

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: P928368

Luminaire Tested: DFN2DIP-HX4F0-090D090US927-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928368  
REPORT IS A COMBINATION OF REPORTS P900919 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D090US927-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

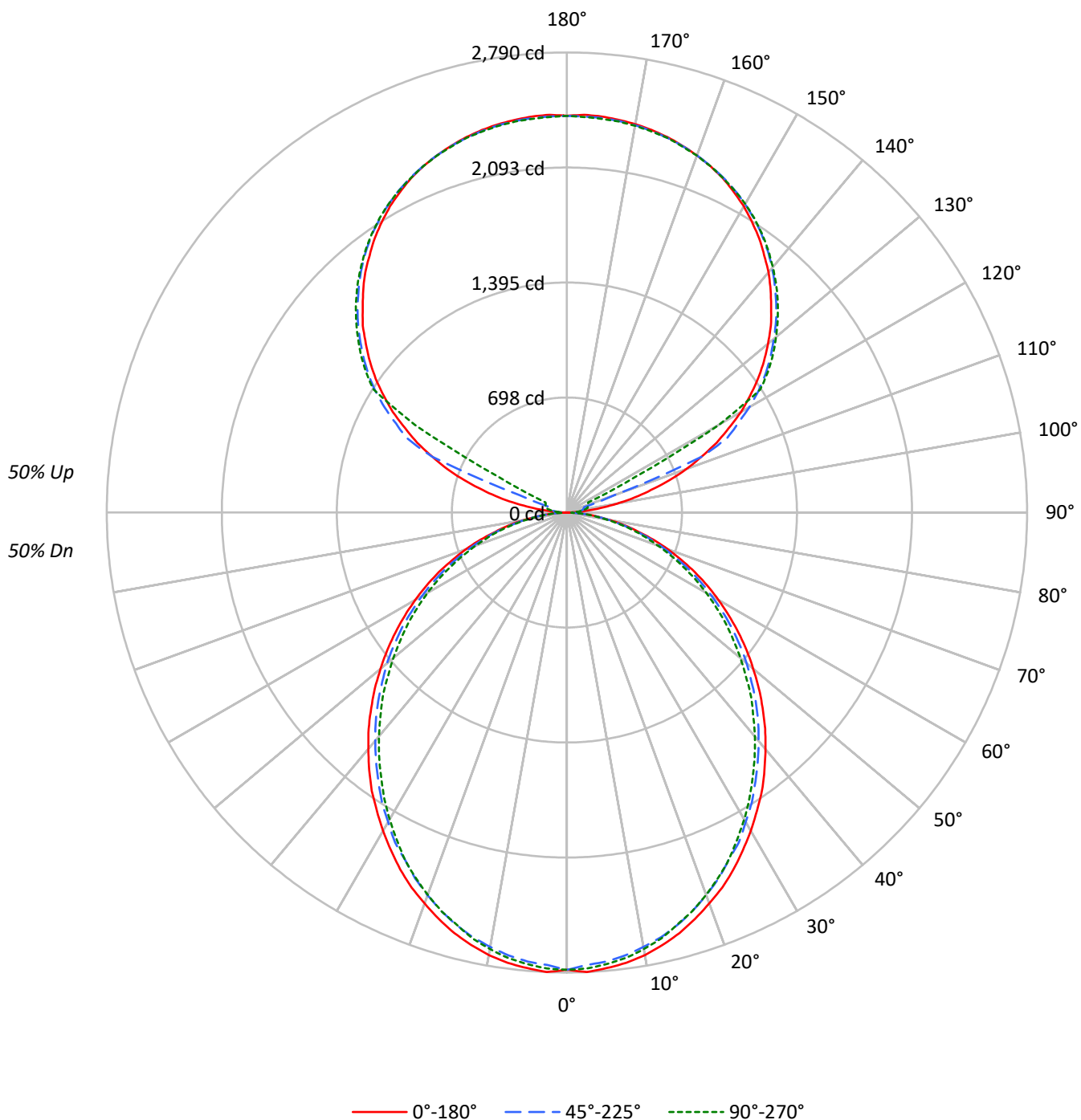
Lumens per Lamp: N/A  
Luminaire Lumens: 14113.5 lumens  
Efficiency: N/A  
Efficacy: 90.1 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 156.6  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9821  
Total Harmonic Distortion (THDi): 0.08  
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 | 99 | 99 | 99 | 99 | 83 | 83 | 83 | 69 | 69 | 69 | 56 | 56 | 56 |
| 1   | 98  | 93  | 90  | 86  | 90 | 86 | 83 | 80 | 73 | 71 | 68 | 61 | 59 | 58 | 50 | 48 | 47 |
| 2   | 89  | 82  | 75  | 70  | 82 | 76 | 70 | 66 | 64 | 60 | 57 | 53 | 51 | 48 | 44 | 42 | 40 |
| 3   | 81  | 72  | 64  | 59  | 75 | 66 | 60 | 55 | 56 | 52 | 48 | 47 | 44 | 41 | 39 | 36 | 34 |
| 4   | 74  | 64  | 56  | 50  | 68 | 59 | 52 | 47 | 50 | 45 | 41 | 42 | 38 | 35 | 35 | 32 | 29 |
| 5   | 68  | 57  | 48  | 42  | 63 | 53 | 45 | 40 | 45 | 39 | 35 | 38 | 34 | 30 | 31 | 28 | 26 |
| 6   | 63  | 51  | 43  | 37  | 58 | 47 | 40 | 35 | 40 | 35 | 31 | 34 | 30 | 27 | 28 | 25 | 23 |
| 7   | 58  | 46  | 38  | 32  | 53 | 43 | 36 | 30 | 37 | 31 | 27 | 31 | 27 | 23 | 26 | 23 | 20 |
| 8   | 54  | 42  | 34  | 29  | 50 | 39 | 32 | 27 | 33 | 28 | 24 | 28 | 24 | 21 | 24 | 20 | 18 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 29 | 24 | 31 | 25 | 21 | 26 | 22 | 19 | 22 | 19 | 16 |
| 10  | 47  | 35  | 28  | 23  | 43 | 33 | 26 | 22 | 28 | 23 | 19 | 24 | 20 | 17 | 20 | 17 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2062 | 2062 | 2062 |
| 5°  | 2066 | 2034 | 2047 |
| 10° | 2049 | 2007 | 2020 |
| 15° | 2019 | 1974 | 1977 |
| 20° | 1979 | 1928 | 1932 |
| 25° | 1938 | 1873 | 1881 |
| 30° | 1888 | 1822 | 1816 |
| 35° | 1840 | 1762 | 1747 |
| 40° | 1781 | 1702 | 1682 |
| 45° | 1722 | 1641 | 1615 |
| 50° | 1658 | 1577 | 1537 |
| 55° | 1590 | 1503 | 1466 |
| 60° | 1514 | 1416 | 1384 |
| 65° | 1431 | 1325 | 1288 |
| 70° | 1326 | 1215 | 1184 |
| 75° | 1179 | 1083 | 1088 |
| 80° | 1003 | 914  | 906  |
| 85° | 728  | 623  | 602  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1722 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 261.0   | 1.8       |
| 10°-20°   | 734.5   | 5.2       |
| 20°-30°   | 1079.4  | 7.6       |
| 30°-40°   | 1253.7  | 8.9       |
| 40°-50°   | 1252.1  | 8.9       |
| 50°-60°   | 1091.8  | 7.7       |
| 60°-70°   | 807.1   | 5.7       |
| 70°-80°   | 456.6   | 3.2       |
| 80°-90°   | 124.8   | 0.9       |
| 90°-100°  | 79.3    | 0.6       |
| 100°-110° | 295.7   | 2.1       |
| 110°-120° | 784.2   | 5.6       |
| 120°-130° | 1300.7  | 9.2       |
| 130°-140° | 1381.7  | 9.8       |
| 140°-150° | 1284.1  | 9.1       |
| 150°-160° | 1032.4  | 7.3       |
| 160°-170° | 665.2   | 4.7       |
| 170°-180° | 229.0   | 1.6       |
| 0°-30°    | 2074.9  | 14.7      |
| 0°-40°    | 3328.6  | 23.6      |
| 0°-60°    | 5672.5  | 40.2      |
| 0°-90°    | 7061.0  | 50.0      |
| 90°-120°  | 1159.3  | 8.2       |
| 90°-150°  | 5125.8  | 36.3      |
| 90°-180°  | 7052.0  | 50.0      |
| 0°-180°   | 14113.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2774 | 2774  | 2774 | 2774  | 2774 |      |
| 5°   | 2774 | 2763  | 2734 | 2755  | 2750 | 263  |
| 15°  | 2640 | 2624  | 2590 | 2600  | 2587 | 744  |
| 25°  | 2390 | 2368  | 2323 | 2328  | 2323 | 1100 |
| 35°  | 2062 | 2035  | 1992 | 1976  | 1963 | 1287 |
| 45°  | 1678 | 1659  | 1619 | 1590  | 1579 | 1295 |
| 55°  | 1270 | 1254  | 1222 | 1190  | 1176 | 1135 |
| 65°  | 856  | 840   | 814  | 790   | 776  | 847  |
| 75°  | 448  | 443   | 429  | 413   | 419  | 478  |
| 85°  | 109  | 107   | 104  | 96    | 93   | 122  |
| 90°  | 2    | 21    | 35   | 44    | 47   | 13   |
| 95°  | 113  | 56    | 68   | 77    | 75   | 134  |
| 105° | 529  | 582   | 106  | 125   | 132  | 565  |
| 115° | 1001 | 1030  | 1074 | 268   | 143  | 985  |
| 125° | 1415 | 1438  | 1471 | 1483  | 1488 | 1262 |
| 135° | 1751 | 1779  | 1795 | 1812  | 1809 | 1353 |
| 145° | 2032 | 2030  | 2059 | 2071  | 2063 | 1271 |
| 155° | 2237 | 2221  | 2242 | 2252  | 2239 | 1031 |
| 165° | 2357 | 2346  | 2352 | 2364  | 2352 | 666  |
| 175° | 2411 | 2399  | 2402 | 2414  | 2397 | 229  |
| 180° | 2406 | 2406  | 2406 | 2406  | 2406 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2773.5 | 2773.5 | 2773.5 | 2773.5 | 2773.5 |
| 2.5°   | 2789.7 | 2776.4 | 2747.0 | 2773.5 | 2768.4 |
| 5°     | 2773.5 | 2763.1 | 2733.7 | 2754.9 | 2749.7 |
| 7.5°   | 2754.9 | 2739.1 | 2709.6 | 2731.1 | 2725.7 |
| 10°    | 2725.7 | 2707.1 | 2675.1 | 2696.3 | 2688.4 |
| 12.5°  | 2685.5 | 2669.7 | 2637.8 | 2651.0 | 2645.7 |
| 15°    | 2640.3 | 2624.5 | 2589.6 | 2600.4 | 2587.1 |
| 17.5°  | 2584.2 | 2568.4 | 2533.6 | 2546.9 | 2533.6 |
| 20°    | 2522.8 | 2507.0 | 2469.6 | 2477.5 | 2467.1 |
| 22.5°  | 2461.7 | 2437.7 | 2402.8 | 2402.8 | 2397.5 |
| 25°    | 2389.5 | 2368.3 | 2323.1 | 2328.2 | 2323.1 |
| 27.5°  | 2309.5 | 2290.8 | 2256.3 | 2248.4 | 2235.1 |
| 30°    | 2229.7 | 2208.2 | 2168.3 | 2160.3 | 2149.6 |
| 32.5°  | 2144.3 | 2128.4 | 2085.7 | 2069.6 | 2058.8 |
| 35°    | 2061.7 | 2035.0 | 1992.3 | 1976.2 | 1962.9 |
| 37.5°  | 1968.3 | 1944.2 | 1901.4 | 1882.8 | 1869.5 |
| 40°    | 1872.3 | 1850.8 | 1808.1 | 1784.3 | 1773.6 |
| 42.5°  | 1778.9 | 1757.4 | 1715.0 | 1688.1 | 1672.3 |
| 45°    | 1677.6 | 1659.0 | 1618.8 | 1589.6 | 1578.9 |
| 47.5°  | 1578.9 | 1560.2 | 1517.5 | 1488.1 | 1472.2 |
| 50°    | 1474.8 | 1461.5 | 1424.1 | 1386.8 | 1373.5 |
| 52.5°  | 1373.5 | 1354.8 | 1320.3 | 1290.9 | 1272.2 |
| 55°    | 1269.7 | 1253.5 | 1221.5 | 1189.6 | 1176.3 |
| 57.5°  | 1165.5 | 1152.2 | 1117.4 | 1085.4 | 1074.7 |
| 60°    | 1061.4 | 1050.9 | 1013.5 | 984.1  | 976.2  |
| 62.5°  | 960.1  | 941.4  | 914.8  | 888.2  | 877.5  |
| 65°    | 856.2  | 840.1  | 813.5  | 789.5  | 776.2  |
| 67.5°  | 749.5  | 736.0  | 712.2  | 693.6  | 682.8  |
| 70°    | 650.8  | 640.0  | 616.0  | 597.3  | 586.9  |
| 72.5°  | 549.5  | 538.7  | 525.4  | 506.8  | 498.9  |
| 75°    | 448.0  | 442.8  | 429.3  | 413.4  | 418.8  |
| 77.5°  | 357.4  | 346.7  | 341.3  | 333.4  | 325.4  |
| 80°    | 266.8  | 264.0  | 258.6  | 250.7  | 245.4  |
| 82.5°  | 181.4  | 181.4  | 178.8  | 168.1  | 168.1  |
| 85°    | 109.2  | 106.7  | 104.1  | 95.9   | 93.4   |
| 87.5°  | 48.1   | 42.7   | 37.4   | 29.5   | 26.6   |
| 90°    | 1.7    | 20.9   | 34.7   | 43.6   | 46.9   |
| 92.5°  | 43.6   | 36.6   | 41.7   | 45.3   | 46.9   |
| 95°    | 113.1  | 55.6   | 67.8   | 76.7   | 74.8   |
| 97.5°  | 203.6  | 61.0   | 88.7   | 94.0   | 95.7   |
| 100°   | 308.2  | 69.7   | 99.2   | 113.1  | 116.6  |
| 102.5° | 422.9  | 419.6  | 102.7  | 121.7  | 127.1  |
| 105°   | 529.1  | 581.5  | 106.2  | 125.3  | 132.3  |
| 107.5° | 652.8  | 696.2  | 109.8  | 128.8  | 135.8  |
| 110°   | 771.2  | 807.6  | 304.7  | 130.6  | 137.5  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 882.6  | 913.8  | 884.3  | 133.9  | 139.3  |
| 115°   | 1000.9 | 1030.4 | 1074.0 | 268.1  | 142.8  |
| 117.5° | 1103.6 | 1138.3 | 1168.0 | 919.0  | 463.0  |
| 120°   | 1218.5 | 1244.5 | 1276.0 | 1296.8 | 1061.8 |
| 122.5° | 1315.9 | 1343.8 | 1378.7 | 1389.0 | 1390.9 |
| 125°   | 1415.1 | 1437.8 | 1470.9 | 1483.1 | 1488.2 |
| 127.5° | 1505.6 | 1530.0 | 1556.3 | 1573.6 | 1575.3 |
| 130°   | 1591.0 | 1618.9 | 1637.9 | 1657.1 | 1655.5 |
| 132.5° | 1678.0 | 1700.7 | 1719.7 | 1735.5 | 1733.8 |
| 135°   | 1751.2 | 1779.1 | 1794.6 | 1812.2 | 1808.7 |
| 137.5° | 1827.7 | 1848.5 | 1866.1 | 1883.5 | 1878.3 |
| 140°   | 1902.5 | 1916.6 | 1935.6 | 1951.3 | 1942.6 |
| 142.5° | 1965.3 | 1977.5 | 2000.0 | 2013.9 | 2005.3 |
| 145°   | 2031.5 | 2029.6 | 2059.2 | 2071.4 | 2062.7 |
| 147.5° | 2088.7 | 2083.6 | 2113.1 | 2121.8 | 2115.0 |
| 150°   | 2144.6 | 2132.4 | 2160.3 | 2170.6 | 2161.9 |
| 152.5° | 2191.5 | 2177.6 | 2203.7 | 2214.2 | 2202.0 |
| 155°   | 2236.8 | 2221.2 | 2242.1 | 2252.4 | 2238.6 |
| 157.5° | 2273.4 | 2259.5 | 2275.2 | 2287.4 | 2273.4 |
| 160°   | 2304.7 | 2294.2 | 2304.7 | 2315.1 | 2302.9 |
| 162.5° | 2332.4 | 2322.1 | 2330.8 | 2343.0 | 2327.3 |
| 165°   | 2356.8 | 2346.5 | 2351.7 | 2363.9 | 2351.7 |
| 167.5° | 2376.1 | 2365.5 | 2370.9 | 2383.0 | 2367.4 |
| 170°   | 2391.8 | 2381.2 | 2384.7 | 2396.9 | 2381.2 |
| 172.5° | 2402.1 | 2391.8 | 2395.2 | 2407.4 | 2391.8 |
| 175°   | 2410.8 | 2398.6 | 2402.1 | 2414.3 | 2396.9 |
| 177.5° | 2414.3 | 2402.1 | 2404.0 | 2416.2 | 2400.5 |
| 180°   | 2405.6 | 2405.6 | 2405.6 | 2405.6 | 2405.6 |



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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 | 9.79             | 10.65 | 10.75 | 11.62 | 12.90 | 9.36           | 10.22 | 10.32 | 11.19 | 12.46 |
|                 | 3H   | 11.45            | 12.22 | 12.42 | 13.21 | 14.50 | 10.98          | 11.75 | 11.95 | 12.73 | 14.03 |
|                 | 4H   | 12.04            | 12.77 | 13.02 | 13.76 | 15.06 | 11.57          | 12.30 | 12.55 | 13.28 | 14.58 |
|                 | 6H   | 12.44            | 13.11 | 13.43 | 14.11 | 15.42 | 11.97          | 12.64 | 12.96 | 13.63 | 14.94 |
|                 | 8H   | 12.55            | 13.19 | 13.54 | 14.19 | 15.51 | 12.07          | 12.71 | 13.07 | 13.72 | 15.03 |
|                 | 12H  | 12.59            | 13.21 | 13.60 | 14.21 | 15.54 | 12.11          | 12.72 | 13.12 | 13.72 | 15.06 |
| 4H              | 2H   | 10.25            | 10.98 | 11.24 | 11.97 | 13.27 | 9.91           | 10.64 | 10.90 | 11.62 | 12.93 |
|                 | 3H   | 12.12            | 12.73 | 13.12 | 13.74 | 15.06 | 11.73          | 12.34 | 12.72 | 13.35 | 14.67 |
|                 | 4H   | 12.84            | 13.39 | 13.84 | 14.40 | 15.74 | 12.43          | 12.99 | 13.43 | 14.00 | 15.33 |
|                 | 6H   | 13.35            | 13.83 | 14.37 | 14.86 | 16.20 | 12.94          | 13.42 | 13.96 | 14.45 | 15.79 |
|                 | 8H   | 13.50            | 13.95 | 14.52 | 14.97 | 16.33 | 13.09          | 13.54 | 14.11 | 14.56 | 15.91 |
|                 | 12H  | 13.58            | 13.98 | 14.61 | 15.02 | 16.38 | 13.15          | 13.56 | 14.19 | 14.60 | 15.95 |
| 8H              | 4H   | 13.03            | 13.48 | 14.05 | 14.51 | 15.86 | 12.67          | 13.12 | 13.69 | 14.15 | 15.50 |
|                 | 6H   | 13.67            | 14.04 | 14.71 | 15.10 | 16.45 | 13.30          | 13.67 | 14.34 | 14.74 | 16.09 |
|                 | 8H   | 13.89            | 14.21 | 14.94 | 15.26 | 16.63 | 13.52          | 13.84 | 14.57 | 14.90 | 16.26 |
|                 | 12H  | 14.02            | 14.31 | 15.07 | 15.35 | 16.76 | 13.63          | 13.92 | 14.69 | 14.97 | 16.38 |
| 12H             | 4H   | 13.02            | 13.42 | 14.05 | 14.46 | 15.82 | 12.67          | 13.07 | 13.70 | 14.11 | 15.47 |
|                 | 6H   | 13.70            | 14.02 | 14.75 | 15.07 | 16.44 | 13.34          | 13.67 | 14.39 | 14.72 | 16.09 |
|                 | 8H   | 13.94            | 14.23 | 14.99 | 15.27 | 16.68 | 13.58          | 13.87 | 14.63 | 14.91 | 16.32 |