

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: P911385

Luminaire Tested: DFN2DIP-PN4F0-050D090US850-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P911385  
REPORT IS A COMBINATION OF REPORTS P901221 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-050D090US850-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

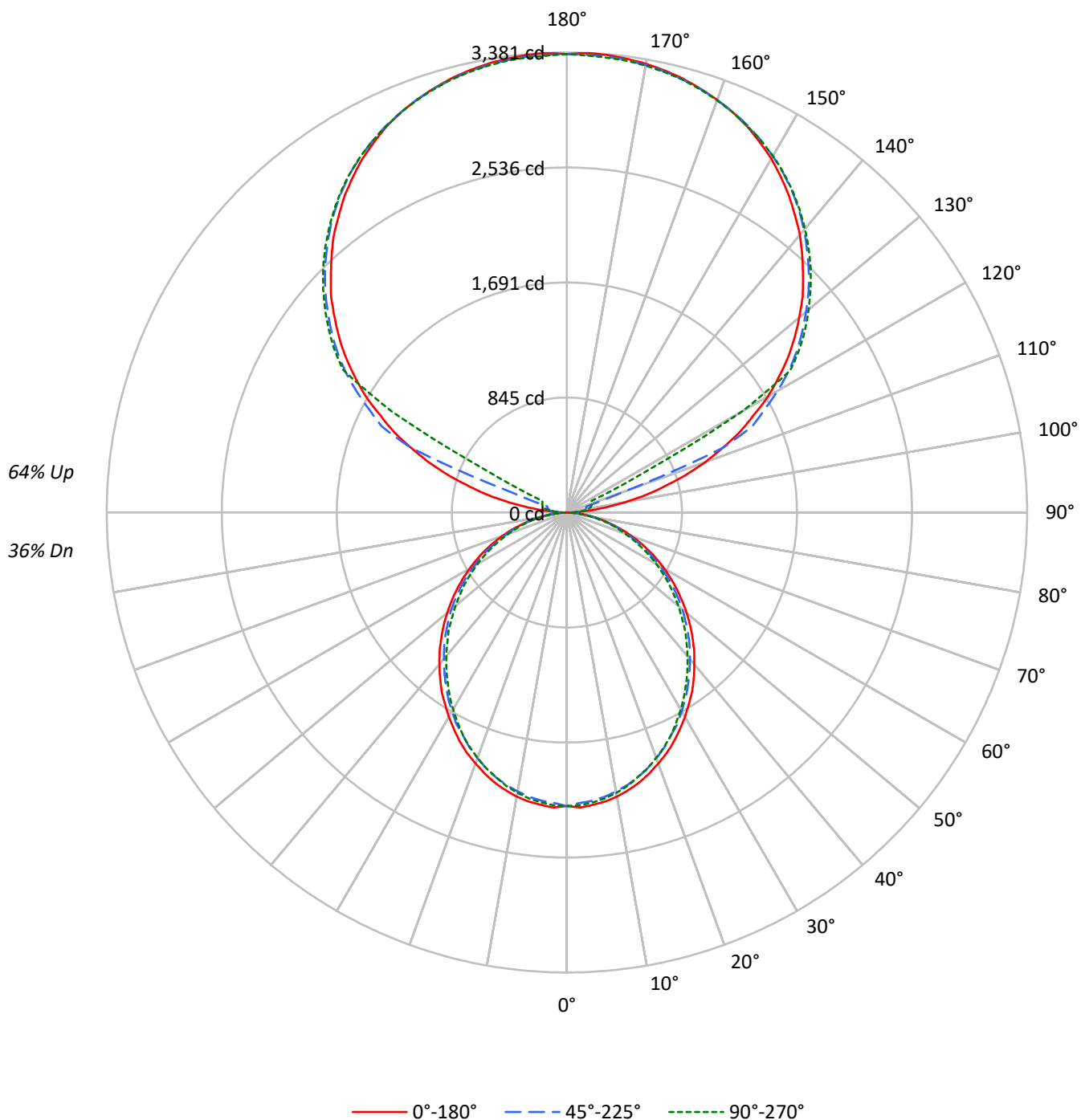
Lumens per Lamp: N/A  
Luminaire Lumens: 15370.7 lumens  
Efficiency: N/A  
Efficacy: 138.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 110.7  
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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### 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   | 104 | 104 | 104 | 104 | 94 | 94 | 94 | 94 | 75 | 75 | 75 | 59 | 59 | 59 | 43 | 43 | 43 |
| 1   | 95  | 90  | 87  | 83  | 85 | 82 | 79 | 76 | 66 | 64 | 62 | 51 | 50 | 49 | 38 | 37 | 36 |
| 2   | 86  | 79  | 73  | 68  | 78 | 72 | 66 | 62 | 58 | 54 | 51 | 45 | 43 | 41 | 33 | 32 | 31 |
| 3   | 79  | 69  | 62  | 56  | 71 | 63 | 57 | 52 | 51 | 47 | 43 | 40 | 37 | 34 | 30 | 28 | 26 |
| 4   | 72  | 61  | 54  | 48  | 65 | 56 | 49 | 44 | 45 | 40 | 37 | 36 | 32 | 29 | 26 | 24 | 22 |
| 5   | 66  | 54  | 47  | 41  | 59 | 50 | 43 | 38 | 40 | 35 | 31 | 32 | 28 | 25 | 24 | 21 | 19 |
| 6   | 61  | 49  | 41  | 35  | 55 | 44 | 38 | 33 | 36 | 31 | 27 | 29 | 25 | 22 | 22 | 19 | 17 |
| 7   | 56  | 44  | 36  | 31  | 50 | 40 | 33 | 28 | 33 | 28 | 24 | 26 | 22 | 20 | 20 | 17 | 15 |
| 8   | 52  | 40  | 32  | 27  | 47 | 36 | 30 | 25 | 30 | 25 | 21 | 24 | 20 | 17 | 18 | 16 | 14 |
| 9   | 48  | 36  | 29  | 24  | 44 | 33 | 27 | 22 | 27 | 22 | 19 | 22 | 18 | 16 | 17 | 14 | 12 |
| 10  | 45  | 33  | 26  | 21  | 41 | 30 | 24 | 20 | 25 | 20 | 17 | 20 | 17 | 14 | 15 | 13 | 11 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1575 | 1575 | 1575 |
| 5°  | 1577 | 1553 | 1564 |
| 10° | 1565 | 1533 | 1543 |
| 15° | 1542 | 1507 | 1510 |
| 20° | 1511 | 1473 | 1476 |
| 25° | 1480 | 1431 | 1438 |
| 30° | 1441 | 1392 | 1388 |
| 35° | 1404 | 1346 | 1336 |
| 40° | 1359 | 1300 | 1286 |
| 45° | 1314 | 1254 | 1235 |
| 50° | 1265 | 1205 | 1176 |
| 55° | 1213 | 1149 | 1122 |
| 60° | 1155 | 1082 | 1060 |
| 65° | 1091 | 1013 | 986  |
| 70° | 1010 | 929  | 908  |
| 75° | 898  | 828  | 836  |
| 80° | 763  | 700  | 697  |
| 85° | 551  | 477  | 466  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1796 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 203.1   | 1.3       |
| 10°-20°   | 571.4   | 3.7       |
| 20°-30°   | 839.7   | 5.5       |
| 30°-40°   | 975.2   | 6.3       |
| 40°-50°   | 974.0   | 6.3       |
| 50°-60°   | 849.3   | 5.5       |
| 60°-70°   | 627.9   | 4.1       |
| 70°-80°   | 355.2   | 2.3       |
| 80°-90°   | 99.7    | 0.6       |
| 90°-100°  | 111.1   | 0.7       |
| 100°-110° | 414.0   | 2.7       |
| 110°-120° | 1098.2  | 7.1       |
| 120°-130° | 1821.4  | 11.8      |
| 130°-140° | 1934.7  | 12.6      |
| 140°-150° | 1798.1  | 11.7      |
| 150°-160° | 1445.6  | 9.4       |
| 160°-170° | 931.5   | 6.1       |
| 170°-180° | 320.6   | 2.1       |
| 0°-30°    | 1614.1  | 10.5      |
| 0°-40°    | 2589.4  | 16.8      |
| 0°-60°    | 4412.7  | 28.7      |
| 0°-90°    | 5495.5  | 35.8      |
| 90°-120°  | 1623.3  | 10.6      |
| 90°-150°  | 7177.5  | 46.7      |
| 90°-180°  | 9875.0  | 64.2      |
| 0°-180°   | 15370.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2158 | 2158  | 2158 | 2158  | 2158 |      |
| 5°   | 2158 | 2150  | 2126 | 2143  | 2139 | 205  |
| 15°  | 2054 | 2042  | 2014 | 2023  | 2012 | 578  |
| 25°  | 1859 | 1842  | 1807 | 1811  | 1807 | 855  |
| 35°  | 1604 | 1583  | 1550 | 1537  | 1527 | 1001 |
| 45°  | 1305 | 1290  | 1259 | 1237  | 1228 | 1007 |
| 55°  | 988  | 975   | 950  | 925   | 915  | 883  |
| 65°  | 666  | 654   | 633  | 614   | 604  | 659  |
| 75°  | 348  | 344   | 334  | 322   | 326  | 372  |
| 85°  | 85   | 83    | 81   | 75    | 73   | 95   |
| 90°  | 2    | 29    | 49   | 61    | 66   | 14   |
| 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°     | 2157.6 | 2157.6 | 2157.6 | 2157.6 | 2157.6 |
| 2.5°   | 2170.1 | 2159.8 | 2136.9 | 2157.6 | 2153.7 |
| 5°     | 2157.6 | 2149.5 | 2126.5 | 2143.0 | 2139.2 |
| 7.5°   | 2143.0 | 2130.7 | 2107.9 | 2124.6 | 2120.4 |
| 10°    | 2120.4 | 2105.9 | 2081.0 | 2097.5 | 2091.4 |
| 12.5°  | 2089.1 | 2076.8 | 2052.0 | 2062.3 | 2058.1 |
| 15°    | 2053.9 | 2041.6 | 2014.5 | 2022.9 | 2012.5 |
| 17.5°  | 2010.3 | 1998.0 | 1970.9 | 1981.2 | 1970.9 |
| 20°    | 1962.6 | 1950.3 | 1921.2 | 1927.3 | 1919.2 |
| 22.5°  | 1915.0 | 1896.3 | 1869.2 | 1869.2 | 1865.0 |
| 25°    | 1858.9 | 1842.4 | 1807.1 | 1811.1 | 1807.1 |
| 27.5°  | 1796.6 | 1782.1 | 1755.2 | 1749.0 | 1738.7 |
| 30°    | 1734.5 | 1717.8 | 1686.8 | 1680.6 | 1672.3 |
| 32.5°  | 1668.0 | 1655.7 | 1622.5 | 1609.9 | 1601.6 |
| 35°    | 1603.7 | 1583.1 | 1549.8 | 1537.3 | 1527.0 |
| 37.5°  | 1531.1 | 1512.5 | 1479.2 | 1464.7 | 1454.3 |
| 40°    | 1456.6 | 1439.8 | 1406.5 | 1388.0 | 1379.7 |
| 42.5°  | 1383.9 | 1367.2 | 1334.1 | 1313.2 | 1300.9 |
| 45°    | 1305.1 | 1290.5 | 1259.3 | 1236.6 | 1228.2 |
| 47.5°  | 1228.2 | 1213.7 | 1180.5 | 1157.6 | 1145.3 |
| 50°    | 1147.3 | 1136.9 | 1107.9 | 1078.8 | 1068.4 |
| 52.5°  | 1068.4 | 1053.9 | 1027.0 | 1004.2 | 989.7  |
| 55°    | 987.7  | 975.1  | 950.2  | 925.3  | 915.0  |
| 57.5°  | 906.6  | 896.3  | 869.2  | 844.4  | 836.0  |
| 60°    | 825.7  | 817.6  | 788.5  | 765.5  | 759.4  |
| 62.5°  | 746.9  | 732.4  | 711.6  | 690.9  | 682.6  |
| 65°    | 666.1  | 653.5  | 632.8  | 614.2  | 603.7  |
| 67.5°  | 583.1  | 572.6  | 554.1  | 539.5  | 531.1  |
| 70°    | 506.3  | 497.9  | 479.2  | 464.7  | 456.6  |
| 72.5°  | 427.5  | 419.1  | 408.8  | 394.2  | 388.0  |
| 75°    | 348.4  | 344.5  | 333.9  | 321.6  | 325.8  |
| 77.5°  | 278.0  | 269.6  | 265.5  | 259.3  | 253.2  |
| 80°    | 207.6  | 205.4  | 201.2  | 195.1  | 190.9  |
| 82.5°  | 141.1  | 141.1  | 139.1  | 130.8  | 130.8  |
| 85°    | 84.9   | 83.0   | 81.0   | 74.6   | 72.6   |
| 87.5°  | 37.4   | 33.3   | 29.1   | 22.8   | 20.7   |
| 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 | 7.37             | 8.12  | 8.44  | 9.19  | 10.65 | 6.93           | 7.68  | 8.00  | 8.75  | 10.21 |
|                 | 3H   | 9.03             | 9.70  | 10.11 | 10.78 | 12.26 | 8.54           | 9.21  | 9.62  | 10.29 | 11.77 |
|                 | 4H   | 9.61             | 10.25 | 10.70 | 11.33 | 12.81 | 9.13           | 9.76  | 10.22 | 10.84 | 12.33 |
|                 | 6H   | 10.01            | 10.59 | 11.11 | 11.68 | 13.18 | 9.52           | 10.10 | 10.62 | 11.19 | 12.68 |
|                 | 8H   | 10.11            | 10.67 | 11.22 | 11.77 | 13.26 | 9.62           | 10.17 | 10.72 | 11.28 | 12.77 |
|                 | 12H  | 10.16            | 10.68 | 11.27 | 11.78 | 13.29 | 9.66           | 10.19 | 10.77 | 11.28 | 12.80 |
| 4H              | 2H   | 7.82             | 8.46  | 8.92  | 9.54  | 11.02 | 7.47           | 8.10  | 8.57  | 9.19  | 10.67 |
|                 | 3H   | 9.68             | 10.21 | 10.78 | 11.32 | 12.82 | 9.28           | 9.81  | 10.38 | 10.92 | 12.41 |
|                 | 4H   | 10.39            | 10.88 | 11.50 | 11.98 | 13.50 | 9.97           | 10.46 | 11.08 | 11.56 | 13.08 |
|                 | 6H   | 10.90            | 11.32 | 12.02 | 12.44 | 13.95 | 10.48          | 10.90 | 11.60 | 12.02 | 13.53 |
|                 | 8H   | 11.05            | 11.44 | 12.17 | 12.56 | 14.08 | 10.62          | 11.01 | 11.74 | 12.13 | 13.65 |
|                 | 12H  | 11.12            | 11.47 | 12.25 | 12.60 | 14.13 | 10.68          | 11.03 | 11.81 | 12.16 | 13.69 |
| 8H              | 4H   | 10.58            | 10.97 | 11.70 | 12.08 | 13.61 | 10.21          | 10.60 | 11.32 | 11.71 | 13.24 |
|                 | 6H   | 11.21            | 11.53 | 12.35 | 12.69 | 14.21 | 10.83          | 11.15 | 11.97 | 12.31 | 13.83 |
|                 | 8H   | 11.43            | 11.71 | 12.57 | 12.85 | 14.39 | 11.05          | 11.33 | 12.19 | 12.46 | 14.01 |
|                 | 12H  | 11.56            | 11.81 | 12.71 | 12.94 | 14.52 | 11.16          | 11.40 | 12.31 | 12.54 | 14.12 |
| 12H             | 4H   | 10.56            | 10.91 | 11.69 | 12.04 | 13.57 | 10.20          | 10.55 | 11.33 | 11.68 | 13.21 |
|                 | 6H   | 11.24            | 11.52 | 12.38 | 12.66 | 14.20 | 10.87          | 11.16 | 12.02 | 12.29 | 13.84 |
|                 | 8H   | 11.48            | 11.72 | 12.63 | 12.86 | 14.44 | 11.11          | 11.35 | 12.25 | 12.49 | 14.07 |