    | 4821.9  | 30.5      |
| 0°-90°    | 6008.6  | 38.0      |
| 90°-120°  | 2090.2  | 13.2      |
| 90°-150°  | 7101.0  | 44.9      |
| 90°-180°  | 9821.0  | 62.0      |
| 0°-180°   | 15829.6 | 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°  | 3    | 38    | 104  | 98    | 101  | 15   |
| 95°  | 155  | 184   | 190  | 190   | 184  | 172  |
| 105° | 638  | 646   | 652  | 658   | 658  | 673  |
| 115° | 1186 | 1203  | 1198 | 1195  | 1186 | 1173 |
| 125° | 1725 | 1752  | 1743 | 1734  | 1731 | 1542 |
| 135° | 2232 | 2264  | 2271 | 2268  | 2259 | 1725 |
| 145° | 2709 | 2730  | 2747 | 2751  | 2739 | 1693 |
| 155° | 3098 | 3106  | 3116 | 3131  | 3121 | 1426 |
| 165° | 3370 | 3367  | 3367 | 3388  | 3373 | 951  |
| 175° | 3507 | 3498  | 3492 | 3513  | 3495 | 333  |
| 180° | 3513 | 3513  | 3513 | 3513  | 3513 |      |

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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°    | 3.1    | 38.2   | 103.8  | 97.5   | 100.6  |
| 92.5°  | 65.6   | 89.0   | 92.1   | 95.3   | 95.3   |
| 95°    | 154.6  | 184.3  | 189.6  | 189.6  | 184.3  |
| 97.5°  | 257.4  | 284.9  | 296.6  | 296.6  | 296.6  |
| 100°   | 376.0  | 400.3  | 408.8  | 408.8  | 405.7  |
| 102.5° | 501.0  | 519.0  | 530.7  | 533.8  | 530.7  |
| 105°   | 637.6  | 646.1  | 652.5  | 657.7  | 657.7  |
| 107.5° | 773.2  | 785.9  | 785.9  | 788.0  | 773.2  |
| 110°   | 904.5  | 921.5  | 921.5  | 921.5  | 913.0  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1046.4 | 1064.4 | 1061.3 | 1052.8 | 1046.4 |
| 115°   | 1186.3 | 1203.2 | 1197.9 | 1194.8 | 1186.3 |
| 117.5° | 1325.0 | 1348.3 | 1333.4 | 1325.0 | 1316.6 |
| 120°   | 1464.8 | 1488.1 | 1464.8 | 1464.8 | 1455.3 |
| 122.5° | 1592.0 | 1621.5 | 1606.7 | 1598.2 | 1592.0 |
| 125°   | 1725.4 | 1751.8 | 1743.3 | 1733.8 | 1730.6 |
| 127.5° | 1855.6 | 1888.4 | 1876.8 | 1864.1 | 1855.6 |
| 130°   | 1977.4 | 2015.6 | 2010.2 | 2003.9 | 1992.3 |
| 132.5° | 2114.1 | 2143.7 | 2145.9 | 2131.0 | 2122.5 |
| 135°   | 2231.6 | 2264.4 | 2270.8 | 2267.7 | 2259.2 |
| 137.5° | 2363.0 | 2389.4 | 2394.7 | 2392.6 | 2380.0 |
| 140°   | 2478.4 | 2504.9 | 2519.7 | 2519.7 | 2508.1 |
| 142.5° | 2597.1 | 2623.5 | 2632.0 | 2635.1 | 2623.5 |
| 145°   | 2709.3 | 2730.5 | 2747.4 | 2750.6 | 2739.0 |
| 147.5° | 2810.0 | 2836.4 | 2849.1 | 2854.4 | 2842.8 |
| 150°   | 2913.8 | 2931.7 | 2943.4 | 2952.9 | 2943.4 |
| 152.5° | 3005.9 | 3023.8 | 3038.7 | 3050.4 | 3038.7 |
| 155°   | 3098.1 | 3106.4 | 3116.0 | 3130.9 | 3121.3 |
| 157.5° | 3177.4 | 3183.8 | 3189.1 | 3210.3 | 3195.4 |
| 160°   | 3248.4 | 3254.8 | 3257.9 | 3276.0 | 3263.3 |
| 162.5° | 3314.1 | 3314.1 | 3317.3 | 3337.4 | 3322.6 |
| 165°   | 3370.2 | 3367.0 | 3367.0 | 3388.2 | 3373.4 |
| 167.5° | 3421.0 | 3411.5 | 3411.5 | 3432.7 | 3417.9 |
| 170°   | 3459.2 | 3450.7 | 3447.6 | 3468.7 | 3450.7 |
| 172.5° | 3485.7 | 3477.2 | 3474.0 | 3495.2 | 3477.2 |
| 175°   | 3506.9 | 3498.4 | 3492.0 | 3513.2 | 3495.2 |
| 177.5° | 3518.5 | 3510.0 | 3503.6 | 3521.7 | 3503.6 |
| 180°   | 3513.2 | 3513.2 | 3513.2 | 3513.2 | 3513.2 |

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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 | 7.99             | 8.76  | 9.05  | 9.81  | 11.25 | 7.56           | 8.32  | 8.62  | 9.38  | 10.82 |
|                 | 3H   | 9.65             | 10.33 | 10.71 | 11.40 | 12.85 | 9.17           | 9.86  | 10.24 | 10.92 | 12.38 |
|                 | 4H   | 10.23            | 10.88 | 11.31 | 11.95 | 13.41 | 9.76           | 10.41 | 10.83 | 11.47 | 12.93 |
|                 | 6H   | 10.63            | 11.22 | 11.71 | 12.29 | 13.77 | 10.15          | 10.75 | 11.23 | 11.82 | 13.29 |
|                 | 8H   | 10.73            | 11.30 | 11.82 | 12.38 | 13.85 | 10.25          | 10.82 | 11.34 | 11.91 | 13.37 |
|                 | 12H  | 10.77            | 11.31 | 11.87 | 12.39 | 13.88 | 10.29          | 10.83 | 11.39 | 11.91 | 13.40 |
| 4H              | 2H   | 8.44             | 9.09  | 9.53  | 10.16 | 11.62 | 8.10           | 8.75  | 9.18  | 9.82  | 11.27 |
|                 | 3H   | 10.30            | 10.84 | 11.39 | 11.94 | 13.41 | 9.91           | 10.45 | 11.00 | 11.55 | 13.02 |
|                 | 4H   | 11.01            | 11.51 | 12.11 | 12.60 | 14.09 | 10.61          | 11.10 | 11.70 | 12.19 | 13.68 |
|                 | 6H   | 11.52            | 11.95 | 12.63 | 13.06 | 14.54 | 11.11          | 11.54 | 12.22 | 12.65 | 14.13 |
|                 | 8H   | 11.67            | 12.07 | 12.77 | 13.17 | 14.67 | 11.26          | 11.66 | 12.36 | 12.76 | 14.26 |
|                 | 12H  | 11.74            | 12.10 | 12.86 | 13.21 | 14.72 | 11.32          | 11.68 | 12.44 | 12.79 | 14.30 |
| 8H              | 4H   | 11.20            | 11.60 | 12.30 | 12.70 | 14.20 | 10.84          | 11.24 | 11.94 | 12.34 | 13.84 |
|                 | 6H   | 11.83            | 12.16 | 12.95 | 13.30 | 14.80 | 11.47          | 11.80 | 12.59 | 12.94 | 14.44 |
|                 | 8H   | 12.05            | 12.34 | 13.18 | 13.46 | 14.98 | 11.68          | 11.97 | 12.81 | 13.09 | 14.61 |
|                 | 12H  | 12.18            | 12.43 | 13.31 | 13.55 | 15.11 | 11.79          | 12.05 | 12.93 | 13.17 | 14.72 |
| 12H             | 4H   | 11.18            | 11.54 | 12.30 | 12.66 | 14.16 | 10.83          | 11.19 | 11.95 | 12.31 | 13.81 |
|                 | 6H   | 11.86            | 12.15 | 12.99 | 13.27 | 14.79 | 11.51          | 11.80 | 12.64 | 12.92 | 14.44 |
|                 | 8H   | 12.10            | 12.35 | 13.23 | 13.47 | 15.03 | 11.74          | 11.99 | 12.87 | 13.11 | 14.67 |

END OF REPORT