

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: P911997

Luminaire Tested: DFN2DIP-SQ3F0-090D090US850-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P911997  
REPORT IS A COMBINATION OF REPORTS P901481 AND P898289  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ3F0-090D090US850-FLLONL  
Description: 3 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

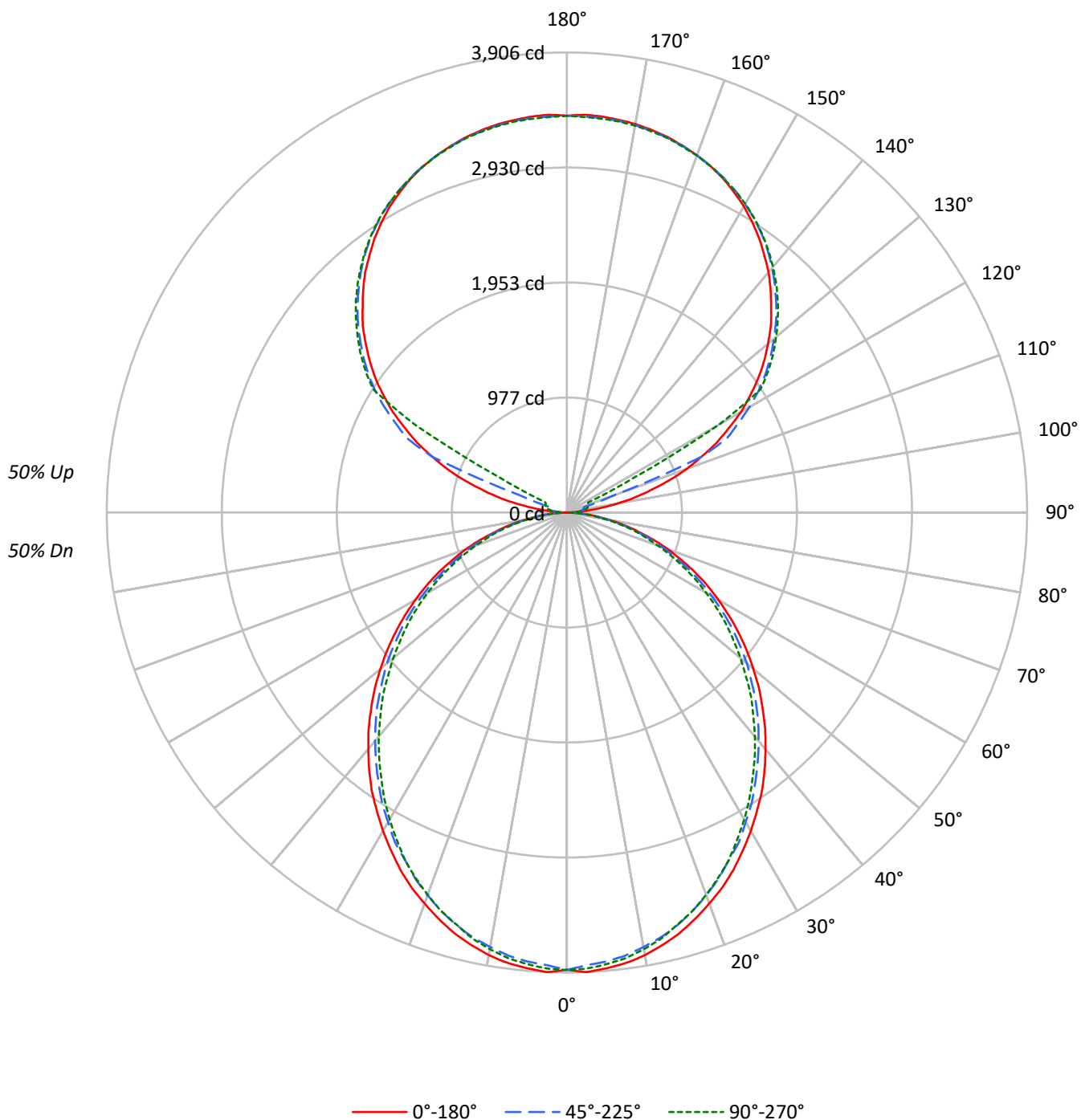
Lumens per Lamp: N/A  
Luminaire Lumens: 19762.4 lumens  
Efficiency: N/A  
Efficacy: 126.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.06' x L: 3.06' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 156.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.996  
Total Harmonic Distortion (THDi): 0.064  
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°  | 4450 | 4450 | 4450 |
| 5°  | 4454 | 4385 | 4416 |
| 10° | 4415 | 4323 | 4355 |
| 15° | 4348 | 4249 | 4260 |
| 20° | 4257 | 4147 | 4163 |
| 25° | 4167 | 4026 | 4051 |
| 30° | 4054 | 3913 | 3909 |
| 35° | 3948 | 3780 | 3759 |
| 40° | 3817 | 3646 | 3616 |
| 45° | 3686 | 3511 | 3469 |
| 50° | 3543 | 3369 | 3300 |
| 55° | 3393 | 3206 | 3144 |
| 60° | 3224 | 3012 | 2965 |
| 65° | 3038 | 2810 | 2754 |
| 70° | 2802 | 2565 | 2527 |
| 75° | 2476 | 2270 | 2314 |
| 80° | 2080 | 1894 | 1913 |
| 85° | 1464 | 1255 | 1252 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3686 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 365.5   | 1.8       |
| 10°-20°   | 1028.5  | 5.2       |
| 20°-30°   | 1511.4  | 7.6       |
| 30°-40°   | 1755.4  | 8.9       |
| 40°-50°   | 1753.3  | 8.9       |
| 50°-60°   | 1528.8  | 7.7       |
| 60°-70°   | 1130.1  | 5.7       |
| 70°-80°   | 639.4   | 3.2       |
| 80°-90°   | 174.7   | 0.9       |
| 90°-100°  | 111.1   | 0.6       |
| 100°-110° | 414.0   | 2.1       |
| 110°-120° | 1098.2  | 5.6       |
| 120°-130° | 1821.4  | 9.2       |
| 130°-140° | 1934.7  | 9.8       |
| 140°-150° | 1798.1  | 9.1       |
| 150°-160° | 1445.6  | 7.3       |
| 160°-170° | 931.5   | 4.7       |
| 170°-180° | 320.6   | 1.6       |
| 0°-30°    | 2905.4  | 14.7      |
| 0°-40°    | 4660.9  | 23.6      |
| 0°-60°    | 7942.9  | 40.2      |
| 0°-90°    | 9887.1  | 50.0      |
| 90°-120°  | 1623.3  | 8.2       |
| 90°-150°  | 7177.5  | 36.3      |
| 90°-180°  | 9875.0  | 50.0      |
| 0°-180°   | 19762.4 | 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    | 29    | 49   | 61    | 66   | 18   |
| 95°  | 158  | 78    | 95   | 107   | 105  | 188  |
| 105° | 741  | 814   | 149  | 175   | 185  | 792  |
| 115° | 1401 | 1443  | 1504 | 375   | 200  | 1380 |
| 125° | 1982 | 2013  | 2060 | 2077  | 2084 | 1767 |
| 135° | 2452 | 2491  | 2513 | 2538  | 2533 | 1894 |
| 145° | 2845 | 2842  | 2883 | 2900  | 2888 | 1779 |
| 155° | 3132 | 3110  | 3140 | 3154  | 3135 | 1443 |
| 165° | 3300 | 3286  | 3293 | 3310  | 3293 | 932  |
| 175° | 3376 | 3359  | 3364 | 3381  | 3356 | 321  |
| 180° | 3368 | 3368  | 3368 | 3368  | 3368 |      |

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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°    | 2.3    | 29.3   | 48.6   | 61.1   | 65.7   |
| 92.5°  | 61.1   | 51.2   | 58.4   | 63.4   | 65.7   |
| 95°    | 158.4  | 77.9   | 94.9   | 107.4  | 104.8  |
| 97.5°  | 285.1  | 85.4   | 124.2  | 131.6  | 134.0  |
| 100°   | 431.5  | 97.6   | 139.0  | 158.4  | 163.2  |
| 102.5° | 592.2  | 587.5  | 143.8  | 170.5  | 178.0  |
| 105°   | 740.9  | 814.2  | 148.7  | 175.4  | 185.2  |
| 107.5° | 914.0  | 974.8  | 153.7  | 180.3  | 190.2  |
| 110°   | 1079.8 | 1130.8 | 426.6  | 182.9  | 192.5  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1235.9 | 1279.6 | 1238.2 | 187.5  | 195.1  |
| 115°   | 1401.4 | 1442.8 | 1503.9 | 375.4  | 200.0  |
| 117.5° | 1545.3 | 1594.0 | 1635.6 | 1286.9 | 648.3  |
| 120°   | 1706.2 | 1742.7 | 1786.7 | 1815.9 | 1486.8 |
| 122.5° | 1842.6 | 1881.6 | 1930.5 | 1945.0 | 1947.6 |
| 125°   | 1981.5 | 2013.3 | 2059.6 | 2076.7 | 2083.9 |
| 127.5° | 2108.2 | 2142.4 | 2179.2 | 2203.5 | 2205.8 |
| 130°   | 2227.8 | 2266.9 | 2293.5 | 2320.4 | 2318.1 |
| 132.5° | 2349.6 | 2381.5 | 2408.1 | 2430.2 | 2427.8 |
| 135°   | 2452.1 | 2491.1 | 2512.9 | 2537.5 | 2532.6 |
| 137.5° | 2559.2 | 2588.4 | 2613.0 | 2637.3 | 2630.1 |
| 140°   | 2663.9 | 2683.7 | 2710.3 | 2732.2 | 2720.2 |
| 142.5° | 2752.0 | 2769.1 | 2800.6 | 2820.0 | 2807.9 |
| 145°   | 2844.6 | 2841.9 | 2883.4 | 2900.5 | 2888.3 |
| 147.5° | 2924.8 | 2917.6 | 2958.9 | 2971.1 | 2961.5 |
| 150°   | 3003.0 | 2985.9 | 3024.9 | 3039.3 | 3027.2 |
| 152.5° | 3068.6 | 3049.2 | 3085.7 | 3100.4 | 3083.4 |
| 155°   | 3132.0 | 3110.3 | 3139.5 | 3154.0 | 3134.6 |
| 157.5° | 3183.3 | 3163.9 | 3185.8 | 3202.9 | 3183.3 |
| 160°   | 3227.2 | 3212.4 | 3227.2 | 3241.7 | 3224.6 |
| 162.5° | 3266.0 | 3251.5 | 3263.7 | 3280.8 | 3258.8 |
| 165°   | 3300.2 | 3285.6 | 3293.0 | 3310.0 | 3293.0 |
| 167.5° | 3327.1 | 3312.4 | 3319.8 | 3336.9 | 3314.9 |
| 170°   | 3349.1 | 3334.3 | 3339.2 | 3356.3 | 3334.3 |
| 172.5° | 3363.6 | 3349.1 | 3353.9 | 3371.0 | 3349.1 |
| 175°   | 3375.7 | 3358.6 | 3363.6 | 3380.6 | 3356.3 |
| 177.5° | 3380.6 | 3363.6 | 3366.1 | 3383.2 | 3361.3 |
| 180°   | 3368.5 | 3368.5 | 3368.5 | 3368.5 | 3368.5 |

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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 | 12.43            | 13.29 | 13.38 | 14.26 | 15.53 | 11.98          | 12.84 | 12.94 | 13.82 | 15.09 |
|                 | 3H   | 14.08            | 14.86 | 15.05 | 15.84 | 17.13 | 13.59          | 14.37 | 14.56 | 15.35 | 16.64 |
|                 | 4H   | 14.67            | 15.40 | 15.65 | 16.38 | 17.69 | 14.17          | 14.91 | 15.16 | 15.89 | 17.19 |
|                 | 6H   | 15.06            | 15.74 | 16.06 | 16.73 | 18.04 | 14.56          | 15.24 | 15.56 | 16.23 | 17.54 |
|                 | 8H   | 15.17            | 15.81 | 16.17 | 16.82 | 18.13 | 14.67          | 15.31 | 15.66 | 16.32 | 17.63 |
|                 | 12H  | 15.21            | 15.82 | 16.22 | 16.83 | 18.16 | 14.71          | 15.32 | 15.71 | 16.32 | 17.65 |
| 4H              | 2H   | 12.89            | 13.62 | 13.87 | 14.60 | 15.90 | 12.53          | 13.26 | 13.52 | 14.25 | 15.55 |
|                 | 3H   | 14.75            | 15.36 | 15.74 | 16.37 | 17.69 | 14.34          | 14.95 | 15.33 | 15.96 | 17.28 |
|                 | 4H   | 15.46            | 16.01 | 16.46 | 17.02 | 18.36 | 15.03          | 15.59 | 16.04 | 16.60 | 17.94 |
|                 | 6H   | 15.97            | 16.45 | 16.98 | 17.48 | 18.81 | 15.53          | 16.02 | 16.55 | 17.05 | 18.38 |
|                 | 8H   | 16.11            | 16.56 | 17.13 | 17.59 | 18.94 | 15.68          | 16.13 | 16.70 | 17.15 | 18.50 |
|                 | 12H  | 16.18            | 16.59 | 17.22 | 17.63 | 18.99 | 15.74          | 16.14 | 16.77 | 17.18 | 18.54 |
| 8H              | 4H   | 15.65            | 16.10 | 16.67 | 17.12 | 18.47 | 15.27          | 15.72 | 16.29 | 16.74 | 18.10 |
|                 | 6H   | 16.27            | 16.65 | 17.32 | 17.71 | 19.06 | 15.89          | 16.26 | 16.93 | 17.33 | 18.68 |
|                 | 8H   | 16.49            | 16.82 | 17.54 | 17.87 | 19.24 | 16.10          | 16.43 | 17.15 | 17.48 | 18.84 |
|                 | 12H  | 16.62            | 16.91 | 17.67 | 17.95 | 19.36 | 16.21          | 16.50 | 17.26 | 17.54 | 18.95 |
| 12H             | 4H   | 15.63            | 16.04 | 16.67 | 17.08 | 18.43 | 15.26          | 15.67 | 16.30 | 16.71 | 18.07 |
|                 | 6H   | 16.30            | 16.63 | 17.35 | 17.68 | 19.05 | 15.93          | 16.26 | 16.98 | 17.31 | 18.68 |
|                 | 8H   | 16.54            | 16.83 | 17.59 | 17.87 | 19.28 | 16.16          | 16.45 | 17.21 | 17.49 | 18.90 |