

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: P919094

Luminaire Tested: DFN2DIP-HX4F0-060D060US935-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P919094  
REPORT IS A COMBINATION OF REPORTS P899339 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-060D060US935-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

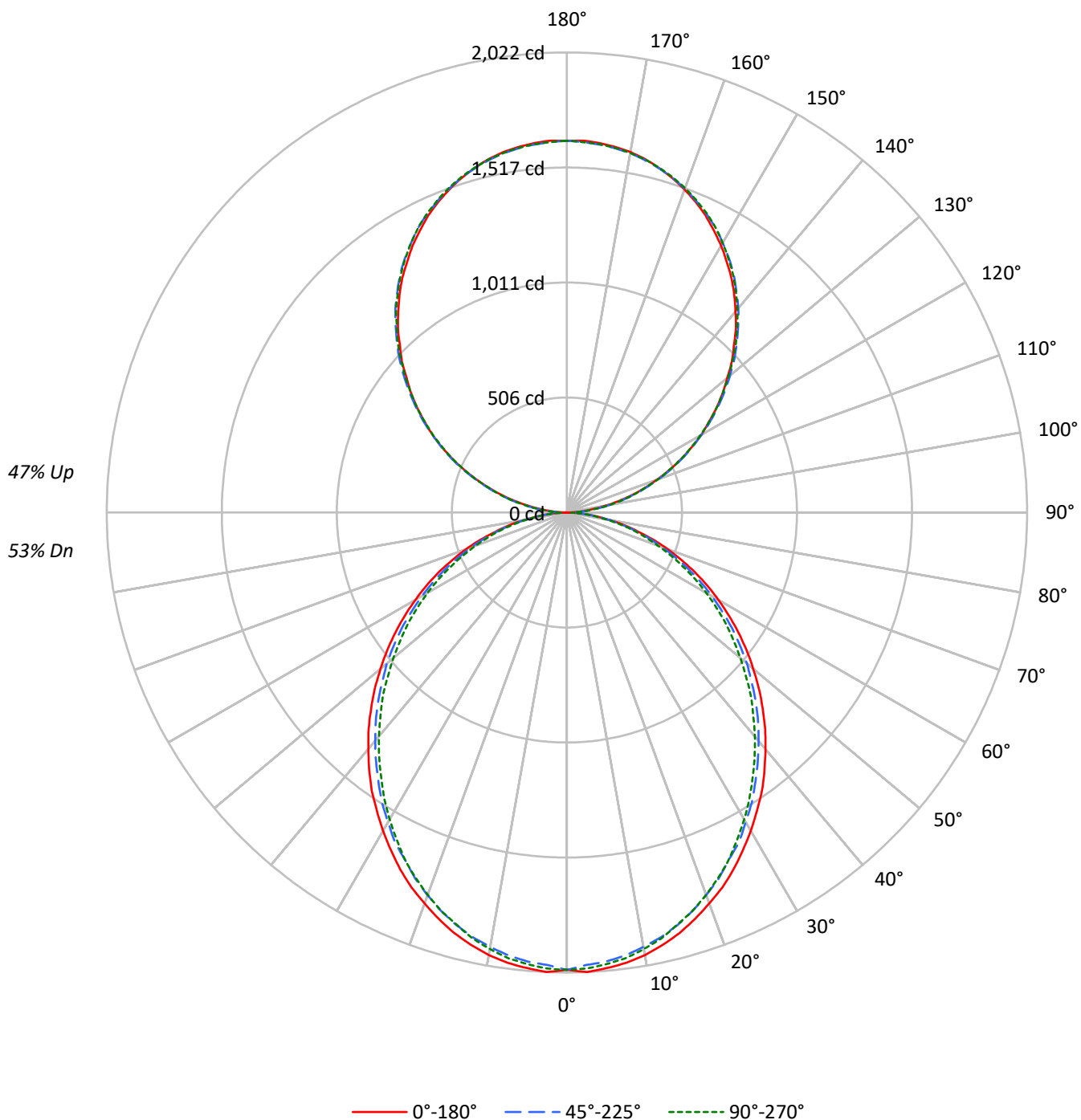
Lumens per Lamp: N/A  
Luminaire Lumens: 9686.2 lumens  
Efficiency: N/A  
Efficacy: 109.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 88.2  
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

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### Luminous Intensity Polar Plot



TEST NUMBER: P919094

CATALOG NUMBER: DFN2DIP-HX4F0-060D060US935-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 |
| RCR |     |     |     |     |     |     |     |     |    |    |    |  |    |    |    |  |    |
| 0   | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 |  | 71 | 71 | 71 |  | 59 |
| 1   | 98  | 94  | 90  | 87  | 91  | 87  | 84  | 81  | 74 | 72 | 70 |  | 63 | 61 | 59 |  | 52 |
| 2   | 90  | 82  | 76  | 71  | 83  | 76  | 71  | 66  | 65 | 61 | 58 |  | 55 | 52 | 50 |  | 46 |
| 3   | 82  | 72  | 65  | 59  | 75  | 67  | 61  | 55  | 58 | 53 | 49 |  | 49 | 45 | 42 |  | 41 |
| 4   | 75  | 64  | 56  | 50  | 69  | 60  | 52  | 47  | 51 | 46 | 41 |  | 43 | 39 | 36 |  | 36 |
| 5   | 69  | 57  | 49  | 43  | 63  | 53  | 46  | 40  | 46 | 40 | 36 |  | 39 | 35 | 31 |  | 33 |
| 6   | 63  | 51  | 43  | 37  | 58  | 48  | 40  | 35  | 41 | 36 | 31 |  | 35 | 31 | 27 |  | 30 |
| 7   | 59  | 46  | 38  | 33  | 54  | 43  | 36  | 31  | 37 | 32 | 28 |  | 32 | 28 | 24 |  | 27 |
| 8   | 54  | 42  | 34  | 29  | 50  | 39  | 32  | 27  | 34 | 29 | 24 |  | 29 | 25 | 22 |  | 25 |
| 9   | 51  | 38  | 31  | 26  | 47  | 36  | 29  | 24  | 31 | 26 | 22 |  | 27 | 23 | 19 |  | 23 |
| 10  | 47  | 35  | 28  | 23  | 44  | 33  | 26  | 22  | 29 | 23 | 20 |  | 25 | 21 | 18 |  | 21 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1495 | 1495 | 1495 |
| 5°  | 1497 | 1474 | 1484 |
| 10° | 1485 | 1454 | 1464 |
| 15° | 1463 | 1430 | 1433 |
| 20° | 1434 | 1397 | 1400 |
| 25° | 1405 | 1358 | 1363 |
| 30° | 1368 | 1321 | 1316 |
| 35° | 1333 | 1277 | 1266 |
| 40° | 1291 | 1233 | 1219 |
| 45° | 1248 | 1189 | 1170 |
| 50° | 1201 | 1143 | 1114 |
| 55° | 1153 | 1090 | 1062 |
| 60° | 1097 | 1026 | 1003 |
| 65° | 1037 | 961  | 933  |
| 70° | 961  | 880  | 858  |
| 75° | 855  | 785  | 789  |
| 80° | 727  | 662  | 656  |
| 85° | 527  | 451  | 437  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1248 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 189.2  | 2.0       |
| 10°-20°   | 532.3  | 5.5       |
| 20°-30°   | 782.3  | 8.1       |
| 30°-40°   | 908.6  | 9.4       |
| 40°-50°   | 907.5  | 9.4       |
| 50°-60°   | 791.3  | 8.2       |
| 60°-70°   | 584.9  | 6.0       |
| 70°-80°   | 330.9  | 3.4       |
| 80°-90°   | 92.0   | 0.9       |
| 90°-100°  | 101.1  | 1.0       |
| 100°-110° | 321.2  | 3.3       |
| 110°-120° | 549.7  | 5.7       |
| 120°-130° | 723.0  | 7.5       |
| 130°-140° | 811.5  | 8.4       |
| 140°-150° | 795.8  | 8.2       |
| 150°-160° | 667.5  | 6.9       |
| 160°-170° | 442.7  | 4.6       |
| 170°-180° | 154.7  | 1.6       |
| 0°-30°    | 1503.8 | 15.5      |
| 0°-40°    | 2412.4 | 24.9      |
| 0°-60°    | 4111.1 | 42.4      |
| 0°-90°    | 5119.0 | 52.8      |
| 90°-120°  | 972.0  | 10.0      |
| 90°-150°  | 3302.3 | 34.1      |
| 90°-180°  | 4567.0 | 47.1      |
| 0°-180°   | 9686.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2010 | 2010  | 2010 | 2010  | 2010 |      |
| 5°   | 2010 | 2002  | 1981 | 1997  | 1993 | 191  |
| 15°  | 1914 | 1902  | 1877 | 1885  | 1875 | 539  |
| 25°  | 1732 | 1716  | 1684 | 1687  | 1684 | 797  |
| 35°  | 1494 | 1475  | 1444 | 1432  | 1422 | 933  |
| 45°  | 1216 | 1202  | 1173 | 1152  | 1144 | 938  |
| 55°  | 920  | 908   | 885  | 862   | 852  | 823  |
| 65°  | 620  | 609   | 590  | 572   | 562  | 614  |
| 75°  | 325  | 321   | 311  | 300   | 304  | 347  |
| 85°  | 79   | 77    | 75   | 70    | 68   | 88   |
| 90°  | 2    | 18    | 48   | 45    | 47   | 9    |
| 95°  | 72   | 86    | 88   | 88    | 86   | 80   |
| 105° | 296  | 300   | 303  | 306   | 306  | 313  |
| 115° | 552  | 560   | 557  | 556   | 552  | 546  |
| 125° | 802  | 815   | 811  | 806   | 805  | 717  |
| 135° | 1038 | 1053  | 1056 | 1055  | 1051 | 802  |
| 145° | 1260 | 1270  | 1278 | 1279  | 1274 | 787  |
| 155° | 1441 | 1445  | 1449 | 1456  | 1452 | 663  |
| 165° | 1567 | 1566  | 1566 | 1576  | 1569 | 442  |
| 175° | 1631 | 1627  | 1624 | 1634  | 1625 | 155  |
| 180° | 1634 | 1634  | 1634 | 1634  | 1634 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2010.1 | 2010.1 | 2010.1 | 2010.1 | 2010.1 |
| 2.5°   | 2021.8 | 2012.2 | 1990.8 | 2010.1 | 2006.4 |
| 5°     | 2010.1 | 2002.5 | 1981.2 | 1996.6 | 1992.9 |
| 7.5°   | 1996.6 | 1985.1 | 1963.8 | 1979.3 | 1975.5 |
| 10°    | 1975.5 | 1962.0 | 1938.7 | 1954.1 | 1948.4 |
| 12.5°  | 1946.4 | 1934.8 | 1911.7 | 1921.3 | 1917.4 |
| 15°    | 1913.5 | 1902.0 | 1876.8 | 1884.6 | 1875.0 |
| 17.5°  | 1872.9 | 1861.5 | 1836.3 | 1845.8 | 1836.3 |
| 20°    | 1828.4 | 1817.0 | 1789.8 | 1795.6 | 1788.0 |
| 22.5°  | 1784.2 | 1766.7 | 1741.5 | 1741.5 | 1737.6 |
| 25°    | 1731.8 | 1716.5 | 1683.6 | 1687.3 | 1683.6 |
| 27.5°  | 1673.8 | 1660.3 | 1635.2 | 1629.5 | 1619.9 |
| 30°    | 1616.0 | 1600.3 | 1571.5 | 1565.7 | 1557.9 |
| 32.5°  | 1554.0 | 1542.6 | 1511.6 | 1499.9 | 1492.1 |
| 35°    | 1494.2 | 1474.9 | 1443.9 | 1432.2 | 1422.5 |
| 37.5°  | 1426.5 | 1409.0 | 1378.1 | 1364.5 | 1354.9 |
| 40°    | 1356.9 | 1341.3 | 1310.4 | 1293.2 | 1285.4 |
| 42.5°  | 1289.3 | 1273.7 | 1242.9 | 1223.5 | 1211.9 |
| 45°    | 1215.9 | 1202.3 | 1173.2 | 1152.1 | 1144.3 |
| 47.5°  | 1144.3 | 1130.7 | 1099.8 | 1078.5 | 1066.9 |
| 50°    | 1068.8 | 1059.2 | 1032.2 | 1005.0 | 995.4  |
| 52.5°  | 995.4  | 981.9  | 956.8  | 935.6  | 922.0  |
| 55°    | 920.1  | 908.4  | 885.3  | 862.1  | 852.5  |
| 57.5°  | 844.7  | 835.1  | 809.9  | 786.7  | 778.9  |
| 60°    | 769.2  | 761.6  | 734.6  | 713.3  | 707.5  |
| 62.5°  | 695.8  | 682.3  | 663.0  | 643.7  | 635.9  |
| 65°    | 620.5  | 608.9  | 589.6  | 572.1  | 562.5  |
| 67.5°  | 543.2  | 533.4  | 516.2  | 502.7  | 494.8  |
| 70°    | 471.7  | 463.9  | 446.4  | 432.9  | 425.3  |
| 72.5°  | 398.2  | 390.5  | 380.8  | 367.3  | 361.5  |
| 75°    | 324.6  | 321.0  | 311.1  | 299.6  | 303.5  |
| 77.5°  | 259.0  | 251.2  | 247.3  | 241.6  | 235.8  |
| 80°    | 193.4  | 191.3  | 187.4  | 181.7  | 177.8  |
| 82.5°  | 131.5  | 131.5  | 129.6  | 121.8  | 121.8  |
| 85°    | 79.1   | 77.3   | 75.4   | 69.5   | 67.7   |
| 87.5°  | 34.9   | 31.0   | 27.0   | 21.4   | 19.3   |
| 90°    | 1.5    | 17.7   | 48.3   | 45.3   | 46.8   |
| 92.5°  | 30.6   | 41.4   | 42.9   | 44.3   | 44.3   |
| 95°    | 71.9   | 85.7   | 88.2   | 88.2   | 85.7   |
| 97.5°  | 119.7  | 132.5  | 137.9  | 137.9  | 137.9  |
| 100°   | 174.9  | 186.1  | 190.1  | 190.1  | 188.6  |
| 102.5° | 233.0  | 241.3  | 246.8  | 248.2  | 246.8  |
| 105°   | 296.5  | 300.5  | 303.4  | 305.9  | 305.9  |
| 107.5° | 359.6  | 365.5  | 365.5  | 366.4  | 359.6  |
| 110°   | 420.7  | 428.5  | 428.5  | 428.5  | 424.6  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 486.6  | 495.0  | 493.5  | 489.6  | 486.6  |
| 115°   | 551.6  | 559.6  | 557.1  | 555.6  | 551.6  |
| 117.5° | 616.2  | 627.1  | 620.1  | 616.2  | 612.3  |
| 120°   | 681.2  | 692.1  | 681.2  | 681.2  | 676.7  |
| 122.5° | 740.3  | 754.1  | 747.2  | 743.3  | 740.3  |
| 125°   | 802.4  | 814.7  | 810.7  | 806.3  | 804.9  |
| 127.5° | 863.0  | 878.2  | 872.8  | 866.9  | 863.0  |
| 130°   | 919.6  | 937.4  | 934.9  | 931.9  | 926.5  |
| 132.5° | 983.2  | 996.9  | 997.9  | 991.0  | 987.0  |
| 135°   | 1037.8 | 1053.1 | 1056.0 | 1054.6 | 1050.6 |
| 137.5° | 1098.9 | 1111.2 | 1113.7 | 1112.7 | 1106.8 |
| 140°   | 1152.6 | 1164.9 | 1171.8 | 1171.8 | 1166.4 |
| 142.5° | 1207.7 | 1220.0 | 1224.0 | 1225.5 | 1220.0 |
| 145°   | 1260.0 | 1269.8 | 1277.7 | 1279.2 | 1273.8 |
| 147.5° | 1306.7 | 1319.0 | 1325.0 | 1327.4 | 1322.0 |
| 150°   | 1355.0 | 1363.4 | 1368.8 | 1373.2 | 1368.8 |
| 152.5° | 1397.8 | 1406.3 | 1413.2 | 1418.6 | 1413.2 |
| 155°   | 1440.7 | 1444.7 | 1449.1 | 1456.0 | 1451.6 |
| 157.5° | 1477.6 | 1480.7 | 1483.1 | 1493.0 | 1486.1 |
| 160°   | 1510.7 | 1513.6 | 1515.1 | 1523.4 | 1517.6 |
| 162.5° | 1541.2 | 1541.2 | 1542.6 | 1552.0 | 1545.1 |
| 165°   | 1567.3 | 1565.8 | 1565.8 | 1575.7 | 1568.8 |
| 167.5° | 1591.0 | 1586.6 | 1586.6 | 1596.4 | 1589.5 |
| 170°   | 1608.7 | 1604.7 | 1603.3 | 1613.1 | 1604.7 |
| 172.5° | 1621.0 | 1617.0 | 1615.6 | 1625.4 | 1617.0 |
| 175°   | 1630.8 | 1626.9 | 1623.9 | 1633.8 | 1625.4 |
| 177.5° | 1636.2 | 1632.4 | 1629.4 | 1637.7 | 1629.4 |
| 180°   | 1633.8 | 1633.8 | 1633.8 | 1633.8 | 1633.8 |

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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 | 8.93             | 9.82  | 9.86  | 10.77 | 11.99 | 8.50           | 9.38  | 9.43  | 10.33 | 11.56 |
|                 | 3H   | 10.59            | 11.39 | 11.53 | 12.35 | 13.60 | 10.12          | 10.91 | 11.06 | 11.87 | 13.13 |
|                 | 4H   | 11.18            | 11.93 | 12.14 | 12.90 | 14.16 | 10.71          | 11.46 | 11.66 | 12.42 | 13.69 |
|                 | 6H   | 11.58            | 12.28 | 12.55 | 13.25 | 14.52 | 11.11          | 11.80 | 12.08 | 12.77 | 14.04 |
|                 | 8H   | 11.69            | 12.35 | 12.66 | 13.34 | 14.61 | 11.21          | 11.87 | 12.19 | 12.86 | 14.13 |
|                 | 12H  | 11.74            | 12.37 | 12.72 | 13.35 | 14.64 | 11.26          | 11.89 | 12.24 | 12.87 | 14.16 |
| 4H              | 2H   | 9.39             | 10.15 | 10.36 | 11.11 | 12.37 | 9.05           | 9.80  | 10.01 | 10.77 | 12.03 |
|                 | 3H   | 11.26            | 11.89 | 12.24 | 12.88 | 14.16 | 10.87          | 11.50 | 11.84 | 12.49 | 13.77 |
|                 | 4H   | 11.98            | 12.55 | 12.96 | 13.54 | 14.84 | 11.57          | 12.15 | 12.56 | 13.13 | 14.43 |
|                 | 6H   | 12.50            | 12.99 | 13.49 | 14.00 | 15.30 | 12.09          | 12.58 | 13.08 | 13.59 | 14.89 |
|                 | 8H   | 12.65            | 13.11 | 13.64 | 14.11 | 15.43 | 12.23          | 12.70 | 13.23 | 13.70 | 15.01 |
|                 | 12H  | 12.72            | 13.14 | 13.74 | 14.16 | 15.48 | 12.30          | 12.72 | 13.31 | 13.74 | 15.06 |
| 8H              | 4H   | 12.18            | 12.64 | 13.17 | 13.64 | 14.96 | 11.82          | 12.28 | 12.81 | 13.28 | 14.60 |
|                 | 6H   | 12.81            | 13.19 | 13.83 | 14.24 | 15.55 | 12.45          | 12.83 | 13.47 | 13.88 | 15.19 |
|                 | 8H   | 13.03            | 13.37 | 14.06 | 14.40 | 15.73 | 12.66          | 13.00 | 13.69 | 14.03 | 15.36 |
|                 | 12H  | 13.17            | 13.46 | 14.20 | 14.49 | 15.86 | 12.78          | 13.08 | 13.82 | 14.11 | 15.48 |
| 12H             | 4H   | 12.17            | 12.58 | 13.18 | 13.60 | 14.92 | 11.81          | 12.23 | 12.83 | 13.25 | 14.57 |
|                 | 6H   | 12.84            | 13.18 | 13.87 | 14.21 | 15.54 | 12.49          | 12.83 | 13.52 | 13.86 | 15.19 |
|                 | 8H   | 13.09            | 13.38 | 14.12 | 14.41 | 15.78 | 12.73          | 13.03 | 13.76 | 14.05 | 15.43 |