

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: P928032

Luminaire Tested: DFN2DIP-HX4F0-090D060US850-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928032  
REPORT IS A COMBINATION OF REPORTS P900865 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D060US850-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

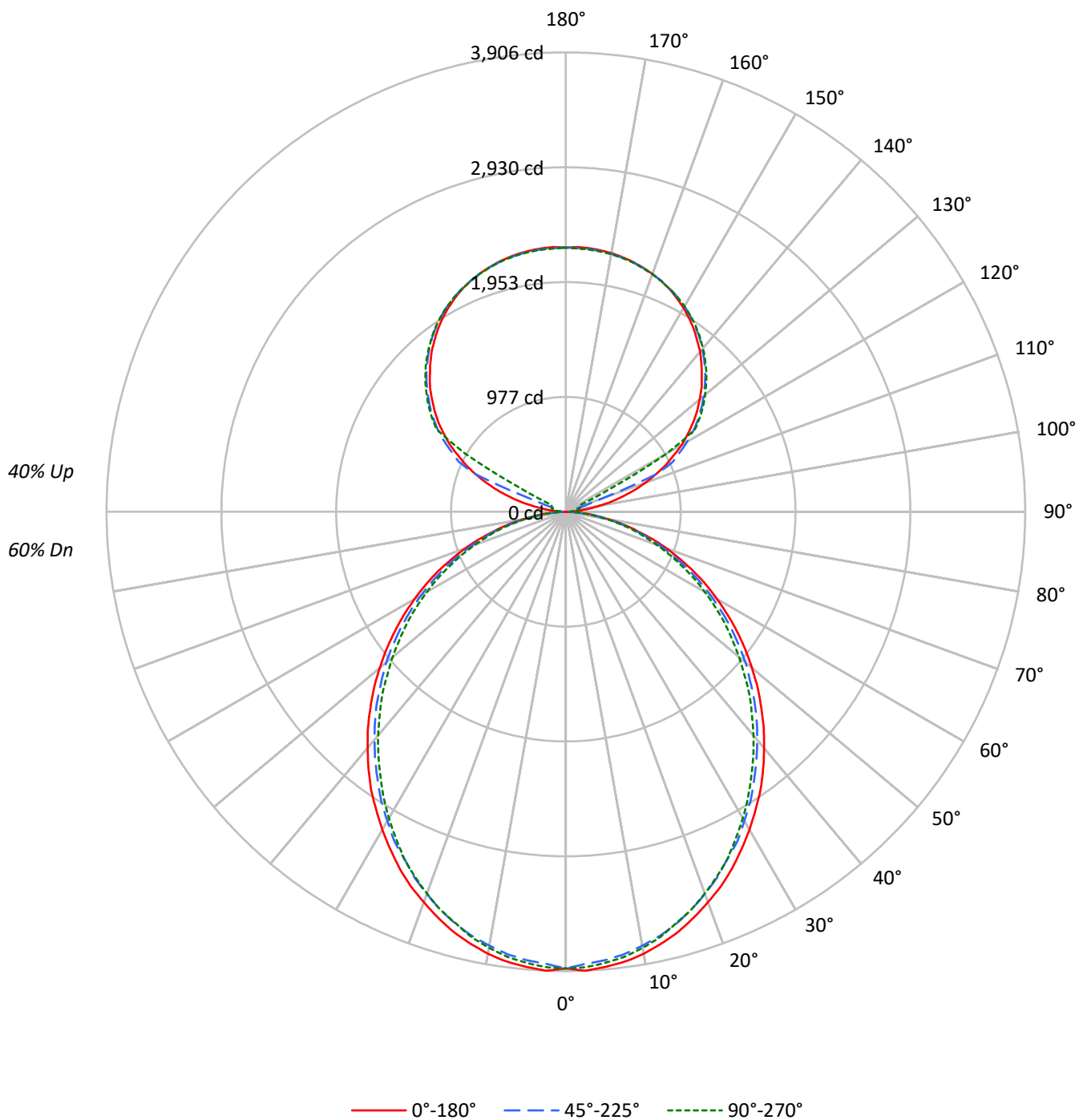
Lumens per Lamp: N/A  
Luminaire Lumens: 16468.6 lumens  
Efficiency: N/A  
Efficacy: 124.1 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 132.7  
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   | 110 | 110 | 110 | 110 |  | 102 | 102 | 102 | 102 |  | 89 | 89 | 89 |  | 77 | 77 | 77 |  | 65 | 65 | 65 |
| 1   | 100 | 96  | 92  | 88  |  | 93  | 90  | 86  | 83  |  | 78 | 75 | 73 |  | 67 | 66 | 64 |  | 58 | 56 | 55 |
| 2   | 91  | 84  | 77  | 72  |  | 85  | 78  | 73  | 68  |  | 68 | 64 | 61 |  | 59 | 56 | 53 |  | 51 | 49 | 47 |
| 3   | 83  | 73  | 66  | 60  |  | 77  | 69  | 62  | 57  |  | 60 | 55 | 51 |  | 52 | 48 | 45 |  | 45 | 42 | 40 |
| 4   | 76  | 65  | 57  | 51  |  | 71  | 61  | 54  | 48  |  | 54 | 48 | 44 |  | 47 | 42 | 39 |  | 40 | 37 | 34 |
| 5   | 70  | 58  | 50  | 44  |  | 65  | 55  | 47  | 42  |  | 48 | 42 | 38 |  | 42 | 37 | 34 |  | 36 | 33 | 30 |
| 6   | 64  | 52  | 44  | 38  |  | 60  | 49  | 42  | 36  |  | 43 | 37 | 33 |  | 38 | 33 | 30 |  | 33 | 29 | 26 |
| 7   | 60  | 47  | 39  | 33  |  | 56  | 44  | 37  | 32  |  | 39 | 33 | 29 |  | 35 | 30 | 26 |  | 30 | 26 | 23 |
| 8   | 55  | 43  | 35  | 30  |  | 52  | 40  | 33  | 28  |  | 36 | 30 | 26 |  | 32 | 27 | 23 |  | 28 | 24 | 21 |
| 9   | 52  | 39  | 32  | 26  |  | 48  | 37  | 30  | 25  |  | 33 | 27 | 23 |  | 29 | 24 | 21 |  | 26 | 22 | 19 |
| 10  | 48  | 36  | 29  | 24  |  | 45  | 34  | 27  | 23  |  | 30 | 25 | 21 |  | 27 | 22 | 19 |  | 24 | 20 | 17 |

**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   | 2.2       |
| 10°-20°   | 1028.5  | 6.2       |
| 20°-30°   | 1511.4  | 9.2       |
| 30°-40°   | 1755.4  | 10.7      |
| 40°-50°   | 1753.3  | 10.6      |
| 50°-60°   | 1528.8  | 9.3       |
| 60°-70°   | 1130.1  | 6.9       |
| 70°-80°   | 639.4   | 3.9       |
| 80°-90°   | 172.7   | 1.0       |
| 90°-100°  | 74.1    | 0.4       |
| 100°-110° | 276.0   | 1.7       |
| 110°-120° | 732.1   | 4.4       |
| 120°-130° | 1214.2  | 7.4       |
| 130°-140° | 1289.8  | 7.8       |
| 140°-150° | 1198.7  | 7.3       |
| 150°-160° | 963.8   | 5.9       |
| 160°-170° | 621.0   | 3.8       |
| 170°-180° | 213.7   | 1.3       |
| <hr/>     |         |           |
| 0°-30°    | 2905.4  | 17.6      |
| 0°-40°    | 4660.9  | 28.3      |
| 0°-60°    | 7942.9  | 48.2      |
| 0°-90°    | 9885.2  | 60.0      |
| 90°-120°  | 1082.2  | 6.6       |
| 90°-150°  | 4785.0  | 29.1      |
| 90°-180°  | 6583.0  | 40.0      |
| 0°-180°   | 16468.6 | 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    | 20    | 32   | 41    | 44   | 15   |
| 95°  | 106  | 52    | 63   | 72    | 70   | 125  |
| 105° | 494  | 543   | 99   | 117   | 124  | 528  |
| 115° | 934  | 962   | 1003 | 250   | 133  | 920  |
| 125° | 1321 | 1342  | 1373 | 1384  | 1389 | 1178 |
| 135° | 1635 | 1661  | 1675 | 1692  | 1688 | 1263 |
| 145° | 1896 | 1895  | 1922 | 1934  | 1926 | 1186 |
| 155° | 2088 | 2074  | 2093 | 2103  | 2090 | 962  |
| 165° | 2200 | 2190  | 2195 | 2207  | 2195 | 622  |
| 175° | 2250 | 2239  | 2242 | 2254  | 2238 | 214  |
| 180° | 2246 | 2246  | 2246 | 2246  | 2246 |      |

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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°    | 1.6    | 19.5   | 32.4   | 40.7   | 43.8   |
| 92.5°  | 40.7   | 34.2   | 38.9   | 42.3   | 43.8   |
| 95°    | 105.6  | 51.9   | 63.3   | 71.6   | 69.9   |
| 97.5°  | 190.1  | 56.9   | 82.7   | 87.8   | 89.4   |
| 100°   | 287.7  | 65.0   | 92.6   | 105.6  | 108.8  |
| 102.5° | 394.8  | 391.7  | 95.9   | 113.7  | 118.7  |
| 105°   | 493.9  | 542.7  | 99.1   | 116.9  | 123.5  |
| 107.5° | 609.4  | 649.9  | 102.5  | 120.2  | 126.8  |
| 110°   | 720.0  | 753.9  | 284.5  | 122.0  | 128.3  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 823.9  | 853.0  | 825.4  | 125.0  | 130.1  |
| 115°   | 934.3  | 961.9  | 1002.6 | 250.3  | 133.3  |
| 117.5° | 1030.2 | 1062.6 | 1090.4 | 857.9  | 432.2  |
| 120°   | 1137.5 | 1161.8 | 1191.2 | 1210.6 | 991.2  |
| 122.5° | 1228.3 | 1254.4 | 1287.0 | 1296.6 | 1298.4 |
| 125°   | 1321.0 | 1342.2 | 1373.1 | 1384.5 | 1389.2 |
| 127.5° | 1405.5 | 1428.3 | 1452.8 | 1469.0 | 1470.5 |
| 130°   | 1485.2 | 1511.2 | 1529.0 | 1546.9 | 1545.4 |
| 132.5° | 1566.5 | 1587.6 | 1605.4 | 1620.0 | 1618.5 |
| 135°   | 1634.8 | 1660.8 | 1675.3 | 1691.7 | 1688.3 |
| 137.5° | 1706.1 | 1725.6 | 1742.0 | 1758.2 | 1753.4 |
| 140°   | 1776.0 | 1789.1 | 1806.9 | 1821.5 | 1813.4 |
| 142.5° | 1834.6 | 1846.0 | 1867.1 | 1880.0 | 1871.9 |
| 145°   | 1896.4 | 1894.6 | 1922.2 | 1933.7 | 1925.6 |
| 147.5° | 1949.8 | 1945.0 | 1972.6 | 1980.7 | 1974.4 |
| 150°   | 2002.0 | 1990.5 | 2016.6 | 2026.3 | 2018.2 |
| 152.5° | 2045.8 | 2032.8 | 2057.1 | 2067.0 | 2055.5 |
| 155°   | 2088.0 | 2073.5 | 2093.0 | 2102.7 | 2089.7 |
| 157.5° | 2122.2 | 2109.2 | 2123.8 | 2135.3 | 2122.2 |
| 160°   | 2151.5 | 2141.6 | 2151.5 | 2161.1 | 2149.8 |
| 162.5° | 2177.3 | 2167.7 | 2175.7 | 2187.2 | 2172.5 |
| 165°   | 2200.1 | 2190.5 | 2195.3 | 2206.7 | 2195.3 |
| 167.5° | 2218.0 | 2208.2 | 2213.2 | 2224.7 | 2209.9 |
| 170°   | 2232.7 | 2222.9 | 2226.2 | 2237.5 | 2222.9 |
| 172.5° | 2242.4 | 2232.7 | 2236.0 | 2247.4 | 2232.7 |
| 175°   | 2250.5 | 2239.1 | 2242.4 | 2253.7 | 2237.5 |
| 177.5° | 2253.7 | 2242.4 | 2244.1 | 2255.5 | 2240.8 |
| 180°   | 2245.6 | 2245.6 | 2245.6 | 2245.6 | 2245.6 |

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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 | 11.83            | 12.79 | 12.70 | 13.68 | 14.80 | 11.40          | 12.36 | 12.27 | 13.25 | 14.37 |
|                 | 3H   | 13.50            | 14.36 | 14.38 | 15.26 | 16.41 | 13.03          | 13.89 | 13.91 | 14.79 | 15.93 |
|                 | 4H   | 14.10            | 14.91 | 14.99 | 15.81 | 16.97 | 13.62          | 14.44 | 14.52 | 15.34 | 16.50 |
|                 | 6H   | 14.50            | 15.25 | 15.41 | 16.16 | 17.33 | 14.03          | 14.78 | 14.93 | 15.69 | 16.86 |
|                 | 8H   | 14.61            | 15.32 | 15.52 | 16.25 | 17.42 | 14.13          | 14.85 | 15.05 | 15.78 | 16.94 |
|                 | 12H  | 14.66            | 15.34 | 15.58 | 16.26 | 17.46 | 14.18          | 14.86 | 15.10 | 15.78 | 16.98 |
| 4H              | 2H   | 12.31            | 13.12 | 13.21 | 14.02 | 15.18 | 11.96          | 12.78 | 12.86 | 13.68 | 14.84 |
|                 | 3H   | 14.18            | 14.86 | 15.09 | 15.80 | 16.97 | 13.79          | 14.47 | 14.70 | 15.40 | 16.58 |
|                 | 4H   | 14.90            | 15.52 | 15.82 | 16.45 | 17.65 | 14.50          | 15.12 | 15.42 | 16.05 | 17.24 |
|                 | 6H   | 15.42            | 15.96 | 16.36 | 16.91 | 18.11 | 15.02          | 15.55 | 15.95 | 16.50 | 17.70 |
|                 | 8H   | 15.58            | 16.08 | 16.51 | 17.03 | 18.24 | 15.17          | 15.67 | 16.10 | 16.61 | 17.82 |
|                 | 12H  | 15.66            | 16.11 | 16.61 | 17.07 | 18.29 | 15.23          | 15.68 | 16.19 | 16.65 | 17.87 |
| 8H              | 4H   | 15.11            | 15.61 | 16.05 | 16.56 | 17.77 | 14.75          | 15.25 | 15.69 | 16.20 | 17.41 |
|                 | 6H   | 15.75            | 16.16 | 16.71 | 17.15 | 18.36 | 15.38          | 15.80 | 16.35 | 16.79 | 18.00 |
|                 | 8H   | 15.97            | 16.33 | 16.94 | 17.31 | 18.54 | 15.60          | 15.96 | 16.57 | 16.94 | 18.17 |
|                 | 12H  | 16.10            | 16.43 | 17.08 | 17.40 | 18.68 | 15.72          | 16.04 | 16.70 | 17.01 | 18.29 |
| 12H             | 4H   | 15.10            | 15.55 | 16.06 | 16.52 | 17.73 | 14.75          | 15.20 | 15.70 | 16.16 | 17.38 |
|                 | 6H   | 15.78            | 16.14 | 16.75 | 17.12 | 18.35 | 15.42          | 15.79 | 16.40 | 16.77 | 18.00 |
|                 | 8H   | 16.02            | 16.35 | 17.00 | 17.32 | 18.59 | 15.67          | 15.99 | 16.64 | 16.96 | 18.24 |