

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: P923830

Luminaire Tested: DFN2DIP-TR4F0-090D070US940-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P923830  
REPORT IS A COMBINATION OF REPORTS P900433 AND P897293  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-090D070US940-FLLFLL  
Description: 4 foot, Triangle Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

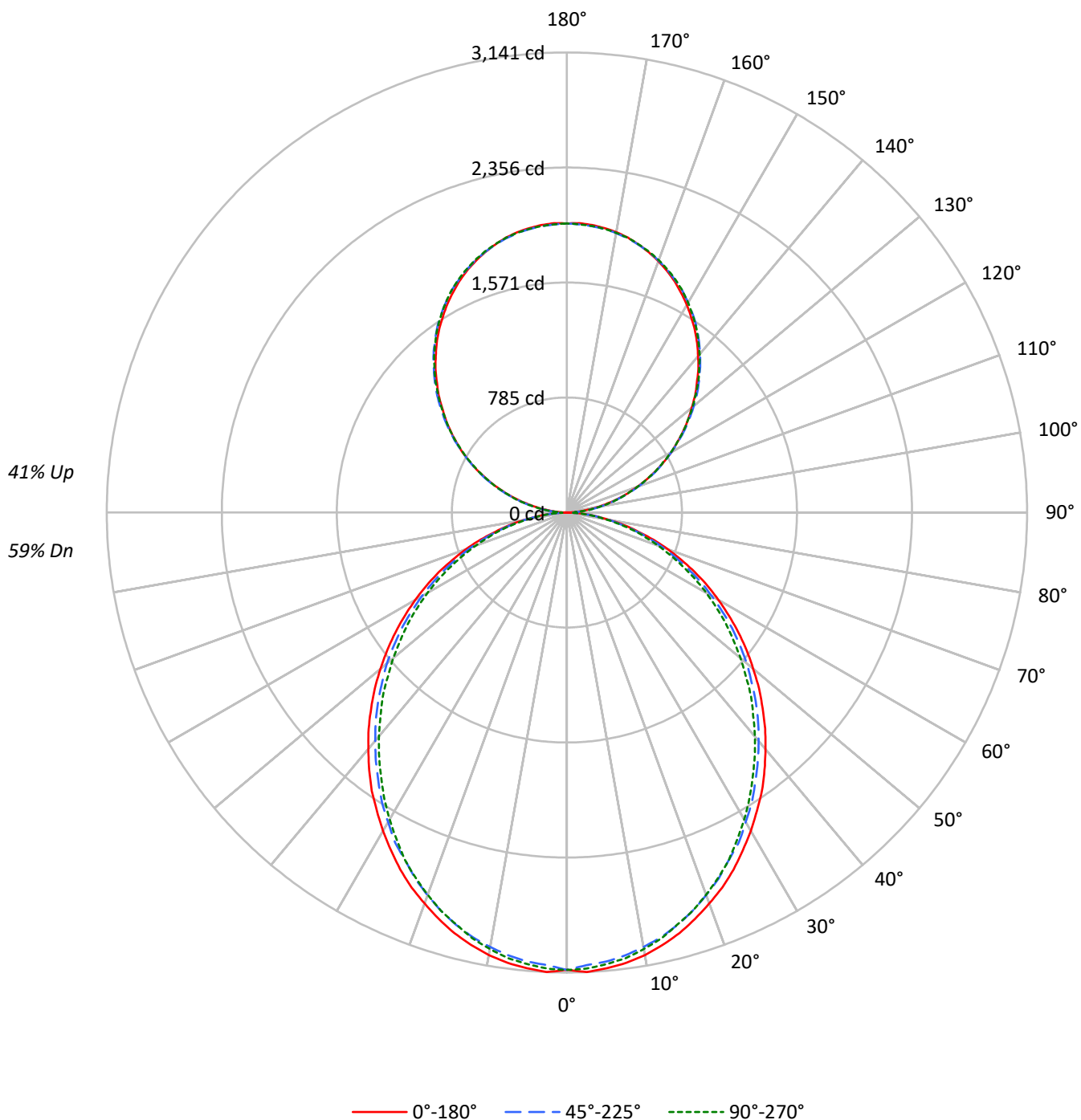
Lumens per Lamp: N/A  
Luminaire Lumens: 13469.4 lumens  
Efficiency: N/A  
Efficacy: 96.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 139.6  
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

TEST NUMBER: P923830

CATALOG NUMBER: DFN2DIP-TR4F0-090D070US940-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P923830

CATALOG NUMBER: DFN2DIP-TR4F0-090D070US940-FLLFLL

**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   | 109 | 109 | 109 | 109 | 102 | 102 | 102 | 102 | 88 | 88 | 88 | 76 | 76 | 76 | 64 | 64 | 64 |
| 1   | 100 | 95  | 91  | 88  | 93  | 89  | 86  | 83  | 78 | 75 | 73 | 67 | 65 | 63 | 57 | 56 | 54 |
| 2   | 91  | 83  | 77  | 72  | 85  | 78  | 73  | 68  | 68 | 64 | 60 | 59 | 56 | 53 | 50 | 48 | 46 |
| 3   | 83  | 73  | 66  | 60  | 77  | 69  | 62  | 57  | 60 | 55 | 51 | 52 | 48 | 45 | 44 | 42 | 39 |
| 4   | 76  | 65  | 57  | 51  | 71  | 61  | 54  | 48  | 53 | 48 | 43 | 46 | 42 | 38 | 40 | 36 | 34 |
| 5   | 70  | 58  | 50  | 44  | 65  | 54  | 47  | 41  | 48 | 42 | 37 | 42 | 37 | 33 | 36 | 32 | 29 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 41  | 36  | 43 | 37 | 33 | 38 | 33 | 29 | 33 | 29 | 26 |
| 7   | 59  | 47  | 39  | 33  | 55  | 44  | 37  | 32  | 39 | 33 | 29 | 34 | 29 | 26 | 30 | 26 | 23 |
| 8   | 55  | 43  | 35  | 29  | 51  | 40  | 33  | 28  | 36 | 30 | 26 | 31 | 27 | 23 | 27 | 23 | 21 |
| 9   | 51  | 39  | 31  | 26  | 48  | 37  | 30  | 25  | 33 | 27 | 23 | 29 | 24 | 21 | 25 | 21 | 19 |
| 10  | 48  | 36  | 29  | 24  | 45  | 34  | 27  | 23  | 30 | 25 | 21 | 27 | 22 | 19 | 23 | 20 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2481 | 2481 | 2481 |
| 5°  | 2485 | 2446 | 2463 |
| 10° | 2465 | 2413 | 2429 |
| 15° | 2428 | 2373 | 2377 |
| 20° | 2380 | 2318 | 2324 |
| 25° | 2331 | 2252 | 2262 |
| 30° | 2270 | 2191 | 2183 |
| 35° | 2212 | 2118 | 2100 |
| 40° | 2141 | 2045 | 2021 |
| 45° | 2070 | 1972 | 1941 |
| 50° | 1992 | 1895 | 1847 |
| 55° | 1911 | 1806 | 1761 |
| 60° | 1819 | 1700 | 1662 |
| 65° | 1719 | 1590 | 1546 |
| 70° | 1591 | 1457 | 1421 |
| 75° | 1415 | 1297 | 1305 |
| 80° | 1202 | 1093 | 1085 |
| 85° | 870  | 742  | 718  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2070 cd/sqm

TEST NUMBER: P923830

CATALOG NUMBER: DFN2DIP-TR4F0-090D070US940-FLLFLL

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 293.9   | 2.2       |
| 10°-20°   | 827.0   | 6.1       |
| 20°-30°   | 1215.3  | 9.0       |
| 30°-40°   | 1411.5  | 10.5      |
| 40°-50°   | 1409.7  | 10.5      |
| 50°-60°   | 1229.3  | 9.1       |
| 60°-70°   | 908.7   | 6.7       |
| 70°-80°   | 514.1   | 3.8       |
| 80°-90°   | 141.3   | 1.0       |
| 90°-100°  | 122.2   | 0.9       |
| 100°-110° | 388.1   | 2.9       |
| 110°-120° | 664.2   | 4.9       |
| 120°-130° | 873.6   | 6.5       |
| 130°-140° | 980.5   | 7.3       |
| 140°-150° | 961.5   | 7.1       |
| 150°-160° | 806.6   | 6.0       |
| 160°-170° | 534.9   | 4.0       |
| 170°-180° | 187.0   | 1.4       |
| 0°-30°    | 2336.2  | 17.3      |
| 0°-40°    | 3747.7  | 27.8      |
| 0°-60°    | 6386.7  | 47.4      |
| 0°-90°    | 7950.8  | 59.0      |
| 90°-120°  | 1174.5  | 8.7       |
| 90°-150°  | 3990.1  | 29.6      |
| 90°-180°  | 5519.0  | 41.0      |
| 0°-180°   | 13469.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3123 | 3123  | 3123 | 3123  | 3123 |      |
| 5°   | 3123 | 3111  | 3078 | 3102  | 3096 | 296  |
| 15°  | 2973 | 2955  | 2916 | 2928  | 2913 | 837  |
| 25°  | 2690 | 2666  | 2616 | 2621  | 2616 | 1238 |
| 35°  | 2321 | 2291  | 2243 | 2225  | 2210 | 1449 |
| 45°  | 1889 | 1868  | 1823 | 1790  | 1778 | 1458 |
| 55°  | 1430 | 1411  | 1375 | 1339  | 1324 | 1278 |
| 65°  | 964  | 946   | 916  | 889   | 874  | 953  |
| 75°  | 504  | 499   | 483  | 466   | 472  | 538  |
| 85°  | 123  | 120   | 117  | 108   | 105  | 137  |
| 90°  | 2    | 21    | 58   | 55    | 56   | 13   |
| 95°  | 87   | 104   | 107  | 107   | 104  | 97   |
| 105° | 358  | 363   | 367  | 370   | 370  | 378  |
| 115° | 667  | 676   | 673  | 671   | 667  | 659  |
| 125° | 970  | 984   | 980  | 974   | 972  | 866  |
| 135° | 1254 | 1272  | 1276 | 1274  | 1269 | 969  |
| 145° | 1522 | 1534  | 1544 | 1546  | 1539 | 951  |
| 155° | 1741 | 1746  | 1751 | 1759  | 1754 | 801  |
| 165° | 1894 | 1892  | 1892 | 1904  | 1896 | 534  |
| 175° | 1970 | 1966  | 1962 | 1974  | 1964 | 187  |
| 180° | 1974 | 1974  | 1974 | 1974  | 1974 |      |

TEST NUMBER: P923830

CATALOG NUMBER: DFN2DIP-TR4F0-090D070US940-FLLFLL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3122.7 | 3122.7 | 3122.7 | 3122.7 | 3122.7 |
| 2.5°   | 3140.9 | 3125.9 | 3092.8 | 3122.7 | 3117.0 |
| 5°     | 3122.7 | 3110.9 | 3077.8 | 3101.7 | 3095.9 |
| 7.5°   | 3101.7 | 3083.9 | 3050.7 | 3075.0 | 3068.9 |
| 10°    | 3068.9 | 3047.9 | 3011.8 | 3035.7 | 3026.8 |
| 12.5°  | 3023.6 | 3005.8 | 2969.8 | 2984.7 | 2978.8 |
| 15°    | 2972.7 | 2954.9 | 2915.6 | 2927.8 | 2912.8 |
| 17.5°  | 2909.6 | 2891.7 | 2852.6 | 2867.6 | 2852.6 |
| 20°    | 2840.5 | 2822.6 | 2780.5 | 2789.4 | 2777.7 |
| 22.5°  | 2771.6 | 2744.6 | 2705.4 | 2705.4 | 2699.3 |
| 25°    | 2690.4 | 2666.5 | 2615.6 | 2621.3 | 2615.6 |
| 27.5°  | 2600.2 | 2579.2 | 2540.4 | 2531.5 | 2516.5 |
| 30°    | 2510.4 | 2486.2 | 2441.2 | 2432.3 | 2420.3 |
| 32.5°  | 2414.2 | 2396.4 | 2348.2 | 2330.1 | 2318.0 |
| 35°    | 2321.2 | 2291.2 | 2243.1 | 2225.0 | 2210.0 |
| 37.5°  | 2216.1 | 2189.0 | 2140.8 | 2119.9 | 2104.9 |
| 40°    | 2108.0 | 2083.8 | 2035.7 | 2008.9 | 1996.9 |
| 42.5°  | 2002.9 | 1978.7 | 1930.9 | 1900.7 | 1882.8 |
| 45°    | 1888.8 | 1867.9 | 1822.6 | 1789.8 | 1777.7 |
| 47.5°  | 1777.7 | 1756.7 | 1708.5 | 1675.4 | 1657.6 |
| 50°    | 1660.5 | 1645.5 | 1603.4 | 1561.4 | 1546.4 |
| 52.5°  | 1546.4 | 1525.4 | 1486.5 | 1453.4 | 1432.4 |
| 55°    | 1429.5 | 1411.3 | 1375.3 | 1339.3 | 1324.4 |
| 57.5°  | 1312.2 | 1297.3 | 1258.1 | 1222.1 | 1210.0 |
| 60°    | 1195.0 | 1183.2 | 1141.1 | 1108.0 | 1099.1 |
| 62.5°  | 1080.9 | 1059.9 | 1029.9 | 1000.1 | 987.9  |
| 65°    | 964.0  | 945.8  | 915.9  | 888.9  | 873.9  |
| 67.5°  | 843.9  | 828.7  | 801.8  | 780.9  | 768.7  |
| 70°    | 732.7  | 720.6  | 693.6  | 672.5  | 660.8  |
| 72.5°  | 618.7  | 606.5  | 591.6  | 570.6  | 561.7  |
| 75°    | 504.4  | 498.6  | 483.3  | 465.5  | 471.5  |
| 77.5°  | 402.3  | 390.3  | 384.2  | 375.3  | 366.4  |
| 80°    | 300.4  | 297.2  | 291.1  | 282.2  | 276.3  |
| 82.5°  | 204.2  | 204.2  | 201.3  | 189.2  | 189.2  |
| 85°    | 123.0  | 120.1  | 117.3  | 108.0  | 105.1  |
| 87.5°  | 54.1   | 48.1   | 42.1   | 33.2   | 30.0   |
| 90°    | 1.8    | 21.4   | 58.3   | 54.8   | 56.5   |
| 92.5°  | 36.9   | 50.0   | 51.8   | 53.6   | 53.6   |
| 95°    | 86.9   | 103.5  | 106.6  | 106.6  | 103.5  |
| 97.5°  | 144.6  | 160.1  | 166.7  | 166.7  | 166.7  |
| 100°   | 211.2  | 225.0  | 229.7  | 229.7  | 227.9  |
| 102.5° | 281.5  | 291.6  | 298.2  | 300.0  | 298.2  |
| 105°   | 358.3  | 363.0  | 366.6  | 369.6  | 369.6  |
| 107.5° | 434.4  | 441.6  | 441.6  | 442.8  | 434.4  |
| 110°   | 508.3  | 517.8  | 517.8  | 517.8  | 513.0  |

TEST NUMBER: P923830

CATALOG NUMBER: DFN2DIP-TR4F0-090D070US940-FLLFLL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 588.0  | 598.2  | 596.4  | 591.6  | 588.0  |
| 115°   | 666.6  | 676.1  | 673.2  | 671.4  | 666.6  |
| 117.5° | 744.5  | 757.6  | 749.3  | 744.5  | 739.8  |
| 120°   | 823.0  | 836.2  | 823.0  | 823.0  | 817.7  |
| 122.5° | 894.5  | 911.1  | 902.9  | 898.0  | 894.5  |
| 125°   | 969.5  | 984.4  | 979.6  | 974.3  | 972.5  |
| 127.5° | 1042.7 | 1061.1 | 1054.6 | 1047.5 | 1042.7 |
| 130°   | 1111.2 | 1132.6 | 1129.6 | 1126.1 | 1119.5 |
| 132.5° | 1187.9 | 1204.6 | 1205.8 | 1197.5 | 1192.7 |
| 135°   | 1254.0 | 1272.4 | 1276.0 | 1274.2 | 1269.4 |
| 137.5° | 1327.8 | 1342.6 | 1345.6 | 1344.4 | 1337.3 |
| 140°   | 1392.7 | 1407.6 | 1415.9 | 1415.9 | 1409.3 |
| 142.5° | 1459.3 | 1474.2 | 1478.9 | 1480.7 | 1474.2 |
| 145°   | 1522.4 | 1534.3 | 1543.8 | 1545.6 | 1539.1 |
| 147.5° | 1579.0 | 1593.8 | 1601.0 | 1603.9 | 1597.4 |
| 150°   | 1637.3 | 1647.3 | 1653.9 | 1659.3 | 1653.9 |
| 152.5° | 1689.0 | 1699.2 | 1707.4 | 1714.0 | 1707.4 |
| 155°   | 1740.8 | 1745.5 | 1751.0 | 1759.3 | 1753.9 |
| 157.5° | 1785.5 | 1789.0 | 1792.0 | 1803.9 | 1795.5 |
| 160°   | 1825.3 | 1828.9 | 1830.7 | 1840.8 | 1833.6 |
| 162.5° | 1862.2 | 1862.2 | 1864.0 | 1875.3 | 1867.0 |
| 165°   | 1893.7 | 1891.9 | 1891.9 | 1903.9 | 1895.5 |
| 167.5° | 1922.3 | 1917.0 | 1917.0 | 1928.9 | 1920.6 |
| 170°   | 1943.8 | 1939.0 | 1937.2 | 1949.1 | 1939.0 |
| 172.5° | 1958.6 | 1953.8 | 1952.0 | 1964.0 | 1953.8 |
| 175°   | 1970.5 | 1965.8 | 1962.2 | 1974.1 | 1964.0 |
| 177.5° | 1977.1 | 1972.3 | 1968.7 | 1978.9 | 1968.7 |
| 180°   | 1974.1 | 1974.1 | 1974.1 | 1974.1 | 1974.1 |

TEST NUMBER: P923830

CATALOG NUMBER: DFN2DIP-TR4F0-090D070US940-FLLFLL

**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 | 11.22            | 12.17 | 12.09 | 13.06 | 14.20 | 10.78          | 11.73 | 11.66 | 12.63 | 13.77 |
|                 | 3H   | 12.88            | 13.73 | 13.77 | 14.64 | 15.80 | 12.41          | 13.26 | 13.30 | 14.17 | 15.33 |
|                 | 4H   | 13.47            | 14.28 | 14.38 | 15.19 | 16.36 | 13.00          | 13.81 | 13.90 | 14.72 | 15.89 |
|                 | 6H   | 13.88            | 14.62 | 14.79 | 15.54 | 16.72 | 13.40          | 14.15 | 14.32 | 15.06 | 16.25 |
|                 | 8H   | 13.99            | 14.69 | 14.91 | 15.63 | 16.81 | 13.51          | 14.22 | 14.43 | 15.15 | 16.34 |
|                 | 12H  | 14.04            | 14.71 | 14.97 | 15.64 | 16.85 | 13.56          | 14.23 | 14.48 | 15.16 | 16.37 |
| 4H              | 2H   | 11.69            | 12.49 | 12.60 | 13.41 | 14.58 | 11.34          | 12.15 | 12.25 | 13.06 | 14.23 |
|                 | 3H   | 13.56            | 14.23 | 14.48 | 15.18 | 16.36 | 13.17          | 13.84 | 14.09 | 14.78 | 15.97 |
|                 | 4H   | 14.28            | 14.89 | 15.21 | 15.83 | 17.04 | 13.87          | 14.49 | 14.80 | 15.43 | 16.64 |
|                 | 6H   | 14.80            | 15.33 | 15.74 | 16.29 | 17.50 | 14.39          | 14.92 | 15.33 | 15.88 | 17.09 |
|                 | 8H   | 14.95            | 15.45 | 15.90 | 16.40 | 17.63 | 14.54          | 15.03 | 15.49 | 15.99 | 17.22 |
|                 | 12H  | 15.03            | 15.48 | 15.99 | 16.45 | 17.68 | 14.61          | 15.05 | 15.57 | 16.03 | 17.26 |
| 8H              | 4H   | 14.48            | 14.98 | 15.43 | 15.93 | 17.16 | 14.12          | 14.62 | 15.07 | 15.57 | 16.80 |
|                 | 6H   | 15.12            | 15.53 | 16.09 | 16.53 | 17.75 | 14.76          | 15.17 | 15.73 | 16.16 | 17.39 |
|                 | 8H   | 15.34            | 15.70 | 16.32 | 16.69 | 17.93 | 14.97          | 15.33 | 15.95 | 16.32 | 17.56 |
|                 | 12H  | 15.48            | 15.79 | 16.46 | 16.77 | 18.06 | 15.09          | 15.41 | 16.08 | 16.39 | 17.68 |
| 12H             | 4H   | 14.47            | 14.92 | 15.44 | 15.89 | 17.12 | 14.12          | 14.57 | 15.09 | 15.54 | 16.77 |
|                 | 6H   | 15.15            | 15.51 | 16.13 | 16.50 | 17.74 | 14.80          | 15.16 | 15.78 | 16.15 | 17.39 |
|                 | 8H   | 15.40            | 15.71 | 16.38 | 16.69 | 17.98 | 15.04          | 15.36 | 16.02 | 16.34 | 17.63 |