

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: P911996

Luminaire Tested: DFN2DIP-SQ3F0-090D090US850-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P911996  
REPORT IS A COMBINATION OF REPORTS P899961 AND P896733  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ3F0-090D090US850-FLLFLL  
Description: 3 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

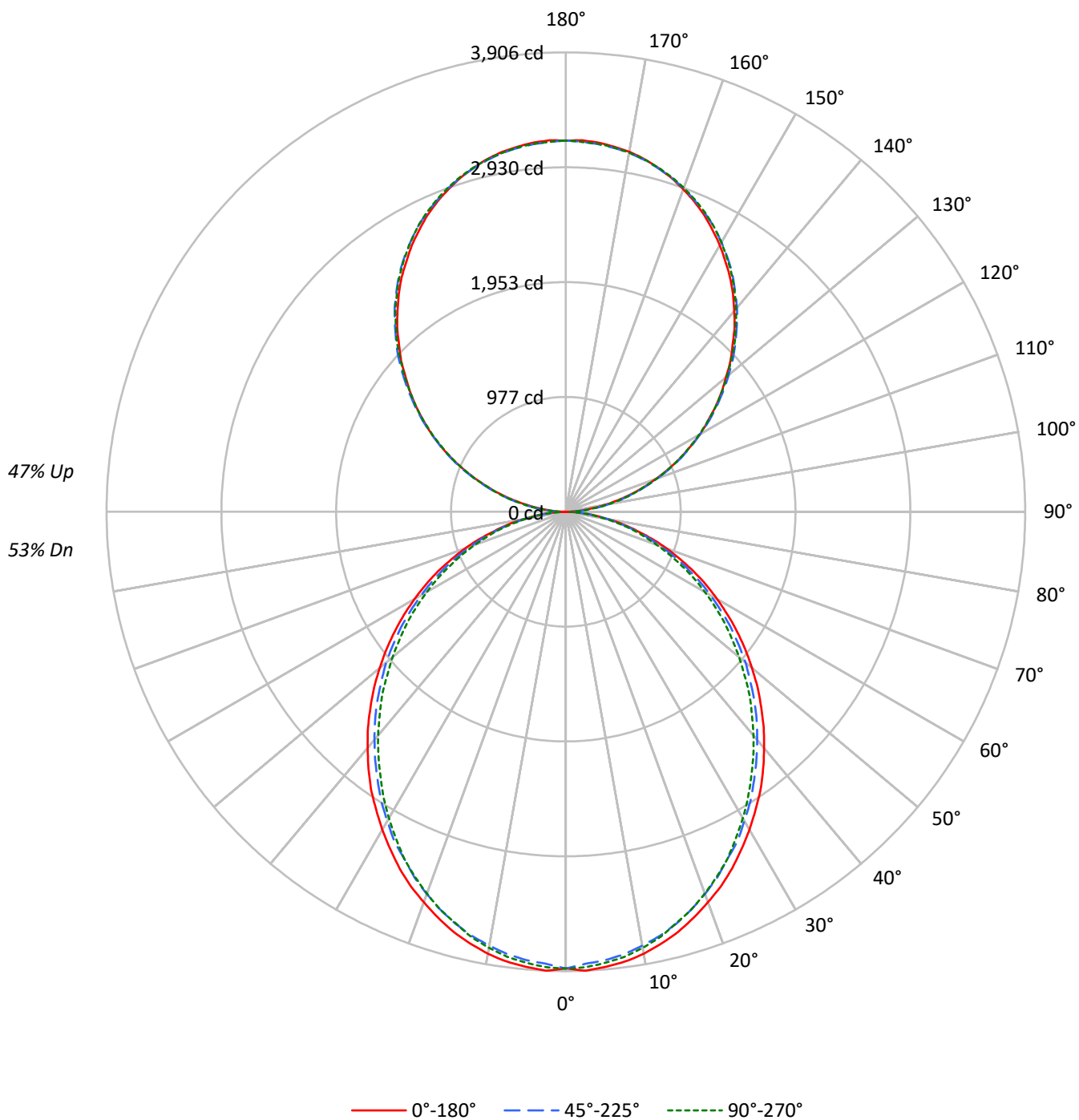
Lumens per Lamp: N/A  
Luminaire Lumens: 18714.4 lumens  
Efficiency: N/A  
Efficacy: 119.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.06' x L: 3.06' x H: 0.1')  
CIE Type: General Diffuse

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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CATALOG NUMBER: DFN2DIP-SQ3F0-090D090US850-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°  | 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   | 2.0       |
| 10°-20°   | 1028.5  | 5.5       |
| 20°-30°   | 1511.4  | 8.1       |
| 30°-40°   | 1755.4  | 9.4       |
| 40°-50°   | 1753.3  | 9.4       |
| 50°-60°   | 1528.8  | 8.2       |
| 60°-70°   | 1130.1  | 6.0       |
| 70°-80°   | 639.4   | 3.4       |
| 80°-90°   | 177.7   | 0.9       |
| 90°-100°  | 195.3   | 1.0       |
| 100°-110° | 620.6   | 3.3       |
| 110°-120° | 1062.1  | 5.7       |
| 120°-130° | 1396.8  | 7.5       |
| 130°-140° | 1567.9  | 8.4       |
| 140°-150° | 1537.5  | 8.2       |
| 150°-160° | 1289.7  | 6.9       |
| 160°-170° | 855.3   | 4.6       |
| 170°-180° | 299.0   | 1.6       |
| 0°-30°    | 2905.4  | 15.5      |
| 0°-40°    | 4660.9  | 24.9      |
| 0°-60°    | 7942.9  | 42.4      |
| 0°-90°    | 9890.2  | 52.8      |
| 90°-120°  | 1878.1  | 10.0      |
| 90°-150°  | 6380.2  | 34.1      |
| 90°-180°  | 8824.0  | 47.2      |
| 0°-180°   | 18714.4 | 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°  | 3    | 34    | 93   | 88    | 90   | 18   |
| 95°  | 139  | 166   | 170  | 170   | 166  | 155  |
| 105° | 573  | 580   | 586  | 591   | 591  | 605  |
| 115° | 1066 | 1081  | 1076 | 1074  | 1066 | 1054 |
| 125° | 1550 | 1574  | 1566 | 1558  | 1555 | 1385 |
| 135° | 2005 | 2035  | 2040 | 2038  | 2030 | 1550 |
| 145° | 2434 | 2453  | 2468 | 2471  | 2461 | 1521 |
| 155° | 2784 | 2791  | 2800 | 2813  | 2805 | 1281 |
| 165° | 3028 | 3025  | 3025 | 3044  | 3031 | 854  |
| 175° | 3151 | 3143  | 3138 | 3157  | 3140 | 299  |
| 180° | 3157 | 3157  | 3157 | 3157  | 3157 |      |

TEST NUMBER: P911996

CATALOG NUMBER: DFN2DIP-SQ3F0-090D090US850-FLLFLL

**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°    | 2.9    | 34.3   | 93.3   | 87.5   | 90.4   |
| 92.5°  | 59.0   | 80.0   | 82.8   | 85.6   | 85.6   |
| 95°    | 139.0  | 165.6  | 170.3  | 170.3  | 165.6  |
| 97.5°  | 231.2  | 256.0  | 266.5  | 266.5  | 266.5  |
| 100°   | 337.8  | 359.8  | 367.3  | 367.3  | 364.5  |
| 102.5° | 450.1  | 466.3  | 476.8  | 479.6  | 476.8  |
| 105°   | 572.9  | 580.5  | 586.2  | 591.0  | 591.0  |
| 107.5° | 694.7  | 706.1  | 706.1  | 708.0  | 694.7  |
| 110°   | 812.7  | 828.0  | 828.0  | 828.0  | 820.3  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 940.2  | 956.4  | 953.5  | 946.0  | 940.2  |
| 115°   | 1065.9 | 1081.1 | 1076.3 | 1073.5 | 1065.9 |
| 117.5° | 1190.5 | 1211.5 | 1198.2 | 1190.5 | 1182.9 |
| 120°   | 1316.2 | 1337.0 | 1316.2 | 1316.2 | 1307.5 |
| 122.5° | 1430.3 | 1457.0 | 1443.7 | 1436.0 | 1430.3 |
| 125°   | 1550.3 | 1574.0 | 1566.5 | 1557.8 | 1555.0 |
| 127.5° | 1667.3 | 1696.8 | 1686.3 | 1674.9 | 1667.3 |
| 130°   | 1776.7 | 1811.0 | 1806.2 | 1800.5 | 1790.0 |
| 132.5° | 1899.5 | 1926.1 | 1928.0 | 1914.7 | 1907.1 |
| 135°   | 2005.1 | 2034.6 | 2040.3 | 2037.5 | 2029.9 |
| 137.5° | 2123.1 | 2146.9 | 2151.7 | 2149.8 | 2138.4 |
| 140°   | 2226.9 | 2250.6 | 2263.9 | 2263.9 | 2253.5 |
| 142.5° | 2333.4 | 2357.2 | 2364.8 | 2367.7 | 2357.2 |
| 145°   | 2434.4 | 2453.3 | 2468.5 | 2471.4 | 2461.0 |
| 147.5° | 2524.7 | 2548.5 | 2559.9 | 2564.7 | 2554.2 |
| 150°   | 2618.0 | 2634.2 | 2644.6 | 2653.2 | 2644.6 |
| 152.5° | 2700.7 | 2716.9 | 2730.2 | 2740.8 | 2730.2 |
| 155°   | 2783.6 | 2791.1 | 2799.8 | 2813.1 | 2804.6 |
| 157.5° | 2854.9 | 2860.7 | 2865.4 | 2884.4 | 2871.1 |
| 160°   | 2918.7 | 2924.4 | 2927.3 | 2943.4 | 2932.0 |
| 162.5° | 2977.7 | 2977.7 | 2980.5 | 2998.6 | 2985.3 |
| 165°   | 3028.1 | 3025.2 | 3025.2 | 3044.3 | 3031.0 |
| 167.5° | 3073.8 | 3065.3 | 3065.3 | 3084.2 | 3070.9 |
| 170°   | 3108.1 | 3100.4 | 3097.7 | 3116.6 | 3100.4 |
| 172.5° | 3131.8 | 3124.3 | 3121.4 | 3140.5 | 3124.3 |
| 175°   | 3150.9 | 3143.2 | 3137.6 | 3156.7 | 3140.5 |
| 177.5° | 3161.3 | 3153.8 | 3148.0 | 3164.2 | 3148.0 |
| 180°   | 3156.7 | 3156.7 | 3156.7 | 3156.7 | 3156.7 |

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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 | 12.68            | 13.57 | 13.62 | 14.52 | 15.75 | 12.24          | 13.13 | 13.17 | 14.08 | 15.31 |
|                 | 3H   | 14.34            | 15.14 | 15.28 | 16.10 | 17.35 | 13.85          | 14.65 | 14.79 | 15.61 | 16.86 |
|                 | 4H   | 14.93            | 15.68 | 15.88 | 16.64 | 17.91 | 14.43          | 15.19 | 15.39 | 16.15 | 17.41 |
|                 | 6H   | 15.32            | 16.02 | 16.29 | 16.99 | 18.26 | 14.82          | 15.52 | 15.79 | 16.49 | 17.76 |
|                 | 8H   | 15.43            | 16.09 | 16.40 | 17.08 | 18.35 | 14.93          | 15.59 | 15.90 | 16.57 | 17.85 |
|                 | 12H  | 15.48            | 16.10 | 16.46 | 17.08 | 18.38 | 14.97          | 15.60 | 15.95 | 16.58 | 17.87 |
| 4H              | 2H   | 13.14            | 13.90 | 14.11 | 14.86 | 16.12 | 12.79          | 13.54 | 13.75 | 14.51 | 15.77 |
|                 | 3H   | 15.01            | 15.64 | 15.98 | 16.63 | 17.90 | 14.60          | 15.23 | 15.57 | 16.22 | 17.50 |
|                 | 4H   | 15.72            | 16.29 | 16.70 | 17.28 | 18.58 | 15.29          | 15.87 | 16.28 | 16.86 | 18.16 |
|                 | 6H   | 16.23            | 16.73 | 17.22 | 17.74 | 19.03 | 15.80          | 16.29 | 16.79 | 17.30 | 18.60 |
|                 | 8H   | 16.38            | 16.84 | 17.37 | 17.84 | 19.16 | 15.94          | 16.40 | 16.94 | 17.41 | 18.72 |
|                 | 12H  | 16.45            | 16.87 | 17.47 | 17.89 | 19.21 | 16.00          | 16.42 | 17.02 | 17.44 | 18.76 |
| 8H              | 4H   | 15.91            | 16.38 | 16.91 | 17.38 | 18.69 | 15.54          | 16.00 | 16.53 | 17.00 | 18.31 |
|                 | 6H   | 16.54            | 16.92 | 17.56 | 17.97 | 19.28 | 16.15          | 16.54 | 17.18 | 17.58 | 18.89 |
|                 | 8H   | 16.76            | 17.09 | 17.79 | 18.13 | 19.46 | 16.36          | 16.70 | 17.39 | 17.73 | 19.06 |
|                 | 12H  | 16.89            | 17.18 | 17.92 | 18.21 | 19.58 | 16.47          | 16.77 | 17.51 | 17.80 | 19.17 |
| 12H             | 4H   | 15.90            | 16.32 | 16.91 | 17.34 | 18.65 | 15.53          | 15.95 | 16.54 | 16.97 | 18.29 |
|                 | 6H   | 16.57            | 16.90 | 17.60 | 17.94 | 19.27 | 16.19          | 16.53 | 17.22 | 17.56 | 18.89 |
|                 | 8H   | 16.81            | 17.10 | 17.84 | 18.13 | 19.50 | 16.43          | 16.72 | 17.46 | 17.75 | 19.12 |