

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: P911510

Luminaire Tested: DFN2DIP-PN4F0-090D040US850-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P911510  
REPORT IS A COMBINATION OF REPORTS P899620 AND P896497  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-090D040US850-RLLFLL  
Description: 4 foot, Pentagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

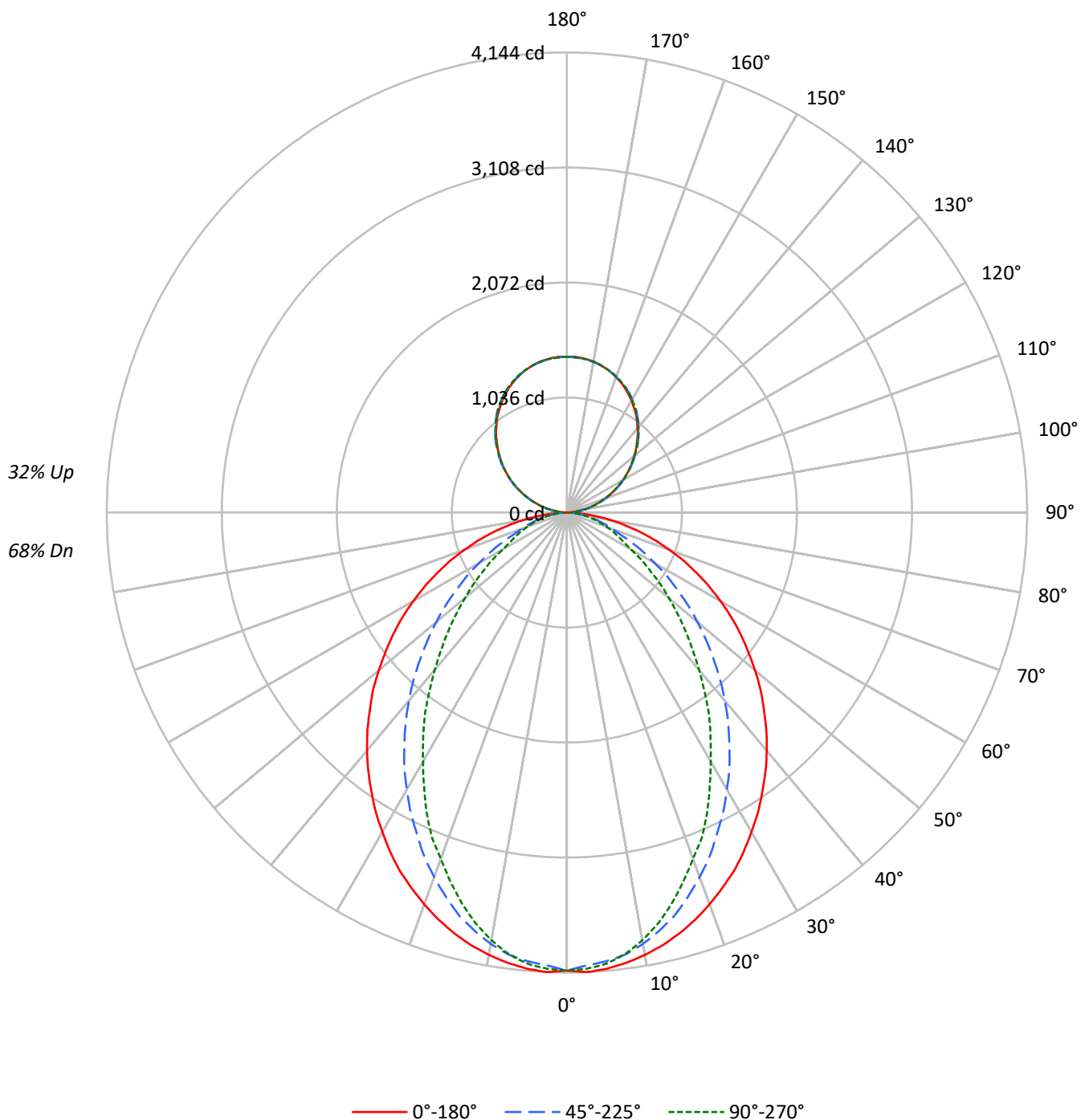
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 12409.7 lumens  
Efficiency: N/A  
Efficacy: 104.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: Semi-Direct  
  
Input Watts (W): 118.7  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9963  
Total Harmonic Distortion (THDi): 0.065  
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   | 112 | 112 | 112 | 112 | 105 | 105 | 105 | 105 | 94 | 94 | 94 | 83 | 83 | 83 | 73 | 73 | 73 |
| 1   | 103 | 98  | 95  | 91  | 97  | 93  | 90  | 87  | 83 | 81 | 78 | 74 | 72 | 70 | 66 | 64 | 63 |
| 2   | 94  | 87  | 81  | 76  | 89  | 82  | 77  | 72  | 74 | 70 | 66 | 66 | 63 | 60 | 59 | 56 | 54 |
| 3   | 86  | 77  | 70  | 64  | 81  | 73  | 67  | 61  | 66 | 61 | 56 | 59 | 55 | 51 | 52 | 49 | 47 |
| 4   | 79  | 69  | 61  | 55  | 75  | 65  | 58  | 53  | 59 | 53 | 49 | 53 | 48 | 45 | 47 | 44 | 41 |
| 5   | 73  | 62  | 53  | 48  | 69  | 59  | 51  | 46  | 53 | 47 | 43 | 48 | 43 | 39 | 43 | 39 | 36 |
| 6   | 68  | 56  | 48  | 42  | 64  | 53  | 46  | 40  | 48 | 42 | 38 | 44 | 39 | 35 | 39 | 35 | 32 |
| 7   | 63  | 51  | 43  | 37  | 59  | 48  | 41  | 36  | 44 | 38 | 33 | 40 | 35 | 31 | 36 | 32 | 29 |
| 8   | 58  | 46  | 38  | 33  | 55  | 44  | 37  | 32  | 40 | 34 | 30 | 37 | 32 | 28 | 33 | 29 | 26 |
| 9   | 55  | 42  | 35  | 30  | 52  | 41  | 34  | 29  | 37 | 31 | 27 | 34 | 29 | 25 | 31 | 27 | 24 |
| 10  | 51  | 39  | 32  | 27  | 48  | 37  | 31  | 26  | 34 | 29 | 25 | 32 | 27 | 23 | 29 | 25 | 22 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3011 | 3011 | 3011 |
| 5°  | 3016 | 2964 | 2983 |
| 10° | 2986 | 2906 | 2886 |
| 15° | 2945 | 2810 | 2737 |
| 20° | 2891 | 2678 | 2553 |
| 25° | 2835 | 2530 | 2376 |
| 30° | 2760 | 2378 | 2151 |
| 35° | 2687 | 2215 | 1953 |
| 40° | 2612 | 2046 | 1726 |
| 45° | 2526 | 1859 | 1520 |
| 50° | 2436 | 1669 | 1319 |
| 55° | 2343 | 1467 | 1126 |
| 60° | 2234 | 1255 | 927  |
| 65° | 2110 | 1040 | 835  |
| 70° | 1959 | 839  | 757  |
| 75° | 1769 | 741  | 690  |
| 80° | 1495 | 622  | 600  |
| 85° | 1041 | 418  | 455  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2526 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 386.6   | 3.1       |
| 10°-20°   | 1061.3  | 8.6       |
| 20°-30°   | 1490.1  | 12.0      |
| 30°-40°   | 1624.3  | 13.1      |
| 40°-50°   | 1492.9  | 12.0      |
| 50°-60°   | 1172.4  | 9.4       |
| 60°-70°   | 763.1   | 6.1       |
| 70°-80°   | 392.8   | 3.2       |
| 80°-90°   | 104.3   | 0.8       |
| 90°-100°  | 86.8    | 0.7       |
| 100°-110° | 275.8   | 2.2       |
| 110°-120° | 472.0   | 3.8       |
| 120°-130° | 620.8   | 5.0       |
| 130°-140° | 696.8   | 5.6       |
| 140°-150° | 683.3   | 5.5       |
| 150°-160° | 573.2   | 4.6       |
| 160°-170° | 380.1   | 3.1       |
| 170°-180° | 132.9   | 1.1       |
| 0°-30°    | 2938.0  | 23.7      |
| 0°-40°    | 4562.3  | 36.8      |
| 0°-60°    | 7227.6  | 58.2      |
| 0°-90°    | 8487.9  | 68.4      |
| 90°-120°  | 834.7   | 6.7       |
| 90°-150°  | 2835.6  | 22.8      |
| 90°-180°  | 3922.0  | 31.6      |
| 0°-180°   | 12409.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4125 | 4125  | 4125 | 4125  | 4125 |      |
| 5°   | 4125 | 4106  | 4058 | 4091  | 4080 | 391  |
| 15°  | 3924 | 3882  | 3756 | 3685  | 3648 | 1106 |
| 25°  | 3562 | 3442  | 3196 | 3043  | 2986 | 1638 |
| 35°  | 3069 | 2878  | 2550 | 2315  | 2232 | 1921 |
| 45°  | 2509 | 2258  | 1867 | 1601  | 1512 | 1937 |
| 55°  | 1908 | 1616  | 1213 | 989   | 918  | 1705 |
| 65°  | 1288 | 986   | 650  | 523   | 511  | 1277 |
| 75°  | 687  | 425   | 299  | 272   | 269  | 726  |
| 85°  | 160  | 82    | 71   | 71    | 71   | 184  |
| 90°  | 1    | 15    | 42   | 39    | 40   | 12   |
| 95°  | 62   | 74    | 76   | 76    | 74   | 69   |
| 105° | 255  | 258   | 260  | 263   | 263  | 269  |
| 115° | 474  | 480   | 478  | 477   | 474  | 469  |
| 125° | 689  | 700   | 696  | 692   | 691  | 616  |
| 135° | 891  | 904   | 907  | 906   | 902  | 689  |
| 145° | 1082 | 1090  | 1097 | 1098  | 1094 | 676  |
| 155° | 1237 | 1240  | 1244 | 1250  | 1246 | 569  |
| 165° | 1346 | 1345  | 1345 | 1353  | 1347 | 380  |
| 175° | 1400 | 1397  | 1394 | 1403  | 1396 | 133  |
| 180° | 1403 | 1403  | 1403 | 1403  | 1403 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4125.1 | 4125.1 | 4125.1 | 4125.1 | 4125.1 |
| 2.5°   | 4143.8 | 4125.1 | 4083.9 | 4121.6 | 4114.1 |
| 5°     | 4125.1 | 4106.5 | 4057.8 | 4091.4 | 4080.3 |
| 7.5°   | 4091.4 | 4069.3 | 4017.0 | 4031.7 | 4013.0 |
| 10°    | 4046.7 | 4020.6 | 3946.2 | 3934.6 | 3912.4 |
| 12.5°  | 3990.8 | 3957.2 | 3856.2 | 3834.0 | 3792.8 |
| 15°    | 3923.5 | 3882.4 | 3755.6 | 3684.7 | 3647.5 |
| 17.5°  | 3845.1 | 3785.3 | 3628.4 | 3546.5 | 3486.7 |
| 20°    | 3755.6 | 3680.8 | 3494.1 | 3401.1 | 3318.7 |
| 22.5°  | 3658.6 | 3572.6 | 3355.9 | 3229.2 | 3173.4 |
| 25°    | 3561.6 | 3441.9 | 3195.6 | 3042.7 | 2986.4 |
| 27.5°  | 3445.9 | 3318.7 | 3046.2 | 2870.8 | 2784.8 |
| 30°    | 3322.7 | 3180.5 | 2881.8 | 2691.8 | 2590.7 |
| 32.5°  | 3203.0 | 3031.1 | 2725.4 | 2501.2 | 2407.7 |
| 35°    | 3068.8 | 2878.3 | 2549.9 | 2314.7 | 2232.3 |
| 37.5°  | 2938.1 | 2732.6 | 2385.6 | 2127.7 | 2034.7 |
| 40°    | 2799.9 | 2576.1 | 2213.7 | 1948.7 | 1851.7 |
| 42.5°  | 2658.1 | 2419.3 | 2042.1 | 1765.7 | 1672.6 |
| 45°    | 2508.8 | 2258.5 | 1866.7 | 1601.3 | 1511.8 |
| 47.5°  | 2366.9 | 2102.0 | 1698.8 | 1433.4 | 1351.4 |
| 50°    | 2210.1 | 1945.1 | 1534.4 | 1276.6 | 1198.5 |
| 52.5°  | 2056.9 | 1776.8 | 1377.6 | 1131.2 | 1060.3 |
| 55°    | 1907.5 | 1616.4 | 1213.1 | 989.4  | 918.5  |
| 57.5°  | 1754.7 | 1456.0 | 1067.9 | 858.7  | 798.9  |
| 60°    | 1597.7 | 1299.1 | 914.6  | 724.4  | 664.6  |
| 62.5°  | 1444.9 | 1146.3 | 783.8  | 604.8  | 575.1  |
| 65°    | 1288.0 | 985.5  | 649.5  | 522.8  | 511.4  |
| 67.5°  | 1138.7 | 836.1  | 522.8  | 459.0  | 447.9  |
| 70°    | 981.9  | 690.8  | 433.0  | 395.7  | 380.6  |
| 72.5°  | 832.5  | 556.1  | 362.0  | 332.3  | 324.8  |
| 75°    | 686.8  | 425.4  | 298.7  | 272.5  | 268.9  |
| 77.5°  | 541.4  | 302.2  | 235.2  | 220.2  | 212.7  |
| 80°    | 406.8  | 216.7  | 179.0  | 164.4  | 164.4  |
| 82.5°  | 283.6  | 145.7  | 123.2  | 115.7  | 115.7  |
| 85°    | 160.4  | 82.0   | 70.9   | 70.9   | 70.9   |
| 87.5°  | 59.8   | 29.7   | 29.7   | 26.2   | 26.2   |
| 90°    | 1.2    | 15.2   | 41.5   | 38.9   | 40.1   |
| 92.5°  | 26.2   | 35.5   | 36.8   | 38.0   | 38.0   |
| 95°    | 61.8   | 73.6   | 75.7   | 75.7   | 73.6   |
| 97.5°  | 102.8  | 113.8  | 118.4  | 118.4  | 118.4  |
| 100°   | 150.2  | 159.9  | 163.2  | 163.2  | 162.0  |
| 102.5° | 200.1  | 207.3  | 211.9  | 213.1  | 211.9  |
| 105°   | 254.6  | 258.0  | 260.5  | 262.6  | 262.6  |
| 107.5° | 308.7  | 313.8  | 313.8  | 314.6  | 308.7  |
| 110°   | 361.2  | 368.0  | 368.0  | 368.0  | 364.6  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 417.9  | 425.1  | 423.7  | 420.4  | 417.9  |
| 115°   | 473.7  | 480.5  | 478.3  | 477.1  | 473.7  |
| 117.5° | 529.1  | 538.4  | 532.5  | 529.1  | 525.8  |
| 120°   | 585.0  | 594.2  | 585.0  | 585.0  | 581.1  |
| 122.5° | 635.7  | 647.5  | 641.7  | 638.2  | 635.7  |
| 125°   | 689.0  | 699.6  | 696.2  | 692.3  | 691.1  |
| 127.5° | 741.0  | 754.1  | 749.5  | 744.4  | 741.0  |
| 130°   | 789.6  | 804.9  | 802.8  | 800.3  | 795.6  |
| 132.5° | 844.2  | 856.0  | 856.9  | 850.9  | 847.6  |
| 135°   | 891.2  | 904.3  | 906.8  | 905.5  | 902.2  |
| 137.5° | 943.6  | 954.2  | 956.3  | 955.4  | 950.4  |
| 140°   | 989.7  | 1000.3 | 1006.2 | 1006.2 | 1001.5 |
| 142.5° | 1037.1 | 1047.7 | 1051.0 | 1052.3 | 1047.7 |
| 145°   | 1081.9 | 1090.4 | 1097.1 | 1098.5 | 1093.8 |
| 147.5° | 1122.1 | 1132.6 | 1137.7 | 1139.8 | 1135.2 |
| 150°   | 1163.6 | 1170.8 | 1175.4 | 1179.2 | 1175.4 |
| 152.5° | 1200.4 | 1207.5 | 1213.5 | 1218.1 | 1213.5 |
| 155°   | 1237.1 | 1240.5 | 1244.3 | 1250.3 | 1246.4 |
| 157.5° | 1268.9 | 1271.4 | 1273.5 | 1282.0 | 1276.0 |
| 160°   | 1297.2 | 1299.7 | 1301.0 | 1308.2 | 1303.1 |
| 162.5° | 1323.4 | 1323.4 | 1324.7 | 1332.7 | 1326.8 |
| 165°   | 1345.9 | 1344.6 | 1344.6 | 1353.0 | 1347.1 |
| 167.5° | 1366.2 | 1362.3 | 1362.3 | 1370.8 | 1364.8 |
| 170°   | 1381.4 | 1377.9 | 1376.7 | 1385.1 | 1377.9 |
| 172.5° | 1391.9 | 1388.6 | 1387.2 | 1395.8 | 1388.6 |
| 175°   | 1400.4 | 1397.0 | 1394.5 | 1402.9 | 1395.8 |
| 177.5° | 1405.1 | 1401.7 | 1399.1 | 1406.3 | 1399.1 |
| 180°   | 1402.9 | 1402.9 | 1402.9 | 1402.9 | 1402.9 |

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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 | 12.55            | 13.56 | 13.34 | 14.36 | 15.35 | 8.52           | 9.52  | 9.30  | 10.33 | 11.31 |
|                 | 3H   | 14.24            | 15.15 | 15.05 | 15.96 | 16.98 | 9.72           | 10.62 | 10.52 | 11.43 | 12.45 |
|                 | 4H   | 14.86            | 15.71 | 15.68 | 16.54 | 17.56 | 10.18          | 11.03 | 11.00 | 11.85 | 12.88 |
|                 | 6H   | 15.30            | 16.08 | 16.13 | 16.91 | 17.95 | 10.51          | 11.29 | 11.34 | 12.12 | 13.16 |
|                 | 8H   | 15.43            | 16.17 | 16.27 | 17.02 | 18.06 | 10.60          | 11.35 | 11.44 | 12.20 | 13.24 |
|                 | 12H  | 15.50            | 16.21 | 16.34 | 17.05 | 18.11 | 10.65          | 11.36 | 11.50 | 12.21 | 13.27 |
| 4H              | 2H   | 12.59            | 13.44 | 13.41 | 14.26 | 15.29 | 9.13           | 9.98  | 9.96  | 10.81 | 11.83 |
|                 | 3H   | 14.44            | 15.14 | 15.27 | 16.00 | 17.04 | 10.50          | 11.21 | 11.34 | 12.06 | 13.10 |
|                 | 4H   | 15.14            | 15.78 | 15.99 | 16.64 | 17.70 | 11.06          | 11.70 | 11.90 | 12.55 | 13.62 |
|                 | 6H   | 15.67            | 16.22 | 16.53 | 17.10 | 18.17 | 11.49          | 12.04 | 12.35 | 12.92 | 13.99 |
|                 | 8H   | 15.85            | 16.36 | 16.71 | 17.24 | 18.32 | 11.62          | 12.14 | 12.49 | 13.01 | 14.09 |
|                 | 12H  | 15.95            | 16.42 | 16.84 | 17.31 | 18.40 | 11.69          | 12.16 | 12.58 | 13.05 | 14.14 |
| 8H              | 4H   | 15.12            | 15.64 | 15.99 | 16.51 | 17.60 | 11.35          | 11.87 | 12.22 | 12.74 | 13.83 |
|                 | 6H   | 15.70            | 16.12 | 16.59 | 17.04 | 18.12 | 11.88          | 12.30 | 12.77 | 13.22 | 14.31 |
|                 | 8H   | 15.92            | 16.29 | 16.82 | 17.20 | 18.31 | 12.07          | 12.45 | 12.98 | 13.36 | 14.46 |
|                 | 12H  | 16.06            | 16.40 | 16.97 | 17.30 | 18.45 | 12.20          | 12.53 | 13.10 | 13.43 | 14.59 |
| 12H             | 4H   | 15.08            | 15.54 | 15.97 | 16.44 | 17.53 | 11.36          | 11.83 | 12.25 | 12.72 | 13.81 |
|                 | 6H   | 15.67            | 16.05 | 16.58 | 16.96 | 18.06 | 11.93          | 12.31 | 12.83 | 13.22 | 14.32 |
|                 | 8H   | 15.90            | 16.24 | 16.81 | 17.14 | 18.29 | 12.15          | 12.48 | 13.05 | 13.38 | 14.54 |