

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: P921039

Luminaire Tested: DFN2DIP-TR4F0-070D090US935-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P921039  
REPORT IS A COMBINATION OF REPORTS P901985 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-070D090US935-FLLONL  
Description: 4 foot, Triangle Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

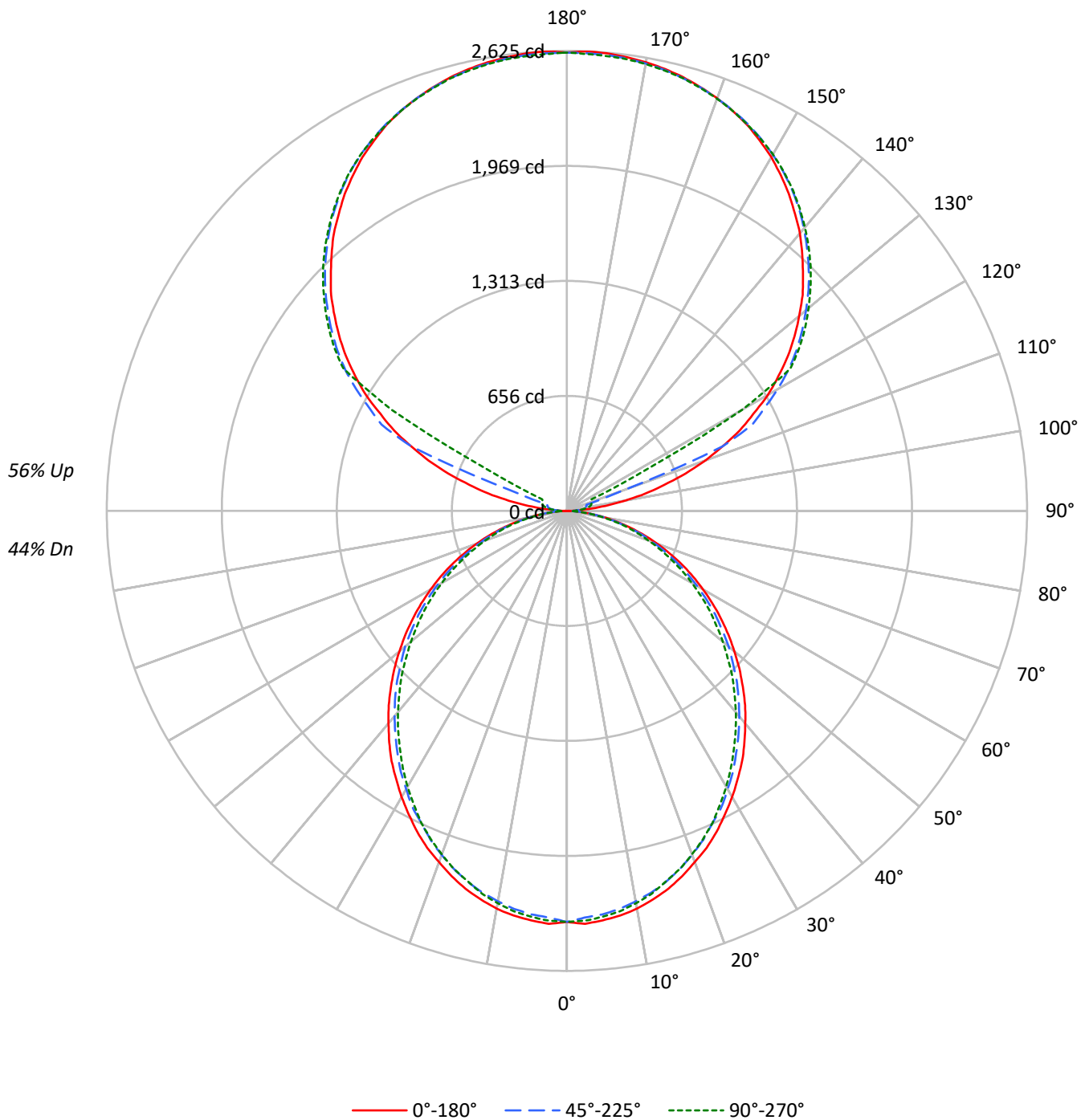
Lumens per Lamp: N/A  
Luminaire Lumens: 13638.2 lumens  
Efficiency: N/A  
Efficacy: 102.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 133.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9977  
Total Harmonic Distortion (THDi): 0.049  
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   | 106 | 106 | 106 | 106 | 97 | 97 | 97 | 97 | 80 | 80 | 80 | 65 | 65 | 65 | 50 | 50 | 50 |
| 1   | 96  | 92  | 88  | 85  | 88 | 84 | 81 | 78 | 70 | 68 | 66 | 57 | 55 | 54 | 45 | 44 | 43 |
| 2   | 88  | 80  | 74  | 69  | 80 | 74 | 69 | 64 | 61 | 58 | 54 | 50 | 47 | 45 | 39 | 37 | 36 |
| 3   | 80  | 71  | 63  | 58  | 73 | 65 | 59 | 54 | 54 | 49 | 46 | 44 | 41 | 38 | 35 | 32 | 31 |
| 4   | 73  | 63  | 55  | 49  | 67 | 58 | 51 | 45 | 48 | 43 | 39 | 39 | 35 | 32 | 31 | 28 | 26 |
| 5   | 67  | 56  | 48  | 42  | 61 | 51 | 44 | 39 | 43 | 38 | 33 | 35 | 31 | 28 | 28 | 25 | 23 |
| 6   | 62  | 50  | 42  | 36  | 56 | 46 | 39 | 34 | 39 | 33 | 29 | 32 | 28 | 25 | 25 | 22 | 20 |
| 7   | 57  | 45  | 37  | 32  | 52 | 42 | 35 | 30 | 35 | 30 | 26 | 29 | 25 | 22 | 23 | 20 | 18 |
| 8   | 53  | 41  | 33  | 28  | 48 | 38 | 31 | 26 | 32 | 27 | 23 | 26 | 22 | 19 | 21 | 18 | 16 |
| 9   | 49  | 37  | 30  | 25  | 45 | 34 | 28 | 23 | 29 | 24 | 20 | 24 | 20 | 17 | 20 | 17 | 14 |
| 10  | 46  | 34  | 27  | 22  | 42 | 32 | 25 | 21 | 27 | 22 | 18 | 22 | 18 | 16 | 18 | 15 | 13 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1863 | 1863 | 1863 |
| 5°  | 1866 | 1837 | 1849 |
| 10° | 1851 | 1812 | 1824 |
| 15° | 1824 | 1782 | 1785 |
| 20° | 1787 | 1741 | 1745 |
| 25° | 1750 | 1691 | 1699 |
| 30° | 1705 | 1645 | 1640 |
| 35° | 1661 | 1591 | 1577 |
| 40° | 1608 | 1536 | 1518 |
| 45° | 1554 | 1481 | 1457 |
| 50° | 1496 | 1423 | 1387 |
| 55° | 1435 | 1356 | 1322 |
| 60° | 1366 | 1276 | 1248 |
| 65° | 1291 | 1194 | 1161 |
| 70° | 1195 | 1094 | 1067 |
| 75° | 1062 | 974  | 980  |
| 80° | 903  | 821  | 814  |
| 85° | 653  | 558  | 540  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 1554 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 220.7   | 1.6       |
| 10°-20°   | 621.0   | 4.6       |
| 20°-30°   | 912.7   | 6.7       |
| 30°-40°   | 1060.0  | 7.8       |
| 40°-50°   | 1058.7  | 7.8       |
| 50°-60°   | 923.2   | 6.8       |
| 60°-70°   | 682.4   | 5.0       |
| 70°-80°   | 386.1   | 2.8       |
| 80°-90°   | 106.5   | 0.8       |
| 90°-100°  | 86.2    | 0.6       |
| 100°-110° | 321.5   | 2.4       |
| 110°-120° | 852.6   | 6.3       |
| 120°-130° | 1414.1  | 10.4      |
| 130°-140° | 1502.1  | 11.0      |
| 140°-150° | 1396.0  | 10.2      |
| 150°-160° | 1122.4  | 8.2       |
| 160°-170° | 723.2   | 5.3       |
| 170°-180° | 248.9   | 1.8       |
| 0°-30°    | 1754.4  | 12.9      |
| 0°-40°    | 2814.4  | 20.6      |
| 0°-60°    | 4796.3  | 35.2      |
| 0°-90°    | 5971.3  | 43.8      |
| 90°-120°  | 1260.3  | 9.2       |
| 90°-150°  | 5572.4  | 40.9      |
| 90°-180°  | 7667.0  | 56.2      |
| 0°-180°   | 13638.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2345 | 2345  | 2345 | 2345  | 2345 |      |
| 5°   | 2345 | 2336  | 2311 | 2329  | 2325 | 223  |
| 15°  | 2232 | 2219  | 2190 | 2199  | 2188 | 629  |
| 25°  | 2020 | 2002  | 1964 | 1969  | 1964 | 930  |
| 35°  | 1743 | 1721  | 1684 | 1671  | 1660 | 1089 |
| 45°  | 1418 | 1403  | 1369 | 1344  | 1335 | 1095 |
| 55°  | 1074 | 1060  | 1033 | 1006  | 994  | 960  |
| 65°  | 724  | 710   | 688  | 668   | 656  | 716  |
| 75°  | 379  | 374   | 363  | 350   | 354  | 404  |
| 85°  | 92   | 90    | 88   | 81    | 79   | 103  |
| 90°  | 2    | 23    | 38   | 47    | 51   | 13   |
| 95°  | 123  | 60    | 74   | 83    | 81   | 146  |
| 105° | 575  | 632   | 116  | 136   | 144  | 615  |
| 115° | 1088 | 1120  | 1168 | 291   | 155  | 1071 |
| 125° | 1538 | 1563  | 1599 | 1612  | 1618 | 1372 |
| 135° | 1904 | 1934  | 1951 | 1970  | 1966 | 1471 |
| 145° | 2208 | 2206  | 2239 | 2252  | 2242 | 1381 |
| 155° | 2432 | 2415  | 2437 | 2449  | 2434 | 1121 |
| 165° | 2562 | 2551  | 2557 | 2570  | 2557 | 724  |
| 175° | 2621 | 2608  | 2611 | 2625  | 2606 | 249  |
| 180° | 2615 | 2615  | 2615 | 2615  | 2615 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2345.1 | 2345.1 | 2345.1 | 2345.1 | 2345.1 |
| 2.5°   | 2358.8 | 2347.5 | 2322.6 | 2345.1 | 2340.8 |
| 5°     | 2345.1 | 2336.3 | 2311.4 | 2329.3 | 2325.0 |
| 7.5°   | 2329.3 | 2315.9 | 2291.0 | 2309.3 | 2304.7 |
| 10°    | 2304.7 | 2288.9 | 2261.8 | 2279.8 | 2273.1 |
| 12.5°  | 2270.7 | 2257.4 | 2230.3 | 2241.5 | 2237.0 |
| 15°    | 2232.5 | 2219.0 | 2189.6 | 2198.7 | 2187.5 |
| 17.5°  | 2185.0 | 2171.7 | 2142.2 | 2153.5 | 2142.2 |
| 20°    | 2133.1 | 2119.8 | 2088.2 | 2094.9 | 2086.0 |
| 22.5°  | 2081.5 | 2061.1 | 2031.7 | 2031.7 | 2027.1 |
| 25°    | 2020.5 | 2002.5 | 1964.3 | 1968.6 | 1964.3 |
| 27.5°  | 1952.7 | 1937.0 | 1907.8 | 1901.1 | 1889.8 |
| 30°    | 1885.3 | 1867.1 | 1833.4 | 1826.7 | 1817.6 |
| 32.5°  | 1813.0 | 1799.7 | 1763.5 | 1749.9 | 1740.8 |
| 35°    | 1743.2 | 1720.7 | 1684.5 | 1670.9 | 1659.7 |
| 37.5°  | 1664.2 | 1643.9 | 1607.7 | 1592.0 | 1580.7 |
| 40°    | 1583.1 | 1564.9 | 1528.8 | 1508.7 | 1499.6 |
| 42.5°  | 1504.2 | 1486.0 | 1450.1 | 1427.4 | 1413.9 |
| 45°    | 1418.5 | 1402.7 | 1368.7 | 1344.1 | 1335.0 |
| 47.5°  | 1335.0 | 1319.2 | 1283.1 | 1258.2 | 1244.8 |
| 50°    | 1247.0 | 1235.7 | 1204.1 | 1172.6 | 1161.3 |
| 52.5°  | 1161.3 | 1145.6 | 1116.4 | 1091.5 | 1075.6 |
| 55°    | 1073.5 | 1059.9 | 1032.9 | 1005.8 | 994.5  |
| 57.5°  | 985.5  | 974.2  | 944.8  | 917.7  | 908.7  |
| 60°    | 897.4  | 888.5  | 857.0  | 832.2  | 825.4  |
| 62.5°  | 811.7  | 796.0  | 773.5  | 751.0  | 741.9  |
| 65°    | 724.0  | 710.3  | 687.9  | 667.5  | 656.3  |
| 67.5°  | 633.8  | 622.3  | 602.2  | 586.4  | 577.3  |
| 70°    | 550.3  | 541.2  | 520.8  | 505.1  | 496.2  |
| 72.5°  | 464.6  | 455.6  | 444.3  | 428.5  | 421.8  |
| 75°    | 378.8  | 374.4  | 362.9  | 349.6  | 354.1  |
| 77.5°  | 302.2  | 293.1  | 288.5  | 281.8  | 275.2  |
| 80°    | 225.6  | 223.3  | 218.7  | 212.0  | 207.4  |
| 82.5°  | 153.3  | 153.3  | 151.2  | 142.2  | 142.2  |
| 85°    | 92.4   | 90.2   | 88.1   | 81.1   | 79.0   |
| 87.5°  | 40.6   | 36.2   | 31.6   | 24.9   | 22.5   |
| 90°    | 1.8    | 22.7   | 37.7   | 47.4   | 51.0   |
| 92.5°  | 47.4   | 39.8   | 45.4   | 49.2   | 51.0   |
| 95°    | 123.0  | 60.4   | 73.7   | 83.3   | 81.4   |
| 97.5°  | 221.4  | 66.3   | 96.4   | 102.2  | 104.0  |
| 100°   | 335.0  | 75.8   | 107.9  | 123.0  | 126.7  |
| 102.5° | 459.8  | 456.2  | 111.7  | 132.3  | 138.2  |
| 105°   | 575.2  | 632.1  | 115.5  | 136.2  | 143.8  |
| 107.5° | 709.6  | 756.8  | 119.3  | 140.0  | 147.7  |
| 110°   | 838.4  | 878.0  | 331.2  | 142.0  | 149.5  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 959.5  | 993.4  | 961.3  | 145.6  | 151.4  |
| 115°   | 1088.0 | 1120.2 | 1167.6 | 291.4  | 155.2  |
| 117.5° | 1199.7 | 1237.5 | 1269.8 | 999.1  | 503.3  |
| 120°   | 1324.6 | 1353.0 | 1387.2 | 1409.8 | 1154.3 |
| 122.5° | 1430.5 | 1460.9 | 1498.8 | 1510.0 | 1512.1 |
| 125°   | 1538.3 | 1563.1 | 1599.0 | 1612.3 | 1617.9 |
| 127.5° | 1636.8 | 1663.3 | 1691.9 | 1710.7 | 1712.5 |
| 130°   | 1729.6 | 1760.0 | 1780.6 | 1801.5 | 1799.7 |
| 132.5° | 1824.2 | 1848.9 | 1869.6 | 1886.7 | 1884.9 |
| 135°   | 1903.8 | 1934.1 | 1950.9 | 1970.0 | 1966.3 |
| 137.5° | 1986.9 | 2009.6 | 2028.7 | 2047.5 | 2041.9 |
| 140°   | 2068.2 | 2083.5 | 2104.2 | 2121.2 | 2111.9 |
| 142.5° | 2136.6 | 2149.8 | 2174.3 | 2189.3 | 2180.0 |
| 145°   | 2208.5 | 2206.4 | 2238.6 | 2251.9 | 2242.4 |
| 147.5° | 2270.7 | 2265.1 | 2297.2 | 2306.7 | 2299.2 |
| 150°   | 2331.4 | 2318.2 | 2348.5 | 2359.7 | 2350.3 |
| 152.5° | 2382.4 | 2367.3 | 2395.6 | 2407.1 | 2393.8 |
| 155°   | 2431.6 | 2414.8 | 2437.4 | 2448.7 | 2433.6 |
| 157.5° | 2471.4 | 2456.3 | 2473.4 | 2486.6 | 2471.4 |
| 160°   | 2505.5 | 2494.1 | 2505.5 | 2516.8 | 2503.5 |
| 162.5° | 2535.6 | 2524.4 | 2533.8 | 2547.1 | 2530.0 |
| 165°   | 2562.2 | 2550.9 | 2556.6 | 2569.8 | 2556.6 |
| 167.5° | 2583.1 | 2571.6 | 2577.4 | 2590.7 | 2573.6 |
| 170°   | 2600.1 | 2588.7 | 2592.5 | 2605.7 | 2588.7 |
| 172.5° | 2611.4 | 2600.1 | 2603.9 | 2617.2 | 2600.1 |
| 175°   | 2620.8 | 2607.5 | 2611.4 | 2624.6 | 2605.7 |
| 177.5° | 2624.6 | 2611.4 | 2613.4 | 2626.6 | 2609.6 |
| 180°   | 2615.2 | 2615.2 | 2615.2 | 2615.2 | 2615.2 |

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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 | 8.83             | 9.63  | 9.83  | 10.65 | 12.01 | 8.39           | 9.20  | 9.40  | 10.22 | 11.58 |
|                 | 3H   | 10.48            | 11.21 | 11.50 | 12.23 | 13.61 | 10.01          | 10.73 | 11.03 | 11.76 | 13.14 |
|                 | 4H   | 11.07            | 11.75 | 12.10 | 12.78 | 14.17 | 10.59          | 11.28 | 11.62 | 12.31 | 13.70 |
|                 | 6H   | 11.46            | 12.10 | 12.51 | 13.13 | 14.53 | 10.99          | 11.62 | 12.03 | 12.65 | 14.05 |
|                 | 8H   | 11.57            | 12.17 | 12.61 | 13.22 | 14.61 | 11.09          | 11.69 | 12.14 | 12.74 | 14.14 |
|                 | 12H  | 11.61            | 12.18 | 12.66 | 13.23 | 14.65 | 11.13          | 11.70 | 12.18 | 12.75 | 14.17 |
| 4H              | 2H   | 9.28             | 9.97  | 10.32 | 11.00 | 12.38 | 8.94           | 9.62  | 9.97  | 10.65 | 12.04 |
|                 | 3H   | 11.14            | 11.71 | 12.19 | 12.77 | 14.17 | 10.75          | 11.32 | 11.80 | 12.38 | 13.78 |
|                 | 4H   | 11.85            | 12.38 | 12.91 | 13.43 | 14.85 | 11.45          | 11.97 | 12.50 | 13.02 | 14.44 |
|                 | 6H   | 12.37            | 12.82 | 13.43 | 13.89 | 15.31 | 11.96          | 12.41 | 13.02 | 13.48 | 14.90 |
|                 | 8H   | 12.51            | 12.94 | 13.58 | 14.00 | 15.43 | 12.10          | 12.52 | 13.17 | 13.59 | 15.02 |
|                 | 12H  | 12.58            | 12.97 | 13.67 | 14.05 | 15.48 | 12.16          | 12.54 | 13.24 | 13.62 | 15.06 |
| 8H              | 4H   | 12.05            | 12.47 | 13.11 | 13.53 | 14.96 | 11.69          | 12.11 | 12.75 | 13.17 | 14.60 |
|                 | 6H   | 12.68            | 13.02 | 13.76 | 14.13 | 15.56 | 12.31          | 12.66 | 13.40 | 13.77 | 15.20 |
|                 | 8H   | 12.90            | 13.20 | 13.99 | 14.29 | 15.74 | 12.53          | 12.83 | 13.62 | 13.92 | 15.37 |
|                 | 12H  | 13.02            | 13.29 | 14.12 | 14.38 | 15.87 | 12.64          | 12.91 | 13.74 | 14.00 | 15.48 |
| 12H             | 4H   | 12.03            | 12.41 | 13.11 | 13.49 | 14.93 | 11.68          | 12.06 | 12.76 | 13.14 | 14.57 |
|                 | 6H   | 12.70            | 13.01 | 13.80 | 14.10 | 15.55 | 12.35          | 12.66 | 13.45 | 13.75 | 15.20 |
|                 | 8H   | 12.94            | 13.21 | 14.04 | 14.30 | 15.79 | 12.59          | 12.86 | 13.68 | 13.94 | 15.43 |