

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: P922298

Luminaire Tested: DFN2DIP-PN4F0-050D090US940-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P922298  
REPORT IS A COMBINATION OF REPORTS P899702 AND P896497  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-050D090US940-RLLFLL  
Description: 4 foot, Pentagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

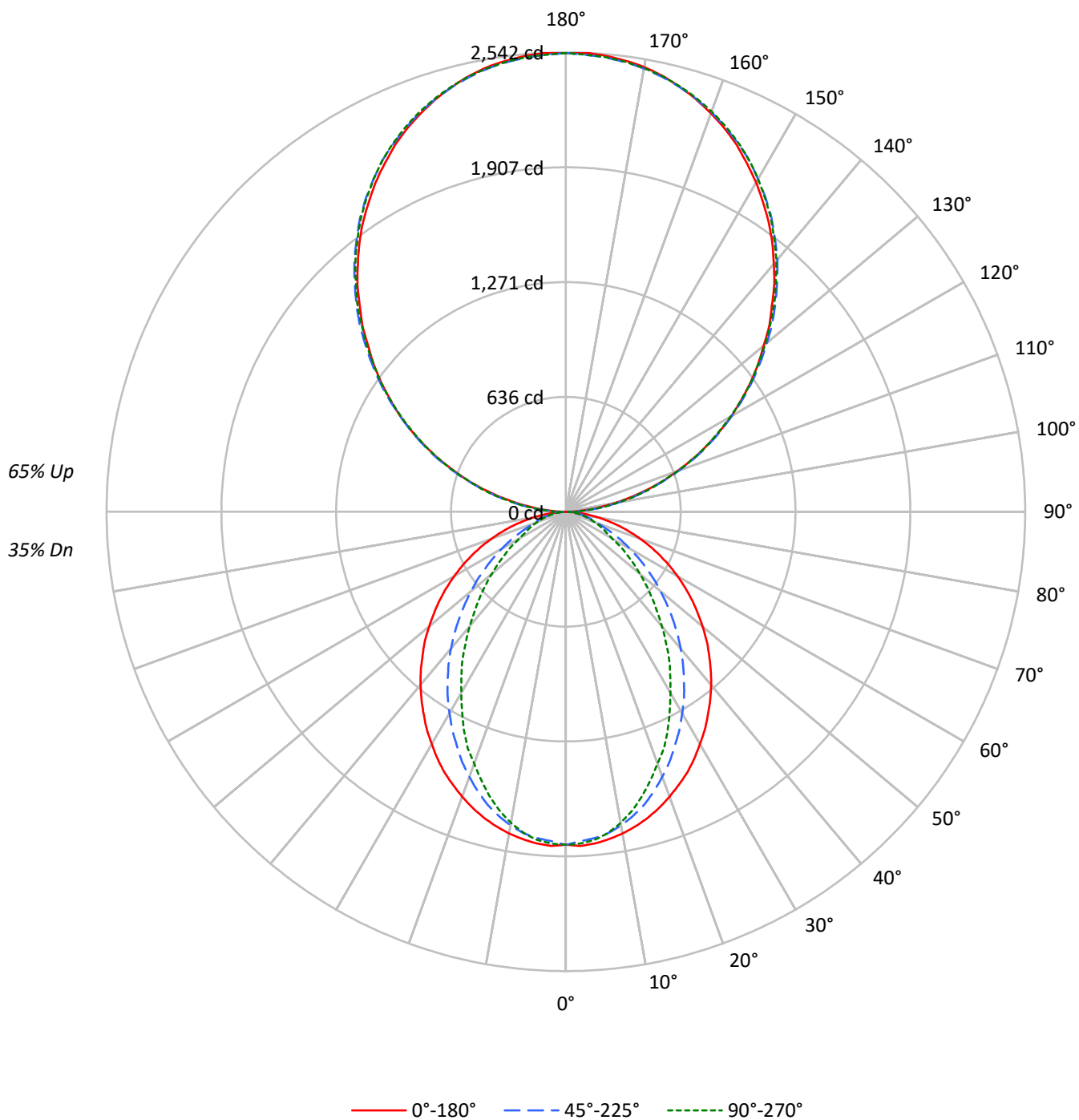
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10892.3 lumens  
Efficiency: N/A  
Efficacy: 98.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: Semi-Indirect  
  
Input Watts (W): 110.7  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9951  
Total Harmonic Distortion (THDi): 0.07  
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: P922298

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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   | 104 | 104 | 104 | 104 | 94 | 94 | 94 | 94 | 75 | 75 | 75 | 58 | 58 | 58 | 42 | 42 | 42 |
| 1   | 95  | 91  | 87  | 84  | 85 | 82 | 79 | 76 | 66 | 64 | 62 | 51 | 50 | 49 | 38 | 37 | 36 |
| 2   | 86  | 79  | 74  | 69  | 78 | 72 | 67 | 63 | 58 | 55 | 52 | 45 | 43 | 41 | 34 | 32 | 31 |
| 3   | 79  | 70  | 63  | 58  | 71 | 64 | 58 | 53 | 52 | 47 | 44 | 40 | 38 | 35 | 30 | 28 | 27 |
| 4   | 72  | 62  | 55  | 49  | 65 | 57 | 50 | 45 | 46 | 41 | 38 | 36 | 33 | 30 | 27 | 25 | 23 |
| 5   | 67  | 55  | 48  | 42  | 60 | 51 | 44 | 39 | 41 | 36 | 33 | 33 | 29 | 26 | 25 | 22 | 21 |
| 6   | 61  | 50  | 42  | 37  | 55 | 45 | 39 | 34 | 37 | 32 | 29 | 30 | 26 | 23 | 22 | 20 | 18 |
| 7   | 57  | 45  | 37  | 32  | 51 | 41 | 34 | 30 | 34 | 29 | 25 | 27 | 23 | 21 | 21 | 18 | 16 |
| 8   | 53  | 41  | 33  | 28  | 48 | 37 | 31 | 26 | 31 | 26 | 22 | 25 | 21 | 19 | 19 | 16 | 15 |
| 9   | 49  | 37  | 30  | 25  | 44 | 34 | 28 | 23 | 28 | 23 | 20 | 23 | 19 | 17 | 17 | 15 | 13 |
| 10  | 46  | 34  | 27  | 23  | 41 | 31 | 25 | 21 | 26 | 21 | 18 | 21 | 18 | 15 | 16 | 14 | 12 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1345 | 1345 | 1345 |
| 5°  | 1347 | 1324 | 1332 |
| 10° | 1334 | 1298 | 1289 |
| 15° | 1316 | 1255 | 1223 |
| 20° | 1291 | 1196 | 1141 |
| 25° | 1266 | 1130 | 1061 |
| 30° | 1233 | 1063 | 961  |
| 35° | 1200 | 990  | 872  |
| 40° | 1167 | 914  | 771  |
| 45° | 1128 | 830  | 679  |
| 50° | 1088 | 746  | 589  |
| 55° | 1046 | 655  | 503  |
| 60° | 998  | 561  | 414  |
| 65° | 942  | 465  | 373  |
| 70° | 875  | 375  | 338  |
| 75° | 790  | 331  | 308  |
| 80° | 668  | 278  | 268  |
| 85° | 465  | 187  | 203  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1987 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 172.7   | 1.6       |
| 10°-20°   | 474.1   | 4.4       |
| 20°-30°   | 665.6   | 6.1       |
| 30°-40°   | 725.6   | 6.7       |
| 40°-50°   | 666.9   | 6.1       |
| 50°-60°   | 523.7   | 4.8       |
| 60°-70°   | 340.9   | 3.1       |
| 70°-80°   | 175.5   | 1.6       |
| 80°-90°   | 52.0    | 0.5       |
| 90°-100°  | 157.1   | 1.4       |
| 100°-110° | 499.0   | 4.6       |
| 110°-120° | 854.0   | 7.8       |
| 120°-130° | 1123.1  | 10.3      |
| 130°-140° | 1260.7  | 11.6      |
| 140°-150° | 1236.2  | 11.3      |
| 150°-160° | 1037.0  | 9.5       |
| 160°-170° | 687.7   | 6.3       |
| 170°-180° | 240.4   | 2.2       |
| 0°-30°    | 1312.4  | 12.0      |
| 0°-40°    | 2038.0  | 18.7      |
| 0°-60°    | 3228.6  | 29.6      |
| 0°-90°    | 3797.0  | 34.9      |
| 90°-120°  | 1510.1  | 13.9      |
| 90°-150°  | 5130.1  | 47.1      |
| 90°-180°  | 7095.0  | 65.1      |
| 0°-180°   | 10892.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1843 | 1843  | 1843 | 1843  | 1843 |      |
| 5°   | 1843 | 1834  | 1813 | 1828  | 1823 | 175  |
| 15°  | 1753 | 1734  | 1678 | 1646  | 1629 | 494  |
| 25°  | 1591 | 1538  | 1427 | 1359  | 1334 | 732  |
| 35°  | 1371 | 1286  | 1139 | 1034  | 997  | 858  |
| 45°  | 1121 | 1009  | 834  | 715   | 675  | 865  |
| 55°  | 852  | 722   | 542  | 442   | 410  | 761  |
| 65°  | 575  | 440   | 290  | 234   | 228  | 570  |
| 75°  | 307  | 190   | 133  | 122   | 120  | 324  |
| 85°  | 72   | 37    | 32   | 32    | 32   | 82   |
| 90°  | 2    | 28    | 75   | 70    | 73   | 11   |
| 95°  | 112  | 133   | 137  | 137   | 133  | 124  |
| 105° | 461  | 467   | 471  | 475   | 475  | 486  |
| 115° | 857  | 869   | 865  | 863   | 857  | 848  |
| 125° | 1246 | 1266  | 1260 | 1253  | 1250 | 1114 |
| 135° | 1612 | 1636  | 1641 | 1638  | 1632 | 1246 |
| 145° | 1957 | 1973  | 1985 | 1987  | 1979 | 1223 |
| 155° | 2238 | 2244  | 2251 | 2262  | 2255 | 1030 |
| 165° | 2435 | 2432  | 2432 | 2448  | 2437 | 687  |
| 175° | 2534 | 2527  | 2523 | 2538  | 2525 | 241  |
| 180° | 2538 | 2538  | 2538 | 2538  | 2538 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1842.7 | 1842.7 | 1842.7 | 1842.7 | 1842.7 |
| 2.5°   | 1851.0 | 1842.7 | 1824.4 | 1841.1 | 1837.7 |
| 5°     | 1842.7 | 1834.4 | 1812.7 | 1827.6 | 1822.7 |
| 7.5°   | 1827.6 | 1817.8 | 1794.4 | 1801.0 | 1792.6 |
| 10°    | 1807.7 | 1796.0 | 1762.7 | 1757.7 | 1747.7 |
| 12.5°  | 1782.7 | 1767.7 | 1722.6 | 1712.7 | 1694.2 |
| 15°    | 1752.7 | 1734.3 | 1677.7 | 1646.0 | 1629.3 |
| 17.5°  | 1717.6 | 1691.0 | 1620.9 | 1584.2 | 1557.5 |
| 20°    | 1677.7 | 1644.2 | 1560.8 | 1519.3 | 1482.5 |
| 22.5°  | 1634.3 | 1595.9 | 1499.1 | 1442.5 | 1417.6 |
| 25°    | 1590.9 | 1537.5 | 1427.4 | 1359.1 | 1334.0 |
| 27.5°  | 1539.3 | 1482.5 | 1360.8 | 1282.4 | 1244.0 |
| 30°    | 1484.3 | 1420.8 | 1287.4 | 1202.4 | 1157.3 |
| 32.5°  | 1430.8 | 1354.1 | 1217.5 | 1117.3 | 1075.6 |
| 35°    | 1370.8 | 1285.8 | 1139.1 | 1033.9 | 997.2  |
| 37.5°  | 1312.4 | 1220.7 | 1065.7 | 950.5  | 908.9  |
| 40°    | 1250.7 | 1150.8 | 988.8  | 870.5  | 827.2  |
| 42.5°  | 1187.4 | 1080.7 | 912.2  | 788.7  | 747.2  |
| 45°    | 1120.7 | 1008.9 | 833.8  | 715.3  | 675.3  |
| 47.5°  | 1057.3 | 939.0  | 758.8  | 640.3  | 603.7  |
| 50°    | 987.3  | 868.9  | 685.5  | 570.2  | 535.4  |
| 52.5°  | 918.8  | 793.7  | 615.4  | 505.3  | 473.7  |
| 55°    | 852.1  | 722.0  | 541.9  | 441.9  | 410.3  |
| 57.5°  | 783.8  | 650.4  | 477.0  | 383.6  | 356.9  |
| 60°    | 713.7  | 580.3  | 408.5  | 323.6  | 296.9  |
| 62.5°  | 645.4  | 512.0  | 350.2  | 270.2  | 256.9  |
| 65°    | 575.3  | 440.2  | 290.2  | 233.5  | 228.5  |
| 67.5°  | 508.6  | 373.5  | 233.5  | 205.1  | 200.1  |
| 70°    | 438.6  | 308.5  | 193.4  | 176.7  | 170.0  |
| 72.5°  | 371.9  | 248.4  | 161.8  | 148.5  | 145.1  |
| 75°    | 306.8  | 190.0  | 133.4  | 121.7  | 120.1  |
| 77.5°  | 241.8  | 135.0  | 105.1  | 98.4   | 95.0   |
| 80°    | 181.7  | 96.8   | 80.0   | 73.4   | 73.4   |
| 82.5°  | 126.7  | 65.1   | 55.0   | 51.6   | 51.6   |
| 85°    | 71.7   | 36.6   | 31.7   | 31.7   | 31.7   |
| 87.5°  | 26.8   | 13.3   | 13.3   | 11.7   | 11.7   |
| 90°    | 2.3    | 27.6   | 75.0   | 70.4   | 72.7   |
| 92.5°  | 47.4   | 64.3   | 66.6   | 68.8   | 68.8   |
| 95°    | 111.7  | 133.1  | 137.0  | 137.0  | 133.1  |
| 97.5°  | 185.9  | 205.8  | 214.3  | 214.3  | 214.3  |
| 100°   | 271.6  | 289.3  | 295.3  | 295.3  | 293.1  |
| 102.5° | 361.9  | 375.0  | 383.3  | 385.7  | 383.3  |
| 105°   | 460.7  | 466.7  | 471.4  | 475.2  | 475.2  |
| 107.5° | 558.6  | 567.8  | 567.8  | 569.3  | 558.6  |
| 110°   | 653.4  | 665.8  | 665.8  | 665.8  | 659.6  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 756.0  | 769.0  | 766.7  | 760.6  | 756.0  |
| 115°   | 857.0  | 869.2  | 865.4  | 863.2  | 857.0  |
| 117.5° | 957.3  | 974.1  | 963.4  | 957.3  | 951.1  |
| 120°   | 1058.3 | 1075.0 | 1058.3 | 1058.3 | 1051.3 |
| 122.5° | 1150.0 | 1171.5 | 1160.8 | 1154.7 | 1150.0 |
| 125°   | 1246.5 | 1265.6 | 1259.5 | 1252.6 | 1250.4 |
| 127.5° | 1340.6 | 1364.3 | 1355.9 | 1346.8 | 1340.6 |
| 130°   | 1428.6 | 1456.2 | 1452.3 | 1447.7 | 1439.3 |
| 132.5° | 1527.3 | 1548.7 | 1550.2 | 1539.5 | 1533.5 |
| 135°   | 1612.2 | 1635.9 | 1640.6 | 1638.3 | 1632.2 |
| 137.5° | 1707.1 | 1726.3 | 1730.1 | 1728.6 | 1719.4 |
| 140°   | 1790.6 | 1809.6 | 1820.3 | 1820.3 | 1812.0 |
| 142.5° | 1876.2 | 1895.3 | 1901.5 | 1903.8 | 1895.3 |
| 145°   | 1957.4 | 1972.6 | 1984.9 | 1987.2 | 1978.8 |
| 147.5° | 2030.1 | 2049.2 | 2058.3 | 2062.2 | 2053.8 |
| 150°   | 2105.1 | 2118.1 | 2126.5 | 2133.3 | 2126.5 |
| 152.5° | 2171.6 | 2184.6 | 2195.3 | 2203.8 | 2195.3 |
| 155°   | 2238.2 | 2244.3 | 2251.2 | 2261.9 | 2255.0 |
| 157.5° | 2295.5 | 2300.2 | 2304.0 | 2319.2 | 2308.5 |
| 160°   | 2346.8 | 2351.4 | 2353.8 | 2366.7 | 2357.5 |
| 162.5° | 2394.2 | 2394.2 | 2396.6 | 2411.1 | 2400.4 |
| 165°   | 2434.8 | 2432.5 | 2432.5 | 2447.8 | 2437.1 |
| 167.5° | 2471.6 | 2464.7 | 2464.7 | 2479.9 | 2469.2 |
| 170°   | 2499.1 | 2493.0 | 2490.7 | 2506.0 | 2493.0 |
| 172.5° | 2518.2 | 2512.1 | 2509.8 | 2525.1 | 2512.1 |
| 175°   | 2533.5 | 2527.4 | 2522.8 | 2538.2 | 2525.1 |
| 177.5° | 2541.9 | 2535.8 | 2531.2 | 2544.2 | 2531.2 |
| 180°   | 2538.2 | 2538.2 | 2538.2 | 2538.2 | 2538.2 |

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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 | 6.58             | 7.30  | 7.66  | 8.38  | 9.85  | 2.54           | 3.26 | 3.62 | 4.34 | 5.82 |
|                 | 3H   | 8.25             | 8.89  | 9.34  | 9.98  | 11.47 | 3.72           | 4.37 | 4.81 | 5.45 | 6.95 |
|                 | 4H   | 8.85             | 9.46  | 9.96  | 10.55 | 12.05 | 4.17           | 4.78 | 5.27 | 5.87 | 7.37 |
|                 | 6H   | 9.27             | 9.83  | 10.38 | 10.93 | 12.44 | 4.48           | 5.05 | 5.60 | 6.14 | 7.65 |
|                 | 8H   | 9.40             | 9.93  | 10.51 | 11.04 | 12.54 | 4.57           | 5.11 | 5.69 | 6.21 | 7.72 |
|                 | 12H  | 9.46             | 9.96  | 10.58 | 11.06 | 12.59 | 4.61           | 5.12 | 5.73 | 6.22 | 7.75 |
| 4H              | 2H   | 6.58             | 7.19  | 7.69  | 8.28  | 9.78  | 3.13           | 3.74 | 4.24 | 4.82 | 6.32 |
|                 | 3H   | 8.40             | 8.91  | 9.52  | 10.03 | 11.54 | 4.47           | 4.97 | 5.58 | 6.09 | 7.60 |
|                 | 4H   | 9.09             | 9.56  | 10.21 | 10.67 | 12.20 | 5.01           | 5.48 | 6.13 | 6.58 | 8.11 |
|                 | 6H   | 9.61             | 10.00 | 10.73 | 11.13 | 12.66 | 5.42           | 5.82 | 6.55 | 6.95 | 8.48 |
|                 | 8H   | 9.78             | 10.15 | 10.91 | 11.27 | 12.81 | 5.55           | 5.92 | 6.68 | 7.04 | 8.58 |
|                 | 12H  | 9.87             | 10.21 | 11.01 | 11.34 | 12.89 | 5.61           | 5.95 | 6.75 | 7.08 | 8.63 |
| 8H              | 4H   | 9.05             | 9.43  | 10.18 | 10.55 | 12.09 | 5.28           | 5.66 | 6.41 | 6.78 | 8.32 |
|                 | 6H   | 9.62             | 9.93  | 10.77 | 11.09 | 12.62 | 5.80           | 6.11 | 6.95 | 7.27 | 8.81 |
|                 | 8H   | 9.84             | 10.11 | 10.99 | 11.25 | 12.80 | 5.99           | 6.26 | 7.14 | 7.40 | 8.96 |
|                 | 12H  | 9.97             | 10.21 | 11.13 | 11.35 | 12.94 | 6.11           | 6.34 | 7.26 | 7.48 | 9.07 |
| 12H             | 4H   | 9.00             | 9.34  | 10.14 | 10.47 | 12.01 | 5.28           | 5.62 | 6.43 | 6.75 | 8.30 |
|                 | 6H   | 9.59             | 9.86  | 10.75 | 11.00 | 12.56 | 5.85           | 6.12 | 7.00 | 7.26 | 8.82 |
|                 | 8H   | 9.81             | 10.05 | 10.97 | 11.19 | 12.78 | 6.06           | 6.29 | 7.21 | 7.43 | 9.02 |