

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: P904096

Luminaire Tested: DFN2DIP-SQ4F0-100D100US830-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P904096  
REPORT IS A COMBINATION OF REPORTS P900139 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-100D100US830-FLLFLL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

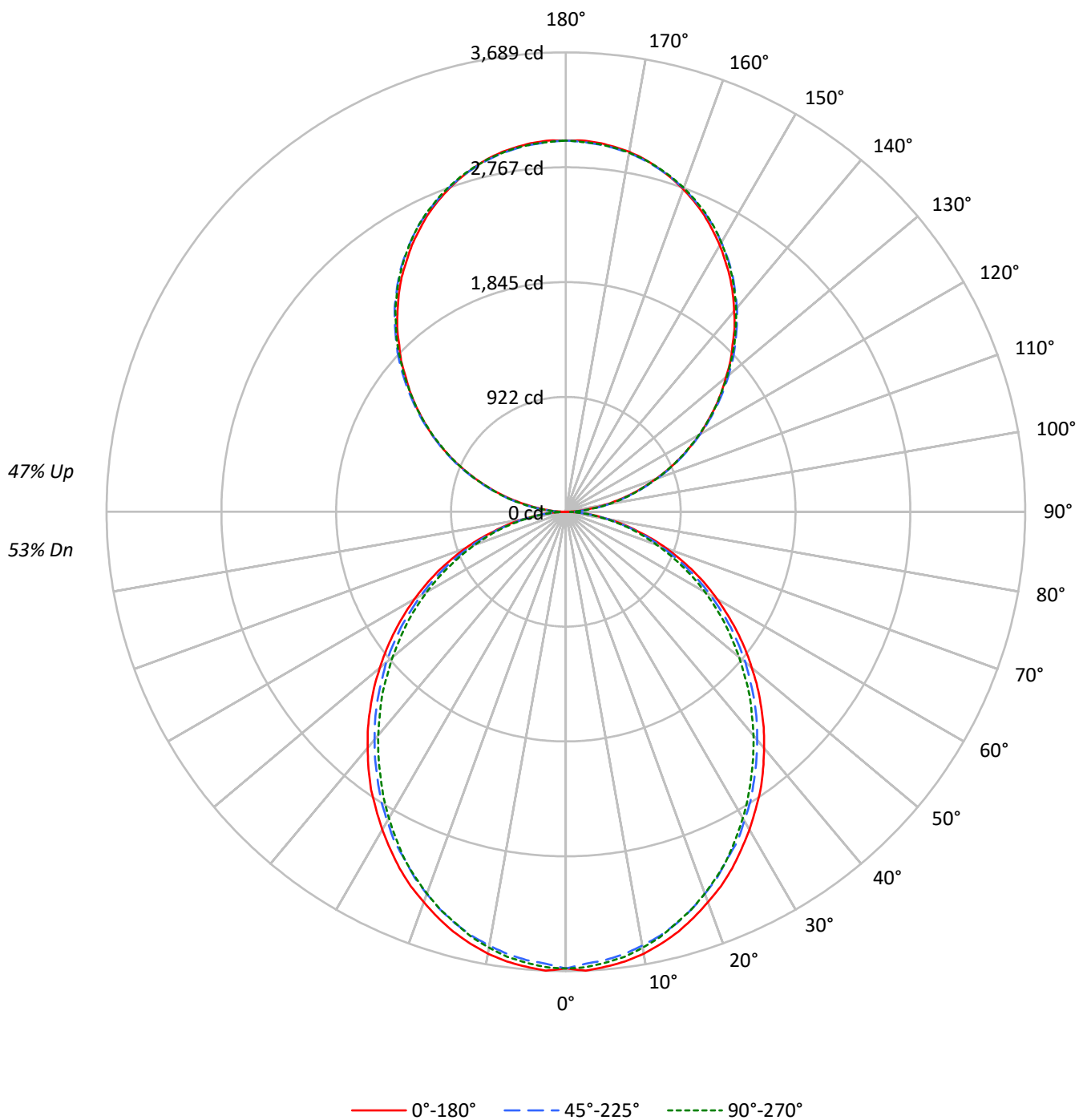
Lumens per Lamp: N/A  
Luminaire Lumens: 17672.7 lumens  
Efficiency: N/A  
Efficacy: 105.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 167.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9968  
Total Harmonic Distortion (THDi): 0.064  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P904096

CATALOG NUMBER: DFN2DIP-SQ4F0-100D100US830-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P904096

CATALOG NUMBER: DFN2DIP-SQ4F0-100D100US830-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   | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 71 | 71 | 71 | 59 | 59 | 59 |
| 1   | 98  | 94  | 90  | 87  | 91  | 87  | 84  | 81  | 74 | 72 | 70 | 63 | 61 | 59 | 52 | 51 | 50 |
| 2   | 90  | 82  | 76  | 71  | 83  | 76  | 71  | 66  | 65 | 61 | 58 | 55 | 52 | 50 | 46 | 44 | 42 |
| 3   | 82  | 72  | 65  | 59  | 75  | 67  | 61  | 55  | 58 | 53 | 49 | 49 | 45 | 42 | 41 | 38 | 36 |
| 4   | 75  | 64  | 56  | 50  | 69  | 60  | 52  | 47  | 51 | 46 | 41 | 43 | 39 | 36 | 36 | 33 | 31 |
| 5   | 69  | 57  | 49  | 43  | 63  | 53  | 46  | 40  | 46 | 40 | 36 | 39 | 35 | 31 | 33 | 29 | 27 |
| 6   | 63  | 51  | 43  | 37  | 58  | 48  | 40  | 35  | 41 | 36 | 31 | 35 | 31 | 27 | 30 | 26 | 24 |
| 7   | 59  | 46  | 38  | 33  | 54  | 43  | 36  | 31  | 37 | 32 | 28 | 32 | 28 | 24 | 27 | 24 | 21 |
| 8   | 54  | 42  | 34  | 29  | 50  | 39  | 32  | 27  | 34 | 29 | 24 | 29 | 25 | 22 | 25 | 21 | 19 |
| 9   | 51  | 38  | 31  | 26  | 47  | 36  | 29  | 24  | 31 | 26 | 22 | 27 | 23 | 19 | 23 | 20 | 17 |
| 10  | 47  | 35  | 28  | 23  | 44  | 33  | 26  | 22  | 29 | 23 | 20 | 25 | 21 | 18 | 21 | 18 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2573 | 2573 | 2573 |
| 5°  | 2577 | 2538 | 2555 |
| 10° | 2557 | 2504 | 2522 |
| 15° | 2519 | 2464 | 2468 |
| 20° | 2468 | 2407 | 2413 |
| 25° | 2418 | 2339 | 2350 |
| 30° | 2354 | 2276 | 2270 |
| 35° | 2294 | 2201 | 2184 |
| 40° | 2220 | 2126 | 2103 |
| 45° | 2147 | 2050 | 2020 |
| 50° | 2066 | 1971 | 1924 |
| 55° | 1982 | 1879 | 1836 |
| 60° | 1886 | 1770 | 1735 |
| 65° | 1782 | 1658 | 1616 |
| 70° | 1650 | 1520 | 1488 |
| 75° | 1466 | 1356 | 1371 |
| 80° | 1245 | 1147 | 1145 |
| 85° | 900  | 785  | 770  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2347 cd/sqm

TEST NUMBER: P904096

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 345.2   | 2.0       |
| 10°-20°   | 971.2   | 5.5       |
| 20°-30°   | 1427.3  | 8.1       |
| 30°-40°   | 1657.7  | 9.4       |
| 40°-50°   | 1655.7  | 9.4       |
| 50°-60°   | 1443.7  | 8.2       |
| 60°-70°   | 1067.2  | 6.0       |
| 70°-80°   | 603.8   | 3.4       |
| 80°-90°   | 167.9   | 0.9       |
| 90°-100°  | 184.5   | 1.0       |
| 100°-110° | 586.1   | 3.3       |
| 110°-120° | 1003.0  | 5.7       |
| 120°-130° | 1319.1  | 7.5       |
| 130°-140° | 1480.6  | 8.4       |
| 140°-150° | 1451.9  | 8.2       |
| 150°-160° | 1217.9  | 6.9       |
| 160°-170° | 807.7   | 4.6       |
| 170°-180° | 282.3   | 1.6       |
| 0°-30°    | 2743.7  | 15.5      |
| 0°-40°    | 4401.4  | 24.9      |
| 0°-60°    | 7500.8  | 42.4      |
| 0°-90°    | 9339.7  | 52.8      |
| 90°-120°  | 1773.5  | 10.0      |
| 90°-150°  | 6025.1  | 34.1      |
| 90°-180°  | 8333.0  | 47.2      |
| 0°-180°   | 17672.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3668 | 3668  | 3668 | 3668  | 3668 |      |
| 5°   | 3668 | 3654  | 3615 | 3643  | 3636 | 348  |
| 15°  | 3491 | 3470  | 3424 | 3438  | 3421 | 983  |
| 25°  | 3160 | 3132  | 3072 | 3078  | 3072 | 1454 |
| 35°  | 2726 | 2691  | 2634 | 2613  | 2596 | 1702 |
| 45°  | 2218 | 2194  | 2140 | 2102  | 2088 | 1712 |
| 55°  | 1679 | 1658  | 1615 | 1573  | 1555 | 1501 |
| 65°  | 1132 | 1111  | 1076 | 1044  | 1026 | 1119 |
| 75°  | 592  | 586   | 568  | 547   | 554  | 632  |
| 85°  | 144  | 141   | 138  | 127   | 124  | 161  |
| 90°  | 3    | 32    | 88   | 83    | 85   | 17   |
| 95°  | 131  | 156   | 161  | 161   | 156  | 146  |
| 105° | 541  | 548   | 554  | 558   | 558  | 571  |
| 115° | 1006 | 1021  | 1016 | 1014  | 1006 | 996  |
| 125° | 1464 | 1486  | 1479 | 1471  | 1468 | 1308 |
| 135° | 1894 | 1921  | 1927 | 1924  | 1917 | 1464 |
| 145° | 2299 | 2317  | 2331 | 2334  | 2324 | 1436 |
| 155° | 2629 | 2636  | 2644 | 2656  | 2648 | 1210 |
| 165° | 2860 | 2857  | 2857 | 2875  | 2862 | 807  |
| 175° | 2976 | 2968  | 2963 | 2981  | 2966 | 283  |
| 180° | 2981 | 2981  | 2981 | 2981  | 2981 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3667.5 | 3667.5 | 3667.5 | 3667.5 | 3667.5 |
| 2.5°   | 3688.8 | 3671.2 | 3632.3 | 3667.5 | 3660.7 |
| 5°     | 3667.5 | 3653.7 | 3614.7 | 3642.8 | 3636.0 |
| 7.5°   | 3642.8 | 3621.8 | 3582.9 | 3611.4 | 3604.3 |
| 10°    | 3604.3 | 3579.6 | 3537.3 | 3565.4 | 3554.9 |
| 12.5°  | 3551.1 | 3530.2 | 3487.9 | 3505.5 | 3498.3 |
| 15°    | 3491.3 | 3470.3 | 3424.3 | 3438.5 | 3421.0 |
| 17.5°  | 3417.2 | 3396.3 | 3350.2 | 3367.8 | 3350.2 |
| 20°    | 3335.9 | 3315.0 | 3265.6 | 3276.1 | 3262.2 |
| 22.5°  | 3255.2 | 3223.4 | 3177.3 | 3177.3 | 3170.2 |
| 25°    | 3159.8 | 3131.7 | 3071.8 | 3078.5 | 3071.8 |
| 27.5°  | 3053.8 | 3029.1 | 2983.5 | 2973.1 | 2955.4 |
| 30°    | 2948.4 | 2919.9 | 2867.1 | 2856.7 | 2842.4 |
| 32.5°  | 2835.4 | 2814.4 | 2757.9 | 2736.6 | 2722.3 |
| 35°    | 2726.1 | 2691.0 | 2634.4 | 2613.1 | 2595.5 |
| 37.5°  | 2602.6 | 2570.8 | 2514.3 | 2489.6 | 2472.0 |
| 40°    | 2475.8 | 2447.3 | 2390.9 | 2359.5 | 2345.2 |
| 42.5°  | 2352.3 | 2323.8 | 2267.8 | 2232.2 | 2211.3 |
| 45°    | 2218.4 | 2193.7 | 2140.5 | 2102.0 | 2087.8 |
| 47.5°  | 2087.8 | 2063.1 | 2006.6 | 1967.7 | 1946.7 |
| 50°    | 1950.1 | 1932.5 | 1883.1 | 1833.7 | 1816.2 |
| 52.5°  | 1816.2 | 1791.5 | 1745.8 | 1706.9 | 1682.2 |
| 55°    | 1678.9 | 1657.6 | 1615.2 | 1572.9 | 1555.4 |
| 57.5°  | 1541.2 | 1523.5 | 1477.5 | 1435.3 | 1421.1 |
| 60°    | 1403.4 | 1389.6 | 1340.2 | 1301.3 | 1290.8 |
| 62.5°  | 1269.5 | 1244.8 | 1209.7 | 1174.5 | 1160.3 |
| 65°    | 1132.2 | 1110.9 | 1075.7 | 1043.9 | 1026.3 |
| 67.5°  | 991.2  | 973.2  | 941.8  | 917.1  | 902.9  |
| 70°    | 860.5  | 846.3  | 814.5  | 789.9  | 776.0  |
| 72.5°  | 726.6  | 712.4  | 694.8  | 670.1  | 659.6  |
| 75°    | 592.3  | 585.6  | 567.6  | 546.7  | 553.7  |
| 77.5°  | 472.6  | 458.4  | 451.2  | 440.7  | 430.3  |
| 80°    | 352.8  | 349.1  | 342.0  | 331.5  | 324.4  |
| 82.5°  | 239.9  | 239.9  | 236.5  | 222.3  | 222.3  |
| 85°    | 144.4  | 141.1  | 137.7  | 126.9  | 123.5  |
| 87.5°  | 63.6   | 56.5   | 49.4   | 38.9   | 35.2   |
| 90°    | 2.7    | 32.3   | 88.0   | 82.7   | 85.4   |
| 92.5°  | 55.7   | 75.5   | 78.2   | 80.9   | 80.9   |
| 95°    | 131.2  | 156.4  | 160.9  | 160.9  | 156.4  |
| 97.5°  | 218.4  | 241.8  | 251.7  | 251.7  | 251.7  |
| 100°   | 319.1  | 339.7  | 346.9  | 346.9  | 344.2  |
| 102.5° | 425.1  | 440.4  | 450.3  | 452.9  | 450.3  |
| 105°   | 541.0  | 548.2  | 553.6  | 558.1  | 558.1  |
| 107.5° | 656.0  | 666.8  | 666.8  | 668.6  | 656.0  |
| 110°   | 767.5  | 781.8  | 781.8  | 781.8  | 774.7  |



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CATALOG NUMBER: DFN2DIP-SQ4F0-100D100US830-FLLFLL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 887.9  | 903.1  | 900.5  | 893.2  | 887.9  |
| 115°   | 1006.5 | 1020.9 | 1016.4 | 1013.7 | 1006.5 |
| 117.5° | 1124.3 | 1144.1 | 1131.4 | 1124.3 | 1117.0 |
| 120°   | 1242.8 | 1262.6 | 1242.8 | 1242.8 | 1234.8 |
| 122.5° | 1350.7 | 1375.8 | 1363.3 | 1356.1 | 1350.7 |
| 125°   | 1464.0 | 1486.4 | 1479.2 | 1471.1 | 1468.5 |
| 127.5° | 1574.5 | 1602.3 | 1592.4 | 1581.7 | 1574.5 |
| 130°   | 1677.8 | 1710.1 | 1705.7 | 1700.3 | 1690.4 |
| 132.5° | 1793.8 | 1818.9 | 1820.7 | 1808.2 | 1800.9 |
| 135°   | 1893.5 | 1921.4 | 1926.7 | 1924.1 | 1916.8 |
| 137.5° | 2005.0 | 2027.4 | 2031.9 | 2030.1 | 2019.3 |
| 140°   | 2102.9 | 2125.3 | 2138.0 | 2138.0 | 2128.1 |
| 142.5° | 2203.6 | 2226.0 | 2233.2 | 2235.9 | 2226.0 |
| 145°   | 2298.8 | 2316.8 | 2331.2 | 2333.8 | 2323.9 |
| 147.5° | 2384.2 | 2406.7 | 2417.4 | 2422.0 | 2412.1 |
| 150°   | 2472.3 | 2487.6 | 2497.5 | 2505.5 | 2497.5 |
| 152.5° | 2550.4 | 2565.7 | 2578.3 | 2588.2 | 2578.3 |
| 155°   | 2628.7 | 2635.8 | 2643.9 | 2656.5 | 2648.4 |
| 157.5° | 2696.0 | 2701.4 | 2705.9 | 2723.9 | 2711.3 |
| 160°   | 2756.3 | 2761.6 | 2764.3 | 2779.6 | 2768.8 |
| 162.5° | 2812.0 | 2812.0 | 2814.6 | 2831.7 | 2819.1 |
| 165°   | 2859.6 | 2856.8 | 2856.8 | 2874.8 | 2862.3 |
| 167.5° | 2902.7 | 2894.6 | 2894.6 | 2912.6 | 2900.0 |
| 170°   | 2935.1 | 2927.9 | 2925.2 | 2943.2 | 2927.9 |
| 172.5° | 2957.5 | 2950.3 | 2947.6 | 2965.6 | 2950.3 |
| 175°   | 2975.5 | 2968.3 | 2963.0 | 2980.9 | 2965.6 |
| 177.5° | 2985.4 | 2978.2 | 2972.8 | 2988.0 | 2972.8 |
| 180°   | 2980.9 | 2980.9 | 2980.9 | 2980.9 | 2980.9 |

TEST NUMBER: P904096

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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 | 10.83            | 11.71 | 11.76 | 12.66 | 13.89 | 10.38          | 11.27 | 11.31 | 12.22 | 13.45 |
|                 | 3H   | 12.49            | 13.29 | 13.44 | 14.25 | 15.50 | 12.00          | 12.80 | 12.95 | 13.76 | 15.01 |
|                 | 4H   | 13.08            | 13.84 | 14.04 | 14.80 | 16.06 | 12.59          | 13.34 | 13.55 | 14.31 | 15.57 |
|                 | 6H   | 13.49            | 14.18 | 14.46 | 15.15 | 16.43 | 12.99          | 13.68 | 13.96 | 14.65 | 15.93 |
|                 | 8H   | 13.60            | 14.26 | 14.57 | 15.24 | 16.52 | 13.10          | 13.76 | 14.07 | 14.74 | 16.02 |
|                 | 12H  | 13.65            | 14.28 | 14.63 | 15.26 | 16.55 | 13.14          | 13.77 | 14.12 | 14.75 | 16.05 |
| 4H              | 2H   | 11.29            | 12.04 | 12.25 | 13.01 | 14.27 | 10.94          | 11.69 | 11.90 | 12.65 | 13.92 |
|                 | 3H   | 13.16            | 13.79 | 14.14 | 14.79 | 16.06 | 12.76          | 13.39 | 13.73 | 14.38 | 15.66 |
|                 | 4H   | 13.88            | 14.46 | 14.87 | 15.44 | 16.75 | 13.46          | 14.03 | 14.44 | 15.02 | 16.32 |
|                 | 6H   | 14.40            | 14.90 | 15.40 | 15.91 | 17.21 | 13.97          | 14.47 | 14.97 | 15.48 | 16.78 |
|                 | 8H   | 14.56            | 15.02 | 15.55 | 16.02 | 17.34 | 14.12          | 14.58 | 15.12 | 15.59 | 16.90 |
|                 | 12H  | 14.63            | 15.05 | 15.65 | 16.07 | 17.39 | 14.18          | 14.60 | 15.20 | 15.62 | 16.94 |
| 8H              | 4H   | 14.08            | 14.54 | 15.08 | 15.55 | 16.86 | 13.71          | 14.17 | 14.70 | 15.17 | 16.49 |
|                 | 6H   | 14.72            | 15.10 | 15.74 | 16.15 | 17.46 | 14.34          | 14.72 | 15.36 | 15.76 | 17.08 |
|                 | 8H   | 14.94            | 15.28 | 15.97 | 16.31 | 17.64 | 14.55          | 14.89 | 15.58 | 15.92 | 17.25 |
|                 | 12H  | 15.08            | 15.38 | 16.11 | 16.40 | 17.78 | 14.67          | 14.97 | 15.70 | 15.99 | 17.37 |
| 12H             | 4H   | 14.07            | 14.49 | 15.08 | 15.51 | 16.83 | 13.70          | 14.12 | 14.72 | 15.14 | 16.46 |
|                 | 6H   | 14.75            | 15.09 | 15.78 | 16.12 | 17.45 | 14.38          | 14.72 | 15.41 | 15.75 | 17.08 |
|                 | 8H   | 15.00            | 15.29 | 16.03 | 16.32 | 17.69 | 14.62          | 14.91 | 15.65 | 15.94 | 17.31 |