

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: P906868

Luminaire Tested: DFN2DIP-SQ4F0-110D120US835-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P906868  
REPORT IS A COMBINATION OF REPORTS P900177 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-110D120US835-FLLFLL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

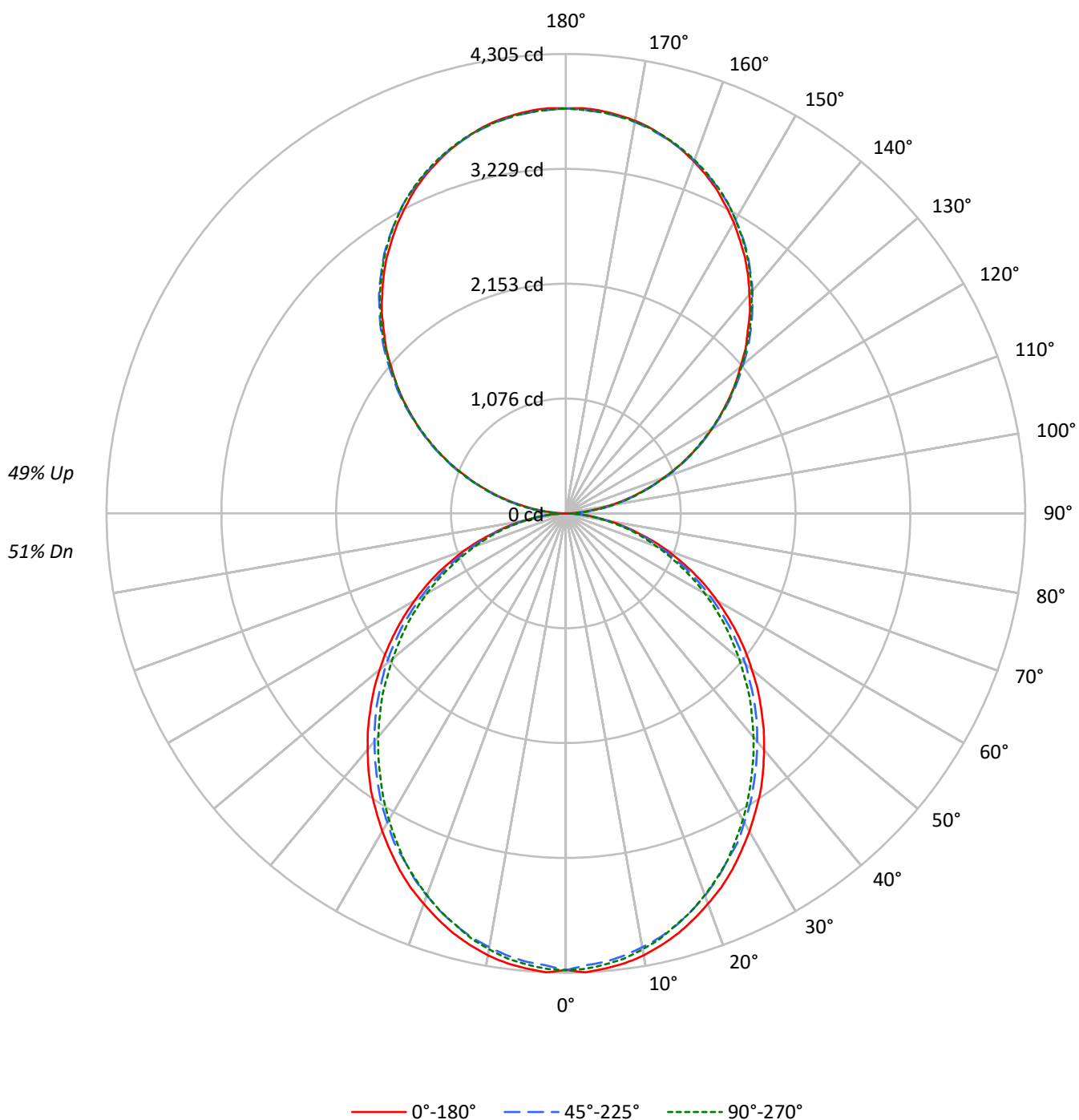
Lumens per Lamp: N/A  
Luminaire Lumens: 21510.0 lumens  
Efficiency: N/A  
Efficacy: 110.2 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 195.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9951  
Total Harmonic Distortion (THDi): 0.07  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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CATALOG NUMBER: DFN2DIP-SQ4F0-110D120US835-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P906868

CATALOG NUMBER: DFN2DIP-SQ4F0-110D120US835-FLLFL

**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 | 84 | 84 | 84 | 70 | 70 | 70 | 57 | 57 | 57 |
| 1   | 98  | 94  | 90  | 86  | 90 | 87 | 83 | 80 | 73 | 71 | 69 | 61 | 60 | 58 | 50 | 49 | 48 |
| 2   | 89  | 82  | 76  | 70  | 82 | 76 | 70 | 66 | 64 | 60 | 57 | 54 | 51 | 48 | 44 | 42 | 40 |
| 3   | 81  | 72  | 65  | 59  | 75 | 67 | 60 | 55 | 57 | 52 | 48 | 48 | 44 | 41 | 39 | 37 | 34 |
| 4   | 74  | 64  | 56  | 50  | 68 | 59 | 52 | 47 | 50 | 45 | 41 | 42 | 38 | 35 | 35 | 32 | 30 |
| 5   | 68  | 57  | 49  | 43  | 63 | 53 | 45 | 40 | 45 | 40 | 35 | 38 | 34 | 30 | 32 | 28 | 26 |
| 6   | 63  | 51  | 43  | 37  | 58 | 47 | 40 | 35 | 41 | 35 | 31 | 34 | 30 | 27 | 29 | 25 | 23 |
| 7   | 58  | 46  | 38  | 32  | 54 | 43 | 36 | 31 | 37 | 31 | 27 | 31 | 27 | 24 | 26 | 23 | 20 |
| 8   | 54  | 42  | 34  | 29  | 50 | 39 | 32 | 27 | 34 | 28 | 24 | 29 | 24 | 21 | 24 | 21 | 18 |
| 9   | 50  | 38  | 31  | 25  | 46 | 36 | 29 | 24 | 31 | 25 | 22 | 26 | 22 | 19 | 22 | 19 | 16 |
| 10  | 47  | 35  | 28  | 23  | 43 | 33 | 26 | 22 | 28 | 23 | 19 | 24 | 20 | 17 | 21 | 17 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3003 | 3003 | 3003 |
| 5°  | 3008 | 2962 | 2982 |
| 10° | 2984 | 2923 | 2943 |
| 15° | 2940 | 2875 | 2880 |
| 20° | 2880 | 2809 | 2817 |
| 25° | 2821 | 2730 | 2743 |
| 30° | 2747 | 2656 | 2649 |
| 35° | 2677 | 2569 | 2549 |
| 40° | 2591 | 2481 | 2454 |
| 45° | 2505 | 2393 | 2358 |
| 50° | 2411 | 2300 | 2245 |
| 55° | 2313 | 2193 | 2142 |
| 60° | 2201 | 2066 | 2025 |
| 65° | 2080 | 1935 | 1885 |
| 70° | 1925 | 1774 | 1736 |
| 75° | 1711 | 1583 | 1600 |
| 80° | 1454 | 1339 | 1336 |
| 85° | 1051 | 916  | 898  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2987 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 402.8   | 1.9       |
| 10°-20°   | 1133.5  | 5.3       |
| 20°-30°   | 1665.7  | 7.7       |
| 30°-40°   | 1934.7  | 9.0       |
| 40°-50°   | 1932.3  | 9.0       |
| 50°-60°   | 1684.9  | 7.8       |
| 60°-70°   | 1245.5  | 5.8       |
| 70°-80°   | 704.7   | 3.3       |
| 80°-90°   | 196.8   | 0.9       |
| 90°-100°  | 234.8   | 1.1       |
| 100°-110° | 746.2   | 3.5       |
| 110°-120° | 1276.9  | 5.9       |
| 120°-130° | 1679.4  | 7.8       |
| 130°-140° | 1885.0  | 8.8       |
| 140°-150° | 1848.5  | 8.6       |
| 150°-160° | 1550.6  | 7.2       |
| 160°-170° | 1028.3  | 4.8       |
| 170°-180° | 359.4   | 1.7       |
| 0°-30°    | 3202.1  | 14.9      |
| 0°-40°    | 5136.7  | 23.9      |
| 0°-60°    | 8753.8  | 40.7      |
| 0°-90°    | 10900.8 | 50.7      |
| 90°-120°  | 2257.9  | 10.5      |
| 90°-150°  | 7670.8  | 35.7      |
| 90°-180°  | 10609.0 | 49.3      |
| 0°-180°   | 21510.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4280 | 4280  | 4280 | 4280  | 4280 |      |
| 5°   | 4280 | 4264  | 4219 | 4251  | 4244 | 406  |
| 15°  | 4074 | 4050  | 3996 | 4013  | 3992 | 1148 |
| 25°  | 3688 | 3655  | 3585 | 3593  | 3585 | 1697 |
| 35°  | 3182 | 3140  | 3074 | 3050  | 3029 | 1987 |
| 45°  | 2589 | 2560  | 2498 | 2453  | 2437 | 1998 |
| 55°  | 1959 | 1934  | 1885 | 1836  | 1815 | 1752 |
| 65°  | 1321 | 1296  | 1255 | 1218  | 1198 | 1306 |
| 75°  | 691  | 683   | 662  | 638   | 646  | 738  |
| 85°  | 169  | 165   | 161  | 148   | 144  | 188  |
| 90°  | 3    | 41    | 112  | 105   | 109  | 21   |
| 95°  | 167  | 199   | 205  | 205   | 199  | 186  |
| 105° | 689  | 698   | 705  | 710   | 710  | 727  |
| 115° | 1281 | 1300  | 1294 | 1291  | 1281 | 1267 |
| 125° | 1864 | 1892  | 1883 | 1873  | 1870 | 1666 |
| 135° | 2411 | 2446  | 2453 | 2450  | 2440 | 1863 |
| 145° | 2927 | 2950  | 2968 | 2971  | 2959 | 1829 |
| 155° | 3347 | 3356  | 3366 | 3382  | 3372 | 1540 |
| 165° | 3641 | 3637  | 3637 | 3660  | 3644 | 1027 |
| 175° | 3788 | 3779  | 3772 | 3795  | 3776 | 360  |
| 180° | 3795 | 3795  | 3795 | 3795  | 3795 |      |

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CATALOG NUMBER: DFN2DIP-SQ4F0-110D120US835-FLLFLL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4280.2 | 4280.2 | 4280.2 | 4280.2 | 4280.2 |
| 2.5°   | 4305.0 | 4284.5 | 4239.1 | 4280.2 | 4272.3 |
| 5°     | 4280.2 | 4264.0 | 4218.6 | 4251.3 | 4243.5 |
| 7.5°   | 4251.3 | 4226.9 | 4181.5 | 4214.7 | 4206.4 |
| 10°    | 4206.4 | 4177.5 | 4128.2 | 4160.9 | 4148.7 |
| 12.5°  | 4144.4 | 4119.9 | 4070.6 | 4091.1 | 4082.8 |
| 15°    | 4074.5 | 4050.0 | 3996.3 | 4012.9 | 3992.4 |
| 17.5°  | 3988.0 | 3963.6 | 3909.9 | 3930.4 | 3909.9 |
| 20°    | 3893.3 | 3868.8 | 3811.2 | 3823.4 | 3807.3 |
| 22.5°  | 3799.0 | 3761.8 | 3708.1 | 3708.1 | 3699.8 |
| 25°    | 3687.6 | 3654.9 | 3585.0 | 3592.9 | 3585.0 |
| 27.5°  | 3564.0 | 3535.2 | 3481.9 | 3469.7 | 3449.2 |
| 30°    | 3440.9 | 3407.7 | 3346.1 | 3333.9 | 3317.3 |
| 32.5°  | 3309.0 | 3284.6 | 3218.6 | 3193.7 | 3177.1 |
| 35°    | 3181.5 | 3140.5 | 3074.5 | 3049.6 | 3029.1 |
| 37.5°  | 3037.4 | 3000.3 | 2934.4 | 2905.5 | 2885.0 |
| 40°    | 2889.4 | 2856.2 | 2790.3 | 2753.6 | 2737.0 |
| 42.5°  | 2745.3 | 2712.1 | 2646.6 | 2605.1 | 2580.7 |
| 45°    | 2589.0 | 2560.1 | 2498.1 | 2453.2 | 2436.6 |
| 47.5°  | 2436.6 | 2407.8 | 2341.8 | 2296.4 | 2271.9 |
| 50°    | 2275.9 | 2255.4 | 2197.7 | 2140.1 | 2119.6 |
| 52.5°  | 2119.6 | 2090.7 | 2037.5 | 1992.0 | 1963.2 |
| 55°    | 1959.3 | 1934.4 | 1885.1 | 1835.7 | 1815.2 |
| 57.5°  | 1798.6 | 1778.1 | 1724.4 | 1675.0 | 1658.4 |
| 60°    | 1637.9 | 1621.8 | 1564.1 | 1518.7 | 1506.5 |
| 62.5°  | 1481.6 | 1452.8 | 1411.7 | 1370.7 | 1354.1 |
| 65°    | 1321.3 | 1296.4 | 1255.4 | 1218.3 | 1197.8 |
| 67.5°  | 1156.7 | 1135.8 | 1099.1 | 1070.3 | 1053.7 |
| 70°    | 1004.3 | 987.7  | 950.6  | 921.8  | 905.6  |
| 72.5°  | 848.0  | 831.4  | 810.9  | 782.1  | 769.8  |
| 75°    | 691.2  | 683.4  | 662.4  | 638.0  | 646.3  |
| 77.5°  | 551.5  | 534.9  | 526.6  | 514.4  | 502.2  |
| 80°    | 411.8  | 407.4  | 399.1  | 386.9  | 378.6  |
| 82.5°  | 279.9  | 279.9  | 276.0  | 259.4  | 259.4  |
| 85°    | 168.6  | 164.6  | 160.7  | 148.0  | 144.1  |
| 87.5°  | 74.2   | 65.9   | 57.6   | 45.4   | 41.0   |
| 90°    | 3.4    | 41.2   | 112.1  | 105.3  | 108.7  |
| 92.5°  | 70.9   | 96.1   | 99.5   | 103.0  | 103.0  |
| 95°    | 167.0  | 199.1  | 204.8  | 204.8  | 199.1  |
| 97.5°  | 278.0  | 307.8  | 320.4  | 320.4  | 320.4  |
| 100°   | 406.2  | 432.5  | 441.6  | 441.6  | 438.2  |
| 102.5° | 541.2  | 560.6  | 573.2  | 576.7  | 573.2  |
| 105°   | 688.8  | 697.9  | 704.8  | 710.5  | 710.5  |
| 107.5° | 835.2  | 849.0  | 849.0  | 851.2  | 835.2  |
| 110°   | 977.1  | 995.4  | 995.4  | 995.4  | 986.3  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1130.4 | 1149.9 | 1146.4 | 1137.3 | 1130.4 |
| 115°   | 1281.4 | 1299.8 | 1294.0 | 1290.6 | 1281.4 |
| 117.5° | 1431.3 | 1456.5 | 1440.5 | 1431.3 | 1422.2 |
| 120°   | 1582.4 | 1607.5 | 1582.4 | 1582.4 | 1572.1 |
| 122.5° | 1719.7 | 1751.7 | 1735.7 | 1726.5 | 1719.7 |
| 125°   | 1863.8 | 1892.4 | 1883.3 | 1873.0 | 1869.5 |
| 127.5° | 2004.6 | 2040.0 | 2027.4 | 2013.7 | 2004.6 |
| 130°   | 2136.1 | 2177.3 | 2171.6 | 2164.7 | 2152.1 |
| 132.5° | 2283.7 | 2315.8 | 2318.0 | 2302.0 | 2292.9 |
| 135°   | 2410.7 | 2446.2 | 2453.1 | 2449.6 | 2440.5 |
| 137.5° | 2552.6 | 2581.2 | 2586.9 | 2584.6 | 2570.9 |
| 140°   | 2677.3 | 2705.9 | 2721.9 | 2721.9 | 2709.3 |
| 142.5° | 2805.5 | 2834.1 | 2843.2 | 2846.6 | 2834.1 |
| 145°   | 2926.7 | 2949.6 | 2967.9 | 2971.4 | 2958.8 |
| 147.5° | 3035.4 | 3064.0 | 3077.8 | 3083.5 | 3070.9 |
| 150°   | 3147.6 | 3167.0 | 3179.6 | 3189.9 | 3179.6 |
| 152.5° | 3247.1 | 3266.5 | 3282.6 | 3295.2 | 3282.6 |
| 155°   | 3346.6 | 3355.8 | 3366.1 | 3382.1 | 3371.8 |
| 157.5° | 3432.5 | 3439.3 | 3445.0 | 3467.9 | 3451.9 |
| 160°   | 3509.1 | 3516.0 | 3519.4 | 3538.9 | 3525.1 |
| 162.5° | 3580.0 | 3580.0 | 3583.5 | 3605.2 | 3589.2 |
| 165°   | 3640.7 | 3637.3 | 3637.3 | 3660.1 | 3644.1 |
| 167.5° | 3695.6 | 3685.3 | 3685.3 | 3708.2 | 3692.2 |
| 170°   | 3736.8 | 3727.6 | 3724.2 | 3747.1 | 3727.6 |
| 172.5° | 3765.4 | 3756.2 | 3752.8 | 3775.7 | 3756.2 |
| 175°   | 3788.3 | 3779.1 | 3772.3 | 3795.1 | 3775.7 |
| 177.5° | 3800.9 | 3791.7 | 3784.8 | 3804.3 | 3784.8 |
| 180°   | 3795.1 | 3795.1 | 3795.1 | 3795.1 | 3795.1 |

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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 | 11.17            | 12.03 | 12.12 | 13.00 | 14.26 | 10.72          | 11.59 | 11.67 | 12.56 | 13.82 |
|                 | 3H   | 12.83            | 13.61 | 13.79 | 14.59 | 15.87 | 12.34          | 13.12 | 13.30 | 14.10 | 15.38 |
|                 | 4H   | 13.42            | 14.16 | 14.40 | 15.14 | 16.43 | 12.93          | 13.66 | 13.90 | 14.65 | 15.94 |
|                 | 6H   | 13.83            | 14.50 | 14.81 | 15.49 | 16.80 | 13.33          | 14.00 | 14.31 | 14.99 | 16.30 |
|                 | 8H   | 13.93            | 14.58 | 14.93 | 15.58 | 16.88 | 13.43          | 14.08 | 14.42 | 15.08 | 16.38 |
|                 | 12H  | 13.98            | 14.60 | 14.98 | 15.59 | 16.92 | 13.47          | 14.09 | 14.47 | 15.08 | 16.41 |
| 4H              | 2H   | 11.63            | 12.37 | 12.61 | 13.35 | 14.64 | 11.27          | 12.01 | 12.26 | 12.99 | 14.28 |
|                 | 3H   | 13.50            | 14.11 | 14.49 | 15.12 | 16.43 | 13.09          | 13.71 | 14.08 | 14.72 | 16.02 |
|                 | 4H   | 14.22            | 14.78 | 15.22 | 15.78 | 17.11 | 13.79          | 14.36 | 14.79 | 15.36 | 16.69 |
|                 | 6H   | 14.74            | 15.22 | 15.75 | 16.25 | 17.58 | 14.31          | 14.79 | 15.32 | 15.82 | 17.14 |
|                 | 8H   | 14.89            | 15.34 | 15.90 | 16.36 | 17.70 | 14.45          | 14.90 | 15.47 | 15.92 | 17.27 |
|                 | 12H  | 14.97            | 15.37 | 16.00 | 16.41 | 17.76 | 14.52          | 14.92 | 15.55 | 15.96 | 17.31 |
| 8H              | 4H   | 14.42            | 14.87 | 15.43 | 15.89 | 17.23 | 14.04          | 14.49 | 15.05 | 15.51 | 16.85 |
|                 | 6H   | 15.05            | 15.43 | 16.09 | 16.49 | 17.83 | 14.67          | 15.04 | 15.71 | 16.10 | 17.44 |
|                 | 8H   | 15.28            | 15.61 | 16.32 | 16.65 | 18.01 | 14.88          | 15.21 | 15.93 | 16.26 | 17.62 |
|                 | 12H  | 15.41            | 15.70 | 16.46 | 16.74 | 18.14 | 15.00          | 15.29 | 16.05 | 16.33 | 17.73 |
| 12H             | 4H   | 14.40            | 14.81 | 15.43 | 15.84 | 17.19 | 14.03          | 14.44 | 15.07 | 15.48 | 16.82 |
|                 | 6H   | 15.08            | 15.41 | 16.13 | 16.46 | 17.82 | 14.71          | 15.04 | 15.76 | 16.09 | 17.45 |
|                 | 8H   | 15.33            | 15.62 | 16.38 | 16.66 | 18.06 | 14.95          | 15.24 | 16.00 | 16.28 | 17.68 |