

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: P924191

Luminaire Tested: DFN2DIP-4P4F0-060D080US950-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P924191  
REPORT IS A COMBINATION OF REPORTS P900665 AND P897523  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P4F0-060D080US950-FLLONL  
Description: 4 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

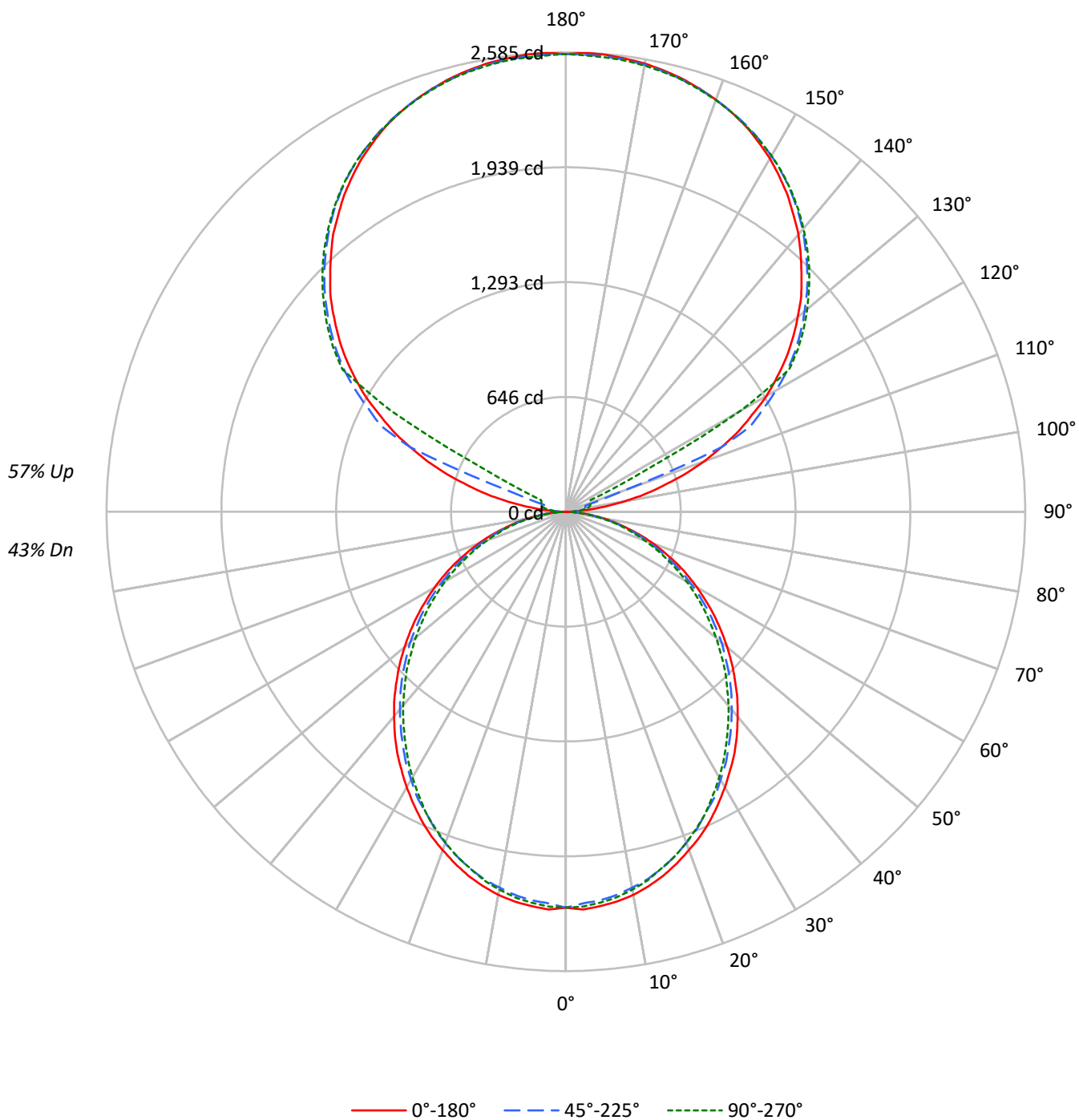
Lumens per Lamp: N/A  
Luminaire Lumens: 13222.5 lumens  
Efficiency: N/A  
Efficacy: 97.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 4.07' x L: 4.07' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 135  
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

TEST NUMBER: P924191

CATALOG NUMBER: DFN2DIP-4P4F0-060D080US950-FLLONL

### Luminous Intensity Polar Plot



TEST NUMBER: P924191

CATALOG NUMBER: DFN2DIP-4P4F0-060D080US950-FLONL

**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   | 105 | 105 | 105 | 105 | 96 | 96 | 96 | 96 | 79 | 79 | 79 | 64 | 64 | 64 | 50 | 50 | 50 |
| 1   | 96  | 92  | 88  | 85  | 88 | 84 | 81 | 78 | 70 | 67 | 65 | 56 | 55 | 53 | 44 | 43 | 42 |
| 2   | 88  | 80  | 74  | 69  | 80 | 74 | 68 | 64 | 61 | 57 | 54 | 49 | 47 | 44 | 39 | 37 | 35 |
| 3   | 80  | 71  | 63  | 58  | 73 | 65 | 58 | 53 | 54 | 49 | 45 | 44 | 40 | 38 | 34 | 32 | 30 |
| 4   | 73  | 62  | 55  | 49  | 66 | 57 | 50 | 45 | 48 | 43 | 39 | 39 | 35 | 32 | 31 | 28 | 26 |
| 5   | 67  | 56  | 48  | 42  | 61 | 51 | 44 | 39 | 43 | 37 | 33 | 35 | 31 | 28 | 28 | 25 | 23 |
| 6   | 62  | 50  | 42  | 36  | 56 | 46 | 39 | 34 | 38 | 33 | 29 | 31 | 27 | 24 | 25 | 22 | 20 |
| 7   | 57  | 45  | 37  | 32  | 52 | 41 | 34 | 29 | 35 | 29 | 25 | 29 | 25 | 22 | 23 | 20 | 18 |
| 8   | 53  | 41  | 33  | 28  | 48 | 38 | 31 | 26 | 32 | 26 | 23 | 26 | 22 | 19 | 21 | 18 | 16 |
| 9   | 49  | 37  | 30  | 25  | 45 | 34 | 28 | 23 | 29 | 24 | 20 | 24 | 20 | 17 | 19 | 16 | 14 |
| 10  | 46  | 34  | 27  | 22  | 42 | 31 | 25 | 21 | 27 | 22 | 18 | 22 | 18 | 16 | 18 | 15 | 13 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1445 | 1445 | 1445 |
| 5°  | 1447 | 1425 | 1435 |
| 10° | 1436 | 1406 | 1416 |
| 15° | 1415 | 1384 | 1386 |
| 20° | 1386 | 1352 | 1356 |
| 25° | 1358 | 1314 | 1320 |
| 30° | 1323 | 1279 | 1275 |
| 35° | 1289 | 1237 | 1227 |
| 40° | 1248 | 1195 | 1182 |
| 45° | 1206 | 1153 | 1135 |
| 50° | 1161 | 1108 | 1081 |
| 55° | 1114 | 1057 | 1032 |
| 60° | 1061 | 996  | 976  |
| 65° | 1003 | 933  | 909  |
| 70° | 929  | 856  | 837  |
| 75° | 826  | 765  | 772  |
| 80° | 703  | 648  | 646  |
| 85° | 510  | 445  | 436  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1329 cd/sqm

TEST NUMBER: P924191

CATALOG NUMBER: DFN2DIP-4P4F0-060D080US950-FLLONL

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 209.6   | 1.6       |
| 10°-20°   | 589.8   | 4.5       |
| 20°-30°   | 866.8   | 6.6       |
| 30°-40°   | 1006.7  | 7.6       |
| 40°-50°   | 1005.5  | 7.6       |
| 50°-60°   | 876.7   | 6.6       |
| 60°-70°   | 648.1   | 4.9       |
| 70°-80°   | 366.7   | 2.8       |
| 80°-90°   | 101.3   | 0.8       |
| 90°-100°  | 84.9    | 0.6       |
| 100°-110° | 316.6   | 2.4       |
| 110°-120° | 839.7   | 6.4       |
| 120°-130° | 1392.7  | 10.5      |
| 130°-140° | 1479.4  | 11.2      |
| 140°-150° | 1374.9  | 10.4      |
| 150°-160° | 1105.4  | 8.4       |
| 160°-170° | 712.3   | 5.4       |
| 170°-180° | 245.2   | 1.9       |
| 0°-30°    | 1666.2  | 12.6      |
| 0°-40°    | 2673.0  | 20.2      |
| 0°-60°    | 4555.2  | 34.5      |
| 0°-90°    | 5671.3  | 42.9      |
| 90°-120°  | 1241.3  | 9.4       |
| 90°-150°  | 5488.3  | 41.5      |
| 90°-180°  | 7551.0  | 57.1      |
| 0°-180°   | 13222.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2227 | 2227  | 2227 | 2227  | 2227 |      |
| 5°   | 2227 | 2219  | 2195 | 2212  | 2208 | 211  |
| 15°  | 2120 | 2108  | 2080 | 2088  | 2078 | 597  |
| 25°  | 1919 | 1902  | 1866 | 1870  | 1866 | 883  |
| 35°  | 1656 | 1634  | 1600 | 1587  | 1576 | 1034 |
| 45°  | 1347 | 1332  | 1300 | 1276  | 1268 | 1040 |
| 55°  | 1020 | 1007  | 981  | 955   | 945  | 912  |
| 65°  | 688  | 675   | 653  | 634   | 623  | 680  |
| 75°  | 360  | 356   | 345  | 332   | 336  | 384  |
| 85°  | 88   | 86    | 84   | 77    | 75   | 98   |
| 90°  | 2    | 22    | 37   | 47    | 50   | 12   |
| 95°  | 121  | 60    | 73   | 82    | 80   | 143  |
| 105° | 567  | 623   | 114  | 134   | 142  | 605  |
| 115° | 1072 | 1103  | 1150 | 287   | 153  | 1055 |
| 125° | 1515 | 1540  | 1575 | 1588  | 1594 | 1351 |
| 135° | 1875 | 1905  | 1922 | 1940  | 1936 | 1448 |
| 145° | 2175 | 2173  | 2205 | 2218  | 2208 | 1360 |
| 155° | 2395 | 2378  | 2401 | 2412  | 2397 | 1104 |
| 165° | 2524 | 2512  | 2518 | 2531  | 2518 | 713  |
| 175° | 2581 | 2568  | 2572 | 2585  | 2566 | 246  |
| 180° | 2576 | 2576  | 2576 | 2576  | 2576 |      |

TEST NUMBER: P924191

CATALOG NUMBER: DFN2DIP-4P4F0-060D080US950-FLLONL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2227.2 | 2227.2 | 2227.2 | 2227.2 | 2227.2 |
| 2.5°   | 2240.2 | 2229.5 | 2205.8 | 2227.2 | 2223.1 |
| 5°     | 2227.2 | 2218.8 | 2195.2 | 2212.2 | 2208.1 |
| 7.5°   | 2212.2 | 2199.5 | 2175.9 | 2193.2 | 2188.9 |
| 10°    | 2188.9 | 2173.9 | 2148.1 | 2165.2 | 2158.8 |
| 12.5°  | 2156.6 | 2143.8 | 2118.2 | 2128.9 | 2124.6 |
| 15°    | 2120.2 | 2107.5 | 2079.5 | 2088.2 | 2077.5 |
| 17.5°  | 2075.2 | 2062.5 | 2034.6 | 2045.2 | 2034.6 |
| 20°    | 2025.9 | 2013.2 | 1983.2 | 1989.6 | 1981.2 |
| 22.5°  | 1976.9 | 1957.5 | 1929.6 | 1929.6 | 1925.3 |
| 25°    | 1918.9 | 1901.9 | 1865.5 | 1869.6 | 1865.5 |
| 27.5°  | 1854.6 | 1839.6 | 1811.8 | 1805.5 | 1794.9 |
| 30°    | 1790.6 | 1773.2 | 1741.2 | 1734.8 | 1726.2 |
| 32.5°  | 1721.9 | 1709.2 | 1674.8 | 1661.9 | 1653.3 |
| 35°    | 1655.6 | 1634.2 | 1599.9 | 1586.9 | 1576.2 |
| 37.5°  | 1580.6 | 1561.2 | 1527.0 | 1511.9 | 1501.2 |
| 40°    | 1503.5 | 1486.2 | 1452.0 | 1432.9 | 1424.2 |
| 42.5°  | 1428.5 | 1411.3 | 1377.2 | 1355.6 | 1342.9 |
| 45°    | 1347.2 | 1332.2 | 1299.9 | 1276.5 | 1267.9 |
| 47.5°  | 1267.9 | 1252.9 | 1218.6 | 1195.0 | 1182.2 |
| 50°    | 1184.3 | 1173.6 | 1143.7 | 1113.6 | 1102.9 |
| 52.5°  | 1102.9 | 1087.9 | 1060.2 | 1036.6 | 1021.6 |
| 55°    | 1019.5 | 1006.6 | 980.9  | 955.2  | 944.6  |
| 57.5°  | 936.0  | 925.3  | 897.3  | 871.7  | 863.0  |
| 60°    | 852.3  | 843.9  | 814.0  | 790.3  | 783.9  |
| 62.5°  | 770.9  | 755.9  | 734.6  | 713.2  | 704.6  |
| 65°    | 687.5  | 674.7  | 653.3  | 633.9  | 623.2  |
| 67.5°  | 601.9  | 591.0  | 571.9  | 556.9  | 548.3  |
| 70°    | 522.6  | 514.0  | 494.6  | 479.7  | 471.3  |
| 72.5°  | 441.2  | 432.6  | 422.0  | 407.0  | 400.6  |
| 75°    | 359.7  | 355.7  | 344.7  | 332.0  | 336.3  |
| 77.5°  | 287.0  | 278.4  | 274.0  | 267.7  | 261.3  |
| 80°    | 214.3  | 212.0  | 207.7  | 201.3  | 197.0  |
| 82.5°  | 145.7  | 145.7  | 143.6  | 135.0  | 135.0  |
| 85°    | 87.7   | 85.7   | 83.6   | 77.0   | 75.0   |
| 87.5°  | 38.6   | 34.3   | 30.0   | 23.7   | 21.4   |
| 90°    | 1.8    | 22.3   | 37.2   | 46.7   | 50.3   |
| 92.5°  | 46.7   | 39.2   | 44.7   | 48.5   | 50.3   |
| 95°    | 121.1  | 59.5   | 72.6   | 82.1   | 80.1   |
| 97.5°  | 218.0  | 65.3   | 94.9   | 100.7  | 102.5  |
| 100°   | 330.0  | 74.6   | 106.3  | 121.1  | 124.8  |
| 102.5° | 452.9  | 449.2  | 110.0  | 130.3  | 136.1  |
| 105°   | 566.6  | 622.6  | 113.7  | 134.1  | 141.7  |
| 107.5° | 698.9  | 745.4  | 117.5  | 137.9  | 145.4  |
| 110°   | 825.8  | 864.7  | 326.3  | 139.9  | 147.2  |

TEST NUMBER: P924191

CATALOG NUMBER: DFN2DIP-4P4F0-060D080US950-FLLONL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 945.0  | 978.4  | 946.8  | 143.4  | 149.2  |
| 115°   | 1071.6 | 1103.3 | 1150.0 | 287.1  | 152.9  |
| 117.5° | 1181.6 | 1218.8 | 1250.7 | 984.0  | 495.8  |
| 120°   | 1304.7 | 1332.5 | 1366.2 | 1388.5 | 1136.9 |
| 122.5° | 1408.9 | 1438.8 | 1476.2 | 1487.3 | 1489.3 |
| 125°   | 1515.1 | 1539.5 | 1574.9 | 1587.9 | 1593.5 |
| 127.5° | 1612.1 | 1638.2 | 1666.4 | 1684.9 | 1686.7 |
| 130°   | 1703.5 | 1733.3 | 1753.7 | 1774.3 | 1772.5 |
| 132.5° | 1796.7 | 1821.0 | 1841.4 | 1858.2 | 1856.4 |
| 135°   | 1875.0 | 1904.9 | 1921.5 | 1940.3 | 1936.5 |
| 137.5° | 1956.9 | 1979.3 | 1998.1 | 2016.7 | 2011.1 |
| 140°   | 2037.0 | 2052.1 | 2072.5 | 2089.3 | 2079.9 |
| 142.5° | 2104.3 | 2117.3 | 2141.4 | 2156.3 | 2147.0 |
| 145°   | 2175.1 | 2173.1 | 2204.8 | 2217.9 | 2208.5 |
| 147.5° | 2236.5 | 2230.9 | 2262.5 | 2271.9 | 2264.5 |
| 150°   | 2296.2 | 2283.1 | 2313.0 | 2324.0 | 2314.8 |
| 152.5° | 2346.5 | 2331.6 | 2359.4 | 2370.8 | 2357.7 |
| 155°   | 2394.9 | 2378.3 | 2400.6 | 2411.7 | 2396.9 |
| 157.5° | 2434.0 | 2419.2 | 2436.0 | 2449.1 | 2434.0 |
| 160°   | 2467.7 | 2456.5 | 2467.7 | 2478.8 | 2465.7 |
| 162.5° | 2497.4 | 2486.3 | 2495.6 | 2508.6 | 2491.8 |
| 165°   | 2523.5 | 2512.5 | 2518.0 | 2531.0 | 2518.0 |
| 167.5° | 2544.0 | 2532.8 | 2538.5 | 2551.6 | 2534.8 |
| 170°   | 2560.9 | 2549.6 | 2553.4 | 2566.5 | 2549.6 |
| 172.5° | 2572.0 | 2560.9 | 2564.6 | 2577.7 | 2560.9 |
| 175°   | 2581.2 | 2568.2 | 2572.0 | 2585.0 | 2566.5 |
| 177.5° | 2585.0 | 2572.0 | 2573.9 | 2587.0 | 2570.2 |
| 180°   | 2575.7 | 2575.7 | 2575.7 | 2575.7 | 2575.7 |

TEST NUMBER: P924191

CATALOG NUMBER: DFN2DIP-4P4F0-060D080US950-FLLONL

**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 | 7.88             | 8.68  | 8.89  | 9.70  | 11.07 | 7.43           | 8.23  | 8.45  | 9.26  | 10.63 |
|                 | 3H   | 9.54             | 10.25 | 10.56 | 11.29 | 12.68 | 9.05           | 9.76  | 10.07 | 10.80 | 12.19 |
|                 | 4H   | 10.12            | 10.81 | 11.16 | 11.84 | 13.24 | 9.63           | 10.31 | 10.67 | 11.35 | 12.74 |
|                 | 6H   | 10.53            | 11.15 | 11.57 | 12.19 | 13.60 | 10.03          | 10.65 | 11.07 | 11.69 | 13.10 |
|                 | 8H   | 10.63            | 11.23 | 11.69 | 12.29 | 13.69 | 10.13          | 10.73 | 11.18 | 11.78 | 13.19 |
|                 | 12H  | 10.68            | 11.25 | 11.74 | 12.30 | 13.73 | 10.17          | 10.74 | 11.23 | 11.79 | 13.22 |
| 4H              | 2H   | 8.33             | 9.01  | 9.37  | 10.05 | 11.44 | 7.98           | 8.66  | 9.02  | 9.69  | 11.09 |
|                 | 3H   | 10.20            | 10.76 | 11.25 | 11.83 | 13.24 | 9.79           | 10.36 | 10.84 | 11.42 | 12.83 |
|                 | 4H   | 10.91            | 11.43 | 11.97 | 12.49 | 13.92 | 10.49          | 11.01 | 11.55 | 12.06 | 13.50 |
|                 | 6H   | 11.43            | 11.88 | 12.50 | 12.96 | 14.38 | 11.00          | 11.44 | 12.07 | 12.52 | 13.95 |
|                 | 8H   | 11.58            | 12.00 | 12.65 | 13.07 | 14.51 | 11.14          | 11.56 | 12.21 | 12.63 | 14.08 |
|                 | 12H  | 11.65            | 12.03 | 12.74 | 13.12 | 14.56 | 11.20          | 11.58 | 12.29 | 12.67 | 14.11 |
| 8H              | 4H   | 11.11            | 11.52 | 12.17 | 12.59 | 14.04 | 10.73          | 11.15 | 11.80 | 12.22 | 13.66 |
|                 | 6H   | 11.74            | 12.09 | 12.83 | 13.20 | 14.64 | 11.36          | 11.70 | 12.45 | 12.82 | 14.25 |
|                 | 8H   | 11.96            | 12.27 | 13.06 | 13.36 | 14.82 | 11.57          | 11.88 | 12.67 | 12.97 | 14.43 |
|                 | 12H  | 12.10            | 12.36 | 13.20 | 13.46 | 14.95 | 11.69          | 11.95 | 12.79 | 13.04 | 14.54 |
| 12H             | 4H   | 11.09            | 11.47 | 12.18 | 12.55 | 14.00 | 10.72          | 11.10 | 11.81 | 12.18 | 13.63 |
|                 | 6H   | 11.77            | 12.07 | 12.87 | 13.17 | 14.63 | 11.40          | 11.70 | 12.50 | 12.80 | 14.26 |
|                 | 8H   | 12.01            | 12.28 | 13.12 | 13.37 | 14.87 | 11.63          | 11.90 | 12.74 | 12.99 | 14.49 |