

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: P919585

Luminaire Tested: DFN2DIP-PN4F0-060D040US935-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P919585  
REPORT IS A COMBINATION OF REPORTS P901133 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-060D040US935-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

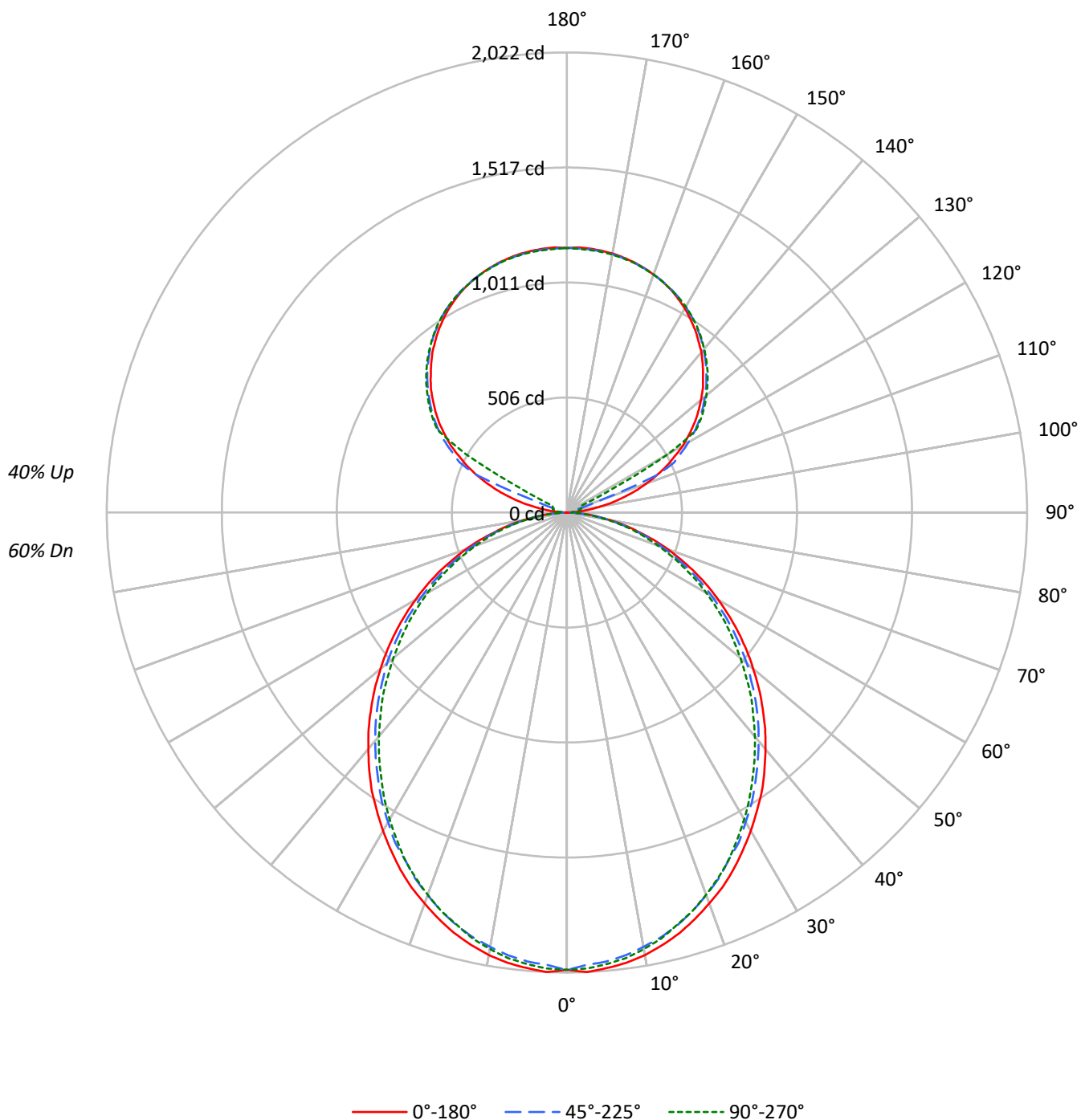
Lumens per Lamp: N/A  
Luminaire Lumens: 8523.8 lumens  
Efficiency: N/A  
Efficacy: 100.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 84.9  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9933  
Total Harmonic Distortion (THDi): 0.066  
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   | 110 | 110 | 110 | 110 | 102 | 102 | 102 | 102 | 89 | 89 | 89 | 77 | 77 | 77 | 65 | 65 | 65 |
| 1   | 100 | 96  | 92  | 88  | 93  | 90  | 86  | 83  | 78 | 75 | 73 | 67 | 66 | 64 | 58 | 56 | 55 |
| 2   | 91  | 84  | 77  | 72  | 85  | 78  | 73  | 68  | 68 | 64 | 61 | 59 | 56 | 53 | 51 | 49 | 47 |
| 3   | 83  | 73  | 66  | 60  | 77  | 69  | 62  | 57  | 60 | 55 | 51 | 52 | 48 | 45 | 45 | 42 | 40 |
| 4   | 76  | 65  | 57  | 51  | 71  | 61  | 54  | 48  | 54 | 48 | 44 | 47 | 42 | 39 | 40 | 37 | 34 |
| 5   | 70  | 58  | 50  | 44  | 65  | 55  | 47  | 42  | 48 | 42 | 38 | 42 | 37 | 34 | 36 | 33 | 30 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 42  | 36  | 43 | 37 | 33 | 38 | 33 | 30 | 33 | 29 | 26 |
| 7   | 60  | 47  | 39  | 33  | 56  | 44  | 37  | 32  | 39 | 33 | 29 | 35 | 30 | 26 | 30 | 26 | 23 |
| 8   | 55  | 43  | 35  | 30  | 52  | 40  | 33  | 28  | 36 | 30 | 26 | 32 | 27 | 23 | 28 | 24 | 21 |
| 9   | 52  | 39  | 32  | 26  | 48  | 37  | 30  | 25  | 33 | 27 | 23 | 29 | 24 | 21 | 26 | 22 | 19 |
| 10  | 48  | 36  | 29  | 24  | 45  | 34  | 27  | 23  | 30 | 25 | 21 | 27 | 22 | 19 | 24 | 20 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1467 | 1467 | 1467 |
| 5°  | 1470 | 1447 | 1457 |
| 10° | 1458 | 1428 | 1437 |
| 15° | 1436 | 1404 | 1407 |
| 20° | 1407 | 1372 | 1376 |
| 25° | 1379 | 1333 | 1339 |
| 30° | 1342 | 1297 | 1293 |
| 35° | 1308 | 1254 | 1244 |
| 40° | 1266 | 1211 | 1198 |
| 45° | 1224 | 1168 | 1151 |
| 50° | 1178 | 1123 | 1096 |
| 55° | 1130 | 1070 | 1045 |
| 60° | 1076 | 1008 | 987  |
| 65° | 1016 | 944  | 919  |
| 70° | 941  | 865  | 846  |
| 75° | 836  | 771  | 778  |
| 80° | 711  | 652  | 649  |
| 85° | 513  | 444  | 434  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1224 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 189.2  | 2.2       |
| 10°-20°   | 532.3  | 6.2       |
| 20°-30°   | 782.3  | 9.2       |
| 30°-40°   | 908.6  | 10.7      |
| 40°-50°   | 907.5  | 10.6      |
| 50°-60°   | 791.3  | 9.3       |
| 60°-70°   | 584.9  | 6.9       |
| 70°-80°   | 330.9  | 3.9       |
| 80°-90°   | 89.4   | 1.0       |
| 90°-100°  | 38.3   | 0.4       |
| 100°-110° | 142.9  | 1.7       |
| 110°-120° | 378.9  | 4.4       |
| 120°-130° | 628.5  | 7.4       |
| 130°-140° | 667.6  | 7.8       |
| 140°-150° | 620.4  | 7.3       |
| 150°-160° | 498.8  | 5.9       |
| 160°-170° | 321.4  | 3.8       |
| 170°-180° | 110.6  | 1.3       |
| 0°-30°    | 1503.8 | 17.6      |
| 0°-40°    | 2412.4 | 28.3      |
| 0°-60°    | 4111.1 | 48.2      |
| 0°-90°    | 5116.4 | 60.0      |
| 90°-120°  | 560.1  | 6.6       |
| 90°-150°  | 2476.6 | 29.1      |
| 90°-180°  | 3407.0 | 40.0      |
| 0°-180°   | 8523.8 | 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°  | 1    | 10    | 17   | 21    | 23   | 8    |
| 95°  | 55   | 27    | 33   | 37    | 36   | 65   |
| 105° | 256  | 281   | 51   | 60    | 64   | 273  |
| 115° | 484  | 498   | 519  | 130   | 69   | 476  |
| 125° | 684  | 695   | 711  | 717   | 719  | 610  |
| 135° | 846  | 860   | 867  | 876   | 874  | 654  |
| 145° | 982  | 981   | 995  | 1001  | 997  | 614  |
| 155° | 1081 | 1073  | 1083 | 1088  | 1082 | 498  |
| 165° | 1139 | 1134  | 1136 | 1142  | 1136 | 322  |
| 175° | 1165 | 1159  | 1161 | 1166  | 1158 | 111  |
| 180° | 1162 | 1162  | 1162 | 1162  | 1162 |      |

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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°    | 0.8    | 10.1   | 16.8   | 21.1   | 22.6   |
| 92.5°  | 21.1   | 17.7   | 20.1   | 21.9   | 22.6   |
| 95°    | 54.6   | 26.9   | 32.7   | 37.0   | 36.2   |
| 97.5°  | 98.4   | 29.4   | 42.9   | 45.5   | 46.2   |
| 100°   | 148.9  | 33.7   | 48.0   | 54.6   | 56.3   |
| 102.5° | 204.3  | 202.8  | 49.6   | 58.8   | 61.4   |
| 105°   | 255.6  | 280.9  | 51.3   | 60.5   | 63.9   |
| 107.5° | 315.4  | 336.4  | 53.0   | 62.3   | 65.6   |
| 110°   | 372.6  | 390.2  | 147.2  | 63.1   | 66.4   |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 426.5  | 441.5  | 427.2  | 64.7   | 67.3   |
| 115°   | 483.5  | 497.8  | 518.9  | 129.5  | 69.1   |
| 117.5° | 533.2  | 550.0  | 564.4  | 444.0  | 223.7  |
| 120°   | 588.8  | 601.3  | 616.5  | 626.6  | 513.1  |
| 122.5° | 635.8  | 649.3  | 666.2  | 671.1  | 672.0  |
| 125°   | 683.7  | 694.7  | 710.7  | 716.6  | 719.1  |
| 127.5° | 727.5  | 739.3  | 751.9  | 760.3  | 761.1  |
| 130°   | 768.7  | 782.2  | 791.3  | 800.6  | 799.9  |
| 132.5° | 810.7  | 821.7  | 830.9  | 838.5  | 837.8  |
| 135°   | 846.1  | 859.6  | 867.1  | 875.5  | 873.9  |
| 137.5° | 883.0  | 893.1  | 901.6  | 910.0  | 907.5  |
| 140°   | 919.2  | 926.0  | 935.2  | 942.8  | 938.6  |
| 142.5° | 949.6  | 955.4  | 966.4  | 973.0  | 968.9  |
| 145°   | 981.5  | 980.7  | 994.9  | 1000.8 | 996.6  |
| 147.5° | 1009.2 | 1006.7 | 1021.0 | 1025.2 | 1021.9 |
| 150°   | 1036.1 | 1030.3 | 1043.8 | 1048.8 | 1044.6 |
| 152.5° | 1058.9 | 1052.1 | 1064.7 | 1069.8 | 1063.9 |
| 155°   | 1080.7 | 1073.2 | 1083.3 | 1088.3 | 1081.6 |
| 157.5° | 1098.4 | 1091.7 | 1099.3 | 1105.2 | 1098.4 |
| 160°   | 1113.5 | 1108.4 | 1113.5 | 1118.5 | 1112.7 |
| 162.5° | 1127.0 | 1122.0 | 1126.2 | 1132.0 | 1124.5 |
| 165°   | 1138.8 | 1133.8 | 1136.3 | 1142.1 | 1136.3 |
| 167.5° | 1148.1 | 1142.9 | 1145.6 | 1151.4 | 1143.8 |
| 170°   | 1155.6 | 1150.6 | 1152.2 | 1158.1 | 1150.6 |
| 172.5° | 1160.6 | 1155.6 | 1157.4 | 1163.2 | 1155.6 |
| 175°   | 1164.8 | 1158.9 | 1160.6 | 1166.5 | 1158.1 |
| 177.5° | 1166.5 | 1160.6 | 1161.5 | 1167.4 | 1159.9 |
| 180°   | 1162.3 | 1162.3 | 1162.3 | 1162.3 | 1162.3 |

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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 | 9.49             | 10.45 | 10.35 | 11.33 | 12.46 | 9.05           | 10.01 | 9.91  | 10.89 | 12.02 |
|                 | 3H   | 11.16            | 12.02 | 12.04 | 12.92 | 14.06 | 10.67          | 11.54 | 11.55 | 12.43 | 13.58 |
|                 | 4H   | 11.75            | 12.57 | 12.65 | 13.47 | 14.63 | 11.27          | 12.08 | 12.16 | 12.98 | 14.14 |
|                 | 6H   | 12.16            | 12.91 | 13.07 | 13.82 | 14.99 | 11.67          | 12.42 | 12.57 | 13.33 | 14.50 |
|                 | 8H   | 12.27            | 12.98 | 13.18 | 13.91 | 15.08 | 11.78          | 12.49 | 12.69 | 13.42 | 14.59 |
|                 | 12H  | 12.32            | 13.00 | 13.24 | 13.92 | 15.12 | 11.82          | 12.50 | 12.74 | 13.42 | 14.62 |
| 4H              | 2H   | 9.96             | 10.78 | 10.86 | 11.68 | 12.83 | 9.61           | 10.42 | 10.51 | 11.33 | 12.48 |
|                 | 3H   | 11.84            | 12.52 | 12.75 | 13.45 | 14.62 | 11.44          | 12.12 | 12.35 | 13.05 | 14.22 |
|                 | 4H   | 12.56            | 13.18 | 13.48 | 14.11 | 15.31 | 12.14          | 12.76 | 13.06 | 13.69 | 14.89 |
|                 | 6H   | 13.08            | 13.62 | 14.02 | 14.57 | 15.77 | 12.66          | 13.19 | 13.59 | 14.15 | 15.35 |
|                 | 8H   | 13.24            | 13.74 | 14.17 | 14.68 | 15.90 | 12.81          | 13.31 | 13.75 | 14.26 | 15.47 |
|                 | 12H  | 13.32            | 13.77 | 14.27 | 14.73 | 15.95 | 12.88          | 13.33 | 13.83 | 14.29 | 15.51 |
| 8H              | 4H   | 12.76            | 13.26 | 13.70 | 14.21 | 15.42 | 12.39          | 12.89 | 13.33 | 13.84 | 15.05 |
|                 | 6H   | 13.40            | 13.82 | 14.37 | 14.81 | 16.02 | 13.03          | 13.44 | 13.99 | 14.43 | 15.64 |
|                 | 8H   | 13.63            | 13.99 | 14.60 | 14.97 | 16.20 | 13.24          | 13.61 | 14.22 | 14.59 | 15.82 |
|                 | 12H  | 13.77            | 14.09 | 14.74 | 15.06 | 16.34 | 13.36          | 13.69 | 14.34 | 14.66 | 15.93 |
| 12H             | 4H   | 12.76            | 13.21 | 13.71 | 14.17 | 15.39 | 12.39          | 12.84 | 13.35 | 13.81 | 15.03 |
|                 | 6H   | 13.43            | 13.80 | 14.41 | 14.78 | 16.01 | 13.07          | 13.44 | 14.04 | 14.41 | 15.64 |
|                 | 8H   | 13.68            | 14.01 | 14.66 | 14.98 | 16.25 | 13.31          | 13.63 | 14.29 | 14.61 | 15.88 |