

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: P916002

Luminaire Tested: DFN2DIP-4P4F0-060D070US930-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P916002  
REPORT IS A COMBINATION OF REPORTS P899133 AND P895967  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P4F0-060D070US930-FLLFLL  
Description: 4 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

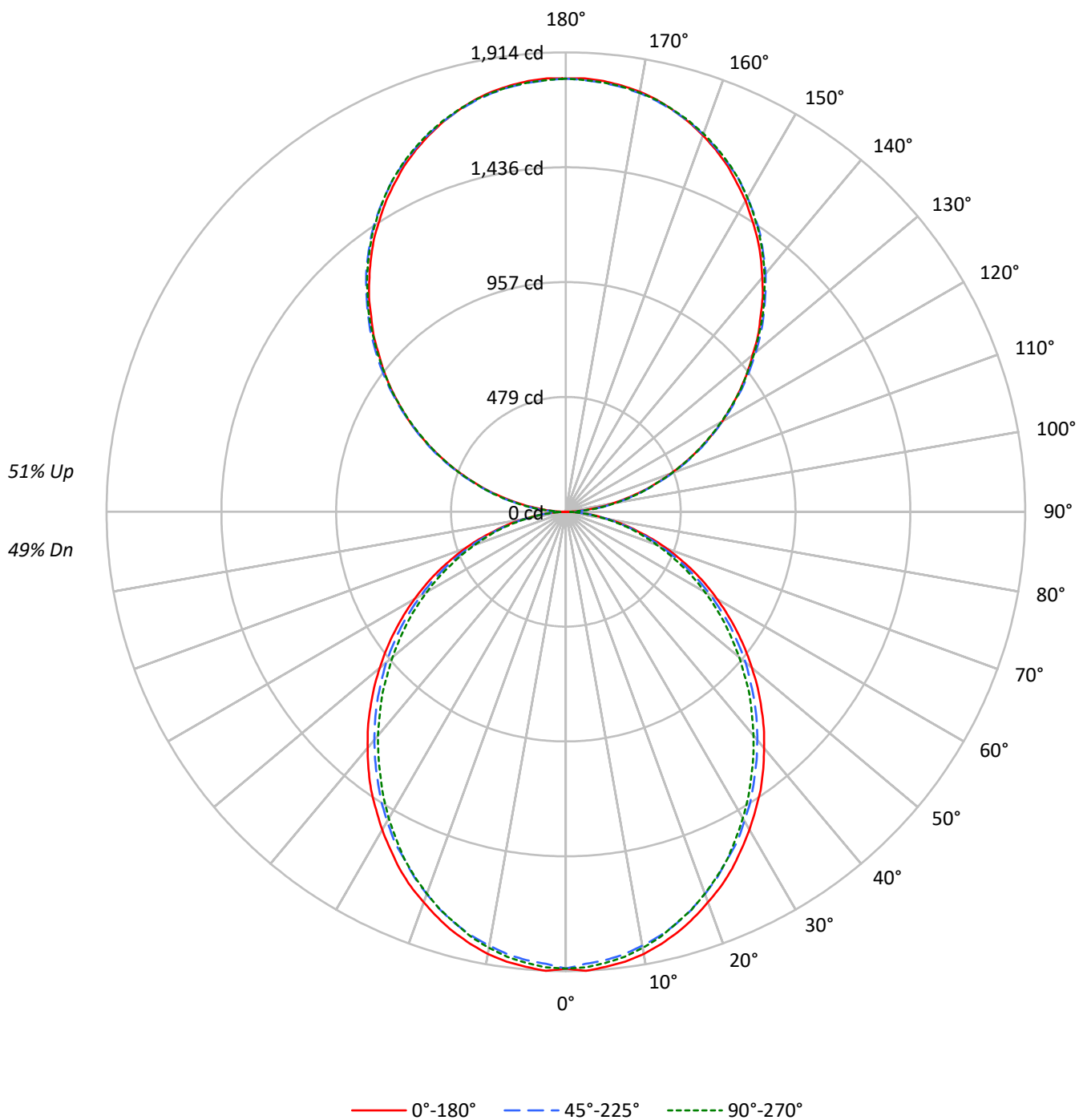
Lumens per Lamp: N/A  
Luminaire Lumens: 9893.7 lumens  
Efficiency: N/A  
Efficacy: 80.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 4.07' x L: 4.07' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 122.6  
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   | 107 | 107 | 107 | 107 | 98 | 98 | 98 | 98 | 83 | 83 | 83 | 68 | 68 | 68 | 55 | 55 | 55 |
| 1   | 98  | 93  | 89  | 86  | 90 | 86 | 83 | 80 | 73 | 70 | 68 | 60 | 59 | 57 | 49 | 48 | 47 |
| 2   | 89  | 81  | 75  | 70  | 82 | 75 | 70 | 65 | 64 | 60 | 56 | 53 | 50 | 48 | 43 | 41 | 39 |
| 3   | 81  | 72  | 64  | 58  | 74 | 66 | 60 | 55 | 56 | 51 | 47 | 47 | 43 | 40 | 38 | 36 | 33 |
| 4   | 74  | 63  | 55  | 49  | 68 | 59 | 52 | 46 | 50 | 45 | 40 | 42 | 38 | 34 | 34 | 31 | 29 |
| 5   | 68  | 56  | 48  | 42  | 62 | 52 | 45 | 40 | 45 | 39 | 35 | 37 | 33 | 30 | 31 | 28 | 25 |
| 6   | 63  | 51  | 43  | 37  | 58 | 47 | 40 | 35 | 40 | 35 | 30 | 34 | 29 | 26 | 28 | 25 | 22 |
| 7   | 58  | 46  | 38  | 32  | 53 | 42 | 35 | 30 | 36 | 31 | 27 | 31 | 26 | 23 | 25 | 22 | 20 |
| 8   | 54  | 41  | 34  | 28  | 49 | 39 | 32 | 27 | 33 | 28 | 24 | 28 | 24 | 21 | 23 | 20 | 18 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 29 | 24 | 30 | 25 | 21 | 26 | 22 | 19 | 22 | 18 | 16 |
| 10  | 47  | 35  | 28  | 23  | 43 | 32 | 26 | 22 | 28 | 23 | 19 | 24 | 20 | 17 | 20 | 17 | 14 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1235 | 1235 | 1235 |
| 5°  | 1237 | 1218 | 1226 |
| 10° | 1227 | 1202 | 1210 |
| 15° | 1209 | 1183 | 1185 |
| 20° | 1185 | 1155 | 1159 |
| 25° | 1161 | 1123 | 1128 |
| 30° | 1130 | 1093 | 1090 |
| 35° | 1102 | 1057 | 1049 |
| 40° | 1066 | 1021 | 1010 |
| 45° | 1031 | 985  | 970  |
| 50° | 992  | 947  | 924  |
| 55° | 952  | 903  | 882  |
| 60° | 907  | 851  | 834  |
| 65° | 857  | 798  | 777  |
| 70° | 794  | 732  | 716  |
| 75° | 706  | 654  | 660  |
| 80° | 600  | 554  | 552  |
| 85° | 435  | 380  | 373  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1366 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 179.1  | 1.8       |
| 10°-20°   | 504.1  | 5.1       |
| 20°-30°   | 740.8  | 7.5       |
| 30°-40°   | 860.4  | 8.7       |
| 40°-50°   | 859.3  | 8.7       |
| 50°-60°   | 749.3  | 7.6       |
| 60°-70°   | 553.9  | 5.6       |
| 70°-80°   | 313.4  | 3.2       |
| 80°-90°   | 87.8   | 0.9       |
| 90°-100°  | 111.7  | 1.1       |
| 100°-110° | 354.9  | 3.6       |
| 110°-120° | 607.3  | 6.1       |
| 120°-130° | 798.7  | 8.1       |
| 130°-140° | 896.5  | 9.1       |
| 140°-150° | 879.1  | 8.9       |
| 150°-160° | 737.5  | 7.5       |
| 160°-170° | 489.1  | 4.9       |
| 170°-180° | 170.9  | 1.7       |
| 0°-30°    | 1424.0 | 14.4      |
| 0°-40°    | 2284.3 | 23.1      |
| 0°-60°    | 3892.9 | 39.3      |
| 0°-90°    | 4848.0 | 49.0      |
| 90°-120°  | 1073.9 | 10.9      |
| 90°-150°  | 3648.2 | 36.9      |
| 90°-180°  | 5046.0 | 51.0      |
| 0°-180°   | 9893.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1903 | 1903  | 1903 | 1903  | 1903 |      |
| 5°   | 1903 | 1896  | 1876 | 1891  | 1887 | 181  |
| 15°  | 1812 | 1801  | 1777 | 1785  | 1776 | 510  |
| 25°  | 1640 | 1625  | 1594 | 1598  | 1594 | 755  |
| 35°  | 1415 | 1397  | 1367 | 1356  | 1347 | 884  |
| 45°  | 1151 | 1138  | 1111 | 1091  | 1084 | 889  |
| 55°  | 871  | 860   | 838  | 816   | 807  | 779  |
| 65°  | 588  | 577   | 558  | 542   | 533  | 581  |
| 75°  | 307  | 304   | 295  | 284   | 287  | 328  |
| 85°  | 75   | 73    | 71   | 66    | 64   | 84   |
| 90°  | 2    | 20    | 53   | 50    | 52   | 10   |
| 95°  | 79   | 95    | 97   | 97    | 95   | 88   |
| 105° | 328  | 332   | 335  | 338   | 338  | 346  |
| 115° | 609  | 618   | 616  | 614   | 609  | 603  |
| 125° | 886  | 900   | 896  | 891   | 889  | 792  |
| 135° | 1147 | 1163  | 1167 | 1165  | 1161 | 886  |
| 145° | 1392 | 1403  | 1412 | 1413  | 1407 | 870  |
| 155° | 1592 | 1596  | 1601 | 1608  | 1604 | 733  |
| 165° | 1731 | 1730  | 1730 | 1741  | 1733 | 488  |
| 175° | 1802 | 1797  | 1794 | 1805  | 1796 | 171  |
| 180° | 1805 | 1805  | 1805 | 1805  | 1805 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1903.4 | 1903.4 | 1903.4 | 1903.4 | 1903.4 |
| 2.5°   | 1914.5 | 1905.4 | 1885.1 | 1903.4 | 1899.9 |
| 5°     | 1903.4 | 1896.2 | 1876.0 | 1890.6 | 1887.1 |
| 7.5°   | 1890.6 | 1879.8 | 1859.5 | 1874.3 | 1870.6 |
| 10°    | 1870.6 | 1857.8 | 1835.8 | 1850.4 | 1844.9 |
| 12.5°  | 1843.1 | 1832.1 | 1810.2 | 1819.3 | 1815.7 |
| 15°    | 1811.9 | 1801.1 | 1777.2 | 1784.6 | 1775.5 |
| 17.5°  | 1773.5 | 1762.7 | 1738.8 | 1747.8 | 1738.8 |
| 20°    | 1731.4 | 1720.5 | 1694.8 | 1700.3 | 1693.1 |
| 22.5°  | 1689.5 | 1672.9 | 1649.0 | 1649.0 | 1645.4 |
| 25°    | 1639.9 | 1625.4 | 1594.2 | 1597.7 | 1594.2 |
| 27.5°  | 1584.9 | 1572.1 | 1548.4 | 1543.0 | 1533.9 |
| 30°    | 1530.2 | 1515.4 | 1488.1 | 1482.6 | 1475.2 |
| 32.5°  | 1471.5 | 1460.7 | 1431.3 | 1420.2 | 1412.9 |
| 35°    | 1414.9 | 1396.6 | 1367.3 | 1356.2 | 1347.0 |
| 37.5°  | 1350.8 | 1334.2 | 1305.0 | 1292.1 | 1283.0 |
| 40°    | 1284.9 | 1270.2 | 1240.9 | 1224.6 | 1217.2 |
| 42.5°  | 1220.8 | 1206.1 | 1177.0 | 1158.5 | 1147.6 |
| 45°    | 1151.4 | 1138.5 | 1110.9 | 1091.0 | 1083.5 |
| 47.5°  | 1083.5 | 1070.7 | 1041.5 | 1021.2 | 1010.3 |
| 50°    | 1012.1 | 1003.0 | 977.4  | 951.7  | 942.6  |
| 52.5°  | 942.6  | 929.8  | 906.0  | 885.9  | 873.1  |
| 55°    | 871.3  | 860.2  | 838.3  | 816.4  | 807.2  |
| 57.5°  | 799.9  | 790.8  | 766.9  | 744.9  | 737.5  |
| 60°    | 728.4  | 721.2  | 695.6  | 675.4  | 669.9  |
| 62.5°  | 658.8  | 646.0  | 627.8  | 609.5  | 602.2  |
| 65°    | 587.6  | 576.6  | 558.3  | 541.8  | 532.6  |
| 67.5°  | 514.4  | 505.1  | 488.8  | 476.0  | 468.6  |
| 70°    | 446.6  | 439.3  | 422.7  | 409.9  | 402.8  |
| 72.5°  | 377.1  | 369.7  | 360.6  | 347.8  | 342.3  |
| 75°    | 307.4  | 303.9  | 294.6  | 283.7  | 287.4  |
| 77.5°  | 245.2  | 237.9  | 234.2  | 228.8  | 223.3  |
| 80°    | 183.1  | 181.2  | 177.5  | 172.0  | 168.4  |
| 82.5°  | 124.5  | 124.5  | 122.7  | 115.4  | 115.4  |
| 85°    | 74.9   | 73.2   | 71.4   | 65.8   | 64.1   |
| 87.5°  | 33.0   | 29.4   | 25.6   | 20.2   | 18.3   |
| 90°    | 1.6    | 19.6   | 53.3   | 50.1   | 51.7   |
| 92.5°  | 33.8   | 45.7   | 47.4   | 49.0   | 49.0   |
| 95°    | 79.4   | 94.7   | 97.4   | 97.4   | 94.7   |
| 97.5°  | 132.2  | 146.3  | 152.4  | 152.4  | 152.4  |
| 100°   | 193.1  | 205.7  | 210.0  | 210.0  | 208.4  |
| 102.5° | 257.4  | 266.6  | 272.6  | 274.3  | 272.6  |
| 105°   | 327.6  | 331.9  | 335.2  | 337.9  | 337.9  |
| 107.5° | 397.2  | 403.7  | 403.7  | 404.9  | 397.2  |
| 110°   | 464.7  | 473.4  | 473.4  | 473.4  | 469.0  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 537.6  | 546.9  | 545.3  | 540.9  | 537.6  |
| 115°   | 609.4  | 618.2  | 615.5  | 613.8  | 609.4  |
| 117.5° | 680.7  | 692.7  | 685.1  | 680.7  | 676.4  |
| 120°   | 752.5  | 764.5  | 752.5  | 752.5  | 747.6  |
| 122.5° | 817.8  | 833.1  | 825.5  | 821.1  | 817.8  |
| 125°   | 886.4  | 900.0  | 895.7  | 890.8  | 889.2  |
| 127.5° | 953.3  | 970.2  | 964.3  | 957.7  | 953.3  |
| 130°   | 1015.9 | 1035.5 | 1032.8 | 1029.6 | 1023.5 |
| 132.5° | 1086.1 | 1101.4 | 1102.4 | 1094.9 | 1090.5 |
| 135°   | 1146.6 | 1163.3 | 1166.7 | 1165.0 | 1160.7 |
| 137.5° | 1214.0 | 1227.6 | 1230.3 | 1229.2 | 1222.7 |
| 140°   | 1273.3 | 1286.9 | 1294.5 | 1294.5 | 1288.6 |
| 142.5° | 1334.2 | 1347.9 | 1352.2 | 1353.8 | 1347.9 |
| 145°   | 1392.0 | 1402.8 | 1411.5 | 1413.2 | 1407.2 |
| 147.5° | 1443.6 | 1457.3 | 1463.8 | 1466.5 | 1460.5 |
| 150°   | 1497.0 | 1506.2 | 1512.2 | 1517.1 | 1512.2 |
| 152.5° | 1544.3 | 1553.6 | 1561.1 | 1567.2 | 1561.1 |
| 155°   | 1591.6 | 1595.9 | 1600.9 | 1608.5 | 1603.6 |
| 157.5° | 1632.5 | 1635.7 | 1638.4 | 1649.3 | 1641.7 |
| 160°   | 1668.9 | 1672.2 | 1673.8 | 1683.0 | 1676.5 |
| 162.5° | 1702.7 | 1702.7 | 1704.3 | 1714.6 | 1707.0 |
| 165°   | 1731.4 | 1729.8 | 1729.8 | 1740.7 | 1733.1 |
| 167.5° | 1757.6 | 1752.7 | 1752.7 | 1763.6 | 1756.0 |
| 170°   | 1777.2 | 1772.9 | 1771.2 | 1782.1 | 1772.9 |
| 172.5° | 1790.8 | 1786.4 | 1784.8 | 1795.7 | 1786.4 |
| 175°   | 1801.6 | 1797.3 | 1794.1 | 1804.9 | 1795.7 |
| 177.5° | 1807.7 | 1803.3 | 1800.0 | 1809.3 | 1800.0 |
| 180°   | 1804.9 | 1804.9 | 1804.9 | 1804.9 | 1804.9 |

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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 | 7.93             | 8.78  | 8.89  | 9.76  | 11.05 | 7.48           | 8.34  | 8.45  | 9.32  | 10.60 |
|                 | 3H   | 9.59             | 10.36 | 10.57 | 11.35 | 12.66 | 9.10           | 9.87  | 10.08 | 10.86 | 12.17 |
|                 | 4H   | 10.19            | 10.91 | 11.18 | 11.90 | 13.22 | 9.69           | 10.41 | 10.68 | 11.41 | 12.72 |
|                 | 6H   | 10.59            | 11.26 | 11.59 | 12.25 | 13.58 | 10.09          | 10.76 | 11.09 | 11.75 | 13.08 |
|                 | 8H   | 10.70            | 11.33 | 11.70 | 12.35 | 13.67 | 10.19          | 10.83 | 11.20 | 11.84 | 13.17 |
|                 | 12H  | 10.75            | 11.35 | 11.76 | 12.36 | 13.71 | 10.24          | 10.84 | 11.25 | 11.85 | 13.20 |
| 4H              | 2H   | 8.39             | 9.11  | 9.39  | 10.11 | 11.42 | 8.04           | 8.76  | 9.03  | 9.75  | 11.07 |
|                 | 3H   | 10.26            | 10.87 | 11.27 | 11.89 | 13.22 | 9.85           | 10.46 | 10.86 | 11.48 | 12.81 |
|                 | 4H   | 10.98            | 11.53 | 11.99 | 12.55 | 13.90 | 10.56          | 11.11 | 11.57 | 12.12 | 13.48 |
|                 | 6H   | 11.50            | 11.98 | 12.52 | 13.01 | 14.36 | 11.07          | 11.54 | 12.09 | 12.58 | 13.93 |
|                 | 8H   | 11.65            | 12.10 | 12.68 | 13.13 | 14.49 | 11.22          | 11.66 | 12.24 | 12.69 | 14.06 |
|                 | 12H  | 11.73            | 12.13 | 12.77 | 13.18 | 14.55 | 11.28          | 11.68 | 12.32 | 12.73 | 14.10 |
| 8H              | 4H   | 11.18            | 11.62 | 12.20 | 12.65 | 14.02 | 10.80          | 11.24 | 11.83 | 12.28 | 13.64 |
|                 | 6H   | 11.81            | 12.18 | 12.86 | 13.25 | 14.62 | 11.43          | 11.80 | 12.48 | 12.87 | 14.23 |
|                 | 8H   | 12.04            | 12.36 | 13.10 | 13.42 | 14.80 | 11.65          | 11.97 | 12.70 | 13.03 | 14.41 |
|                 | 12H  | 12.17            | 12.46 | 13.23 | 13.51 | 14.93 | 11.76          | 12.05 | 12.82 | 13.10 | 14.52 |
| 12H             | 4H   | 11.16            | 11.56 | 12.21 | 12.61 | 13.98 | 10.79          | 11.20 | 11.84 | 12.24 | 13.61 |
|                 | 6H   | 11.84            | 12.17 | 12.90 | 13.23 | 14.61 | 11.47          | 11.80 | 12.53 | 12.85 | 14.24 |
|                 | 8H   | 12.09            | 12.38 | 13.15 | 13.43 | 14.85 | 11.71          | 12.00 | 12.77 | 13.05 | 14.47 |