

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: P928036

Luminaire Tested: DFN2DIP-HX4F0-090D070US850-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928036  
REPORT IS A COMBINATION OF REPORTS P900883 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D070US850-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

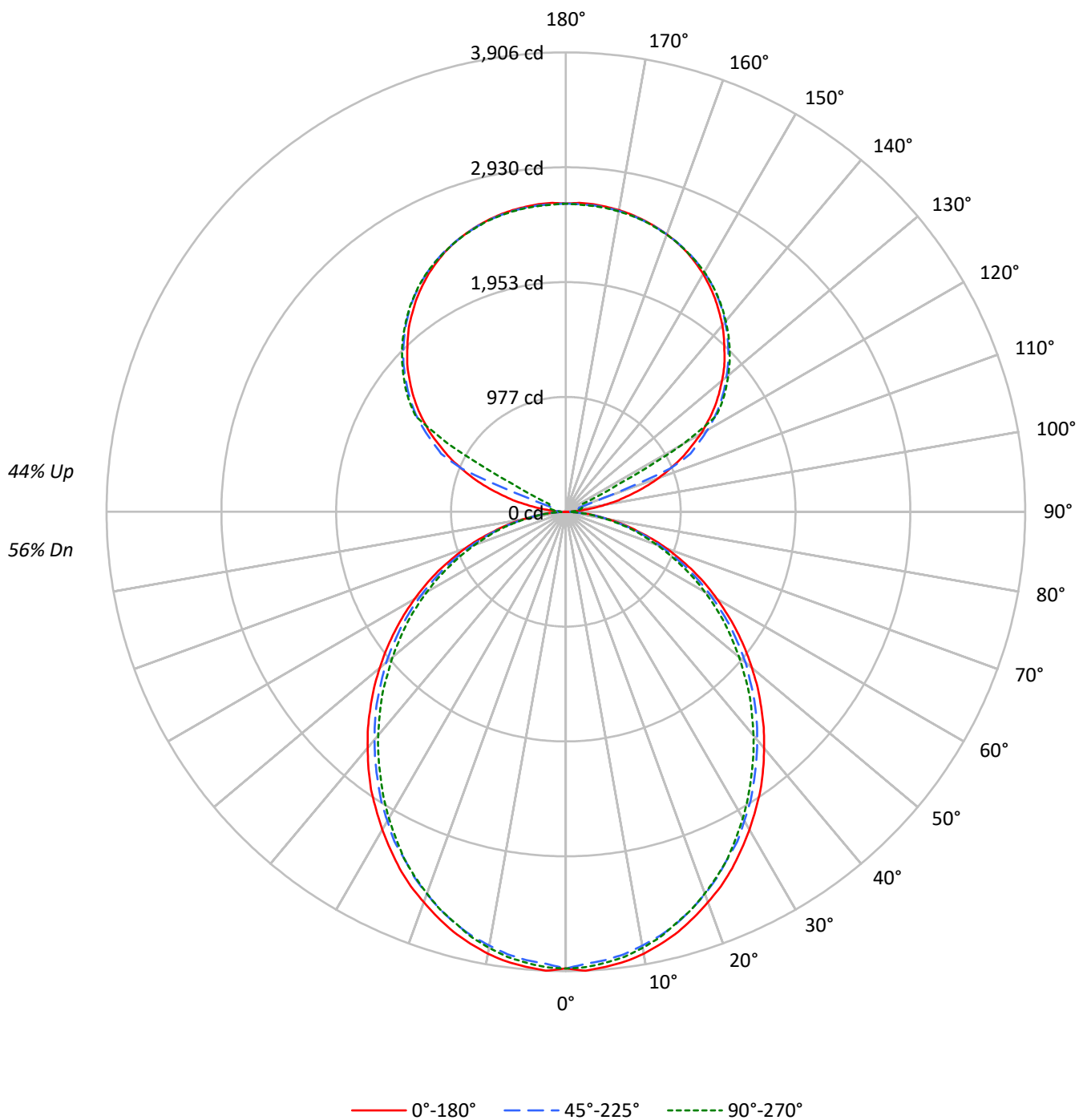
Lumens per Lamp: N/A  
Luminaire Lumens: 17566.6 lumens  
Efficiency: N/A  
Efficacy: 124.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 140.7  
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 |    |  |    |    | 0  |
| RW  | 70  | 50  | 30  | 10  |  | 70  | 50  | 30  | 10  |  | 50 | 30 | 10 |  | 50 | 30 | 10 |  | 50 | 30 | 10 |
| RCR |     |     |     |     |  |     |     |     |     |  |    |    |    |  |    |    |    |  |    |    |    |
| 0   | 109 | 109 | 109 | 109 |  | 101 | 101 | 101 | 101 |  | 87 | 87 | 87 |  | 74 | 74 | 74 |  | 62 | 62 | 62 |
| 1   | 99  | 95  | 91  | 87  |  | 92  | 88  | 85  | 82  |  | 76 | 74 | 71 |  | 65 | 63 | 62 |  | 55 | 53 | 52 |
| 2   | 90  | 83  | 77  | 71  |  | 84  | 77  | 72  | 67  |  | 67 | 63 | 59 |  | 57 | 54 | 51 |  | 48 | 46 | 44 |
| 3   | 82  | 73  | 65  | 59  |  | 76  | 68  | 61  | 56  |  | 59 | 54 | 50 |  | 51 | 47 | 44 |  | 43 | 40 | 38 |
| 4   | 75  | 64  | 56  | 50  |  | 70  | 60  | 53  | 48  |  | 52 | 47 | 42 |  | 45 | 41 | 37 |  | 38 | 35 | 32 |
| 5   | 69  | 58  | 49  | 43  |  | 64  | 54  | 46  | 41  |  | 47 | 41 | 37 |  | 40 | 36 | 32 |  | 34 | 31 | 28 |
| 6   | 64  | 52  | 43  | 38  |  | 59  | 48  | 41  | 36  |  | 42 | 36 | 32 |  | 37 | 32 | 28 |  | 31 | 28 | 25 |
| 7   | 59  | 47  | 39  | 33  |  | 55  | 44  | 37  | 31  |  | 38 | 33 | 28 |  | 33 | 29 | 25 |  | 29 | 25 | 22 |
| 8   | 55  | 42  | 35  | 29  |  | 51  | 40  | 33  | 28  |  | 35 | 29 | 25 |  | 30 | 26 | 22 |  | 26 | 23 | 20 |
| 9   | 51  | 39  | 31  | 26  |  | 48  | 36  | 30  | 25  |  | 32 | 26 | 23 |  | 28 | 23 | 20 |  | 24 | 21 | 18 |
| 10  | 48  | 36  | 28  | 23  |  | 44  | 34  | 27  | 22  |  | 30 | 24 | 20 |  | 26 | 21 | 18 |  | 22 | 19 | 16 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2888 | 2888 | 2888 |
| 5°  | 2893 | 2848 | 2867 |
| 10° | 2869 | 2810 | 2828 |
| 15° | 2827 | 2764 | 2768 |
| 20° | 2771 | 2700 | 2706 |
| 25° | 2714 | 2623 | 2634 |
| 30° | 2643 | 2552 | 2543 |
| 35° | 2576 | 2468 | 2447 |
| 40° | 2494 | 2383 | 2355 |
| 45° | 2411 | 2298 | 2261 |
| 50° | 2321 | 2209 | 2152 |
| 55° | 2227 | 2105 | 2052 |
| 60° | 2120 | 1983 | 1938 |
| 65° | 2004 | 1856 | 1803 |
| 70° | 1856 | 1701 | 1658 |
| 75° | 1651 | 1516 | 1524 |
| 80° | 1405 | 1280 | 1268 |
| 85° | 1019 | 872  | 844  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2411 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 365.5   | 2.1       |
| 10°-20°   | 1028.5  | 5.9       |
| 20°-30°   | 1511.4  | 8.6       |
| 30°-40°   | 1755.4  | 10.0      |
| 40°-50°   | 1753.3  | 10.0      |
| 50°-60°   | 1528.8  | 8.7       |
| 60°-70°   | 1130.1  | 6.4       |
| 70°-80°   | 639.4   | 3.6       |
| 80°-90°   | 173.4   | 1.0       |
| 90°-100°  | 86.4    | 0.5       |
| 100°-110° | 322.1   | 1.8       |
| 110°-120° | 854.1   | 4.9       |
| 120°-130° | 1416.6  | 8.1       |
| 130°-140° | 1504.8  | 8.6       |
| 140°-150° | 1398.5  | 8.0       |
| 150°-160° | 1124.4  | 6.4       |
| 160°-170° | 724.5   | 4.1       |
| 170°-180° | 249.4   | 1.4       |
| 0°-30°    | 2905.4  | 16.5      |
| 0°-40°    | 4660.9  | 26.5      |
| 0°-60°    | 7942.9  | 45.2      |
| 0°-90°    | 9885.8  | 56.3      |
| 90°-120°  | 1262.6  | 7.2       |
| 90°-150°  | 5582.5  | 31.8      |
| 90°-180°  | 7681.0  | 43.7      |
| 0°-180°   | 17566.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3884 | 3884  | 3884 | 3884  | 3884 |      |
| 5°   | 3884 | 3869  | 3828 | 3858  | 3850 | 369  |
| 15°  | 3697 | 3675  | 3626 | 3641  | 3622 | 1041 |
| 25°  | 3346 | 3316  | 3253 | 3260  | 3253 | 1540 |
| 35°  | 2887 | 2850  | 2790 | 2767  | 2748 | 1803 |
| 45°  | 2349 | 2323  | 2267 | 2226  | 2211 | 1813 |
| 55°  | 1778 | 1755  | 1710 | 1666  | 1647 | 1589 |
| 65°  | 1199 | 1176  | 1139 | 1106  | 1087 | 1185 |
| 75°  | 627  | 620   | 601  | 579   | 586  | 670  |
| 85°  | 153  | 149   | 146  | 134   | 131  | 171  |
| 90°  | 2    | 23    | 38   | 48    | 51   | 16   |
| 95°  | 123  | 61    | 74   | 84    | 82   | 146  |
| 105° | 576  | 633   | 116  | 136   | 144  | 616  |
| 115° | 1090 | 1122  | 1170 | 292   | 156  | 1073 |
| 125° | 1541 | 1566  | 1602 | 1615  | 1621 | 1375 |
| 135° | 1907 | 1938  | 1954 | 1974  | 1970 | 1473 |
| 145° | 2212 | 2210  | 2243 | 2256  | 2246 | 1384 |
| 155° | 2436 | 2419  | 2442 | 2453  | 2438 | 1123 |
| 165° | 2567 | 2556  | 2561 | 2574  | 2561 | 725  |
| 175° | 2626 | 2612  | 2616 | 2629  | 2610 | 250  |
| 180° | 2620 | 2620  | 2620 | 2620  | 2620 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3883.6 | 3883.6 | 3883.6 | 3883.6 | 3883.6 |
| 2.5°   | 3906.2 | 3887.6 | 3846.5 | 3883.6 | 3876.5 |
| 5°     | 3883.6 | 3869.0 | 3827.8 | 3857.5 | 3850.3 |
| 7.5°   | 3857.5 | 3835.4 | 3794.1 | 3824.3 | 3816.7 |
| 10°    | 3816.7 | 3790.6 | 3745.8 | 3775.5 | 3764.4 |
| 12.5°  | 3760.4 | 3738.2 | 3693.5 | 3712.0 | 3704.6 |
| 15°    | 3697.1 | 3674.9 | 3626.1 | 3641.2 | 3622.5 |
| 17.5°  | 3618.6 | 3596.4 | 3547.7 | 3566.3 | 3547.7 |
| 20°    | 3532.6 | 3510.4 | 3458.1 | 3469.2 | 3454.5 |
| 22.5°  | 3447.0 | 3413.4 | 3364.6 | 3364.6 | 3357.1 |
| 25°    | 3346.0 | 3316.2 | 3252.9 | 3260.0 | 3252.9 |
| 27.5°  | 3233.8 | 3207.7 | 3159.4 | 3148.3 | 3129.7 |
| 30°    | 3122.2 | 3092.0 | 3036.1 | 3025.0 | 3010.0 |
| 32.5°  | 3002.5 | 2980.3 | 2920.4 | 2897.9 | 2882.8 |
| 35°    | 2886.8 | 2849.6 | 2789.7 | 2767.2 | 2748.5 |
| 37.5°  | 2756.1 | 2722.4 | 2662.5 | 2636.4 | 2617.8 |
| 40°    | 2621.7 | 2591.6 | 2531.7 | 2498.5 | 2483.5 |
| 42.5°  | 2490.9 | 2460.9 | 2401.4 | 2363.8 | 2341.7 |
| 45°    | 2349.1 | 2323.0 | 2266.7 | 2225.9 | 2210.9 |
| 47.5°  | 2210.9 | 2184.7 | 2124.8 | 2083.7 | 2061.5 |
| 50°    | 2065.1 | 2046.4 | 1994.1 | 1941.9 | 1923.2 |
| 52.5°  | 1923.2 | 1897.1 | 1848.7 | 1807.6 | 1781.4 |
| 55°    | 1777.8 | 1755.2 | 1710.4 | 1665.7 | 1647.1 |
| 57.5°  | 1632.0 | 1613.4 | 1564.7 | 1519.9 | 1504.8 |
| 60°    | 1486.2 | 1471.5 | 1419.2 | 1378.0 | 1367.0 |
| 62.5°  | 1344.3 | 1318.2 | 1280.9 | 1243.7 | 1228.7 |
| 65°    | 1198.9 | 1176.3 | 1139.1 | 1105.5 | 1086.8 |
| 67.5°  | 1049.6 | 1030.6 | 997.2  | 971.2  | 956.1  |
| 70°    | 911.3  | 896.2  | 862.6  | 836.4  | 821.8  |
| 72.5°  | 769.4  | 754.3  | 735.7  | 709.6  | 698.6  |
| 75°    | 627.3  | 620.0  | 601.1  | 578.9  | 586.4  |
| 77.5°  | 500.4  | 485.4  | 477.9  | 466.8  | 455.7  |
| 80°    | 373.6  | 369.6  | 362.1  | 351.0  | 343.6  |
| 82.5°  | 254.0  | 254.0  | 250.4  | 235.3  | 235.3  |
| 85°    | 152.9  | 149.4  | 145.8  | 134.3  | 130.8  |
| 87.5°  | 67.3   | 59.8   | 52.3   | 41.3   | 37.3   |
| 90°    | 1.8    | 22.7   | 37.8   | 47.5   | 51.1   |
| 92.5°  | 47.5   | 39.8   | 45.5   | 49.4   | 51.1   |
| 95°    | 123.1  | 60.6   | 73.9   | 83.5   | 81.5   |
| 97.5°  | 221.7  | 66.4   | 96.6   | 102.5  | 104.2  |
| 100°   | 335.7  | 75.9   | 108.0  | 123.1  | 127.0  |
| 102.5° | 460.6  | 457.0  | 111.9  | 132.6  | 138.4  |
| 105°   | 576.3  | 633.2  | 115.7  | 136.4  | 144.1  |
| 107.5° | 710.9  | 758.2  | 119.6  | 140.3  | 147.9  |
| 110°   | 840.0  | 879.5  | 331.8  | 142.3  | 149.7  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 961.3  | 995.2  | 963.1  | 145.8  | 151.7  |
| 115°   | 1090.0 | 1122.2 | 1169.7 | 292.0  | 155.6  |
| 117.5° | 1201.9 | 1239.8 | 1272.1 | 1000.9 | 504.3  |
| 120°   | 1327.0 | 1355.4 | 1389.7 | 1412.4 | 1156.5 |
| 122.5° | 1433.0 | 1463.4 | 1501.6 | 1512.8 | 1514.8 |
| 125°   | 1541.2 | 1565.9 | 1602.0 | 1615.3 | 1620.8 |
| 127.5° | 1639.8 | 1666.3 | 1694.9 | 1713.8 | 1715.6 |
| 130°   | 1732.7 | 1763.1 | 1783.8 | 1804.8 | 1803.0 |
| 132.5° | 1827.5 | 1852.3 | 1873.0 | 1890.1 | 1888.3 |
| 135°   | 1907.1 | 1937.5 | 1954.5 | 1973.6 | 1969.8 |
| 137.5° | 1990.4 | 2013.3 | 2032.4 | 2051.3 | 2045.7 |
| 140°   | 2071.9 | 2087.2 | 2108.0 | 2125.1 | 2115.6 |
| 142.5° | 2140.4 | 2153.7 | 2178.2 | 2193.3 | 2183.8 |
| 145°   | 2212.5 | 2210.5 | 2242.6 | 2255.9 | 2246.5 |
| 147.5° | 2274.8 | 2269.2 | 2301.4 | 2310.8 | 2303.4 |
| 150°   | 2335.6 | 2322.4 | 2352.7 | 2363.9 | 2354.5 |
| 152.5° | 2386.7 | 2371.6 | 2400.0 | 2411.4 | 2398.2 |
| 155°   | 2436.0 | 2419.1 | 2441.8 | 2453.1 | 2438.0 |
| 157.5° | 2475.8 | 2460.8 | 2477.8 | 2491.1 | 2475.8 |
| 160°   | 2510.1 | 2498.6 | 2510.1 | 2521.3 | 2508.0 |
| 162.5° | 2540.3 | 2529.0 | 2538.4 | 2551.7 | 2534.6 |
| 165°   | 2566.8 | 2555.6 | 2561.1 | 2574.4 | 2561.1 |
| 167.5° | 2587.7 | 2576.2 | 2582.1 | 2595.4 | 2578.3 |
| 170°   | 2604.8 | 2593.4 | 2597.2 | 2610.5 | 2593.4 |
| 172.5° | 2616.1 | 2604.8 | 2608.7 | 2621.9 | 2604.8 |
| 175°   | 2625.6 | 2612.2 | 2616.1 | 2629.3 | 2610.5 |
| 177.5° | 2629.3 | 2616.1 | 2618.1 | 2631.4 | 2614.2 |
| 180°   | 2619.9 | 2619.9 | 2619.9 | 2619.9 | 2619.9 |

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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 | 11.52            | 12.44 | 12.42 | 13.36 | 14.54 | 11.09          | 12.01 | 11.99 | 12.93 | 14.11 |
|                 | 3H   | 13.18            | 14.01 | 14.10 | 14.94 | 16.14 | 12.71          | 13.54 | 13.62 | 14.47 | 15.67 |
|                 | 4H   | 13.77            | 14.56 | 14.70 | 15.49 | 16.70 | 13.30          | 14.08 | 14.23 | 15.02 | 16.23 |
|                 | 6H   | 14.18            | 14.90 | 15.12 | 15.84 | 17.07 | 13.70          | 14.42 | 14.64 | 15.36 | 16.59 |
|                 | 8H   | 14.28            | 14.97 | 15.23 | 15.93 | 17.15 | 13.81          | 14.50 | 14.76 | 15.45 | 16.68 |
|                 | 12H  | 14.34            | 14.99 | 15.29 | 15.94 | 17.19 | 13.85          | 14.51 | 14.81 | 15.46 | 16.71 |
| 4H              | 2H   | 11.99            | 12.77 | 12.92 | 13.70 | 14.92 | 11.64          | 12.42 | 12.58 | 13.36 | 14.57 |
|                 | 3H   | 13.86            | 14.51 | 14.80 | 15.48 | 16.70 | 13.47          | 14.12 | 14.41 | 15.08 | 16.31 |
|                 | 4H   | 14.58            | 15.17 | 15.53 | 16.13 | 17.39 | 14.17          | 14.77 | 15.13 | 15.73 | 16.98 |
|                 | 6H   | 15.10            | 15.61 | 16.06 | 16.59 | 17.85 | 14.69          | 15.20 | 15.65 | 16.18 | 17.44 |
|                 | 8H   | 15.25            | 15.73 | 16.22 | 16.71 | 17.97 | 14.84          | 15.32 | 15.81 | 16.29 | 17.56 |
|                 | 12H  | 15.32            | 15.76 | 16.31 | 16.75 | 18.02 | 14.90          | 15.34 | 15.89 | 16.33 | 17.60 |
| 8H              | 4H   | 14.78            | 15.26 | 15.75 | 16.24 | 17.50 | 14.42          | 14.90 | 15.39 | 15.88 | 17.14 |
|                 | 6H   | 15.41            | 15.81 | 16.41 | 16.83 | 18.09 | 15.05          | 15.45 | 16.05 | 16.47 | 17.73 |
|                 | 8H   | 15.64            | 15.99 | 16.64 | 16.99 | 18.28 | 15.27          | 15.62 | 16.27 | 16.63 | 17.91 |
|                 | 12H  | 15.77            | 16.08 | 16.78 | 17.08 | 18.41 | 15.39          | 15.70 | 16.39 | 16.70 | 18.03 |
| 12H             | 4H   | 14.77            | 15.20 | 15.76 | 16.20 | 17.47 | 14.42          | 14.85 | 15.40 | 15.84 | 17.11 |
|                 | 6H   | 15.45            | 15.80 | 16.45 | 16.80 | 18.09 | 15.09          | 15.44 | 16.10 | 16.45 | 17.73 |
|                 | 8H   | 15.69            | 16.00 | 16.70 | 17.00 | 18.33 | 15.33          | 15.64 | 16.34 | 16.64 | 17.97 |