

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: P903382

Luminaire Tested: DFN2DIP-PN4F0-100D090US830-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P903382  
REPORT IS A COMBINATION OF REPORTS P899712 AND P896497  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-100D090US830-RLLFLL  
Description: 4 foot, Pentagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

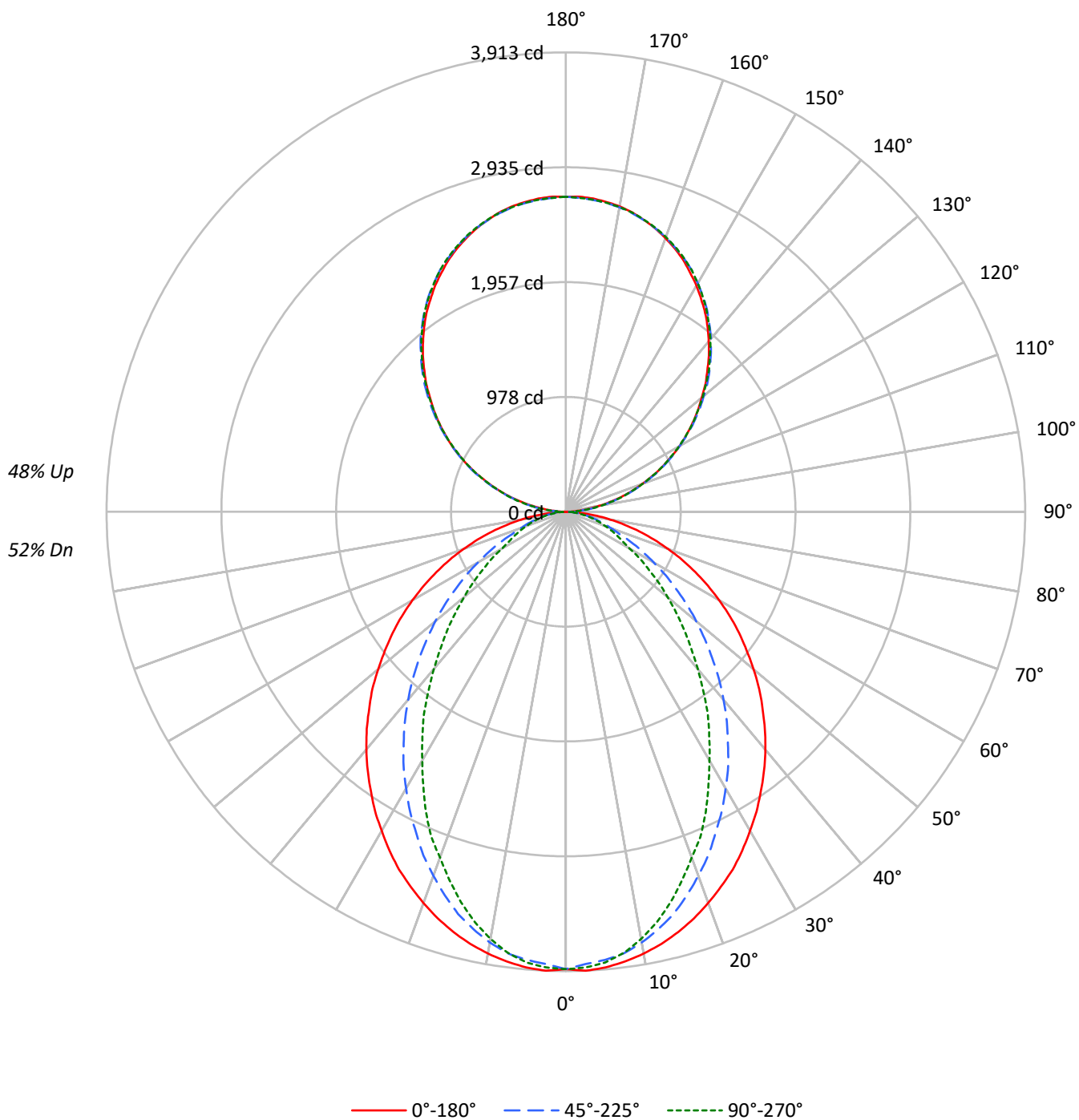
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 15518.9 lumens  
Efficiency: N/A  
Efficacy: 92.6 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: General Diffuse  
  
Input Watts (W): 167.6  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9952  
Total Harmonic Distortion (THDi): 0.069  
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



TEST NUMBER: P903382

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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   | 108 | 108 | 108 | 108 | 99 | 99 | 99 | 99 | 84 | 84 | 84 | 70 | 70 | 70 | 58 | 58 | 58 |
| 1   | 99  | 94  | 91  | 87  | 91 | 88 | 84 | 82 | 75 | 72 | 70 | 63 | 61 | 60 | 52 | 51 | 50 |
| 2   | 90  | 83  | 77  | 72  | 83 | 77 | 72 | 68 | 66 | 62 | 59 | 56 | 53 | 51 | 46 | 44 | 43 |
| 3   | 83  | 73  | 66  | 61  | 76 | 68 | 62 | 57 | 59 | 54 | 50 | 50 | 46 | 43 | 41 | 39 | 37 |
| 4   | 76  | 65  | 58  | 52  | 70 | 61 | 54 | 49 | 52 | 47 | 43 | 45 | 41 | 38 | 37 | 34 | 32 |
| 5   | 70  | 59  | 51  | 45  | 64 | 55 | 48 | 42 | 47 | 42 | 38 | 40 | 36 | 33 | 34 | 31 | 28 |
| 6   | 64  | 53  | 45  | 39  | 60 | 49 | 42 | 37 | 43 | 37 | 33 | 37 | 32 | 29 | 31 | 28 | 25 |
| 7   | 60  | 48  | 40  | 35  | 55 | 45 | 38 | 33 | 39 | 33 | 29 | 33 | 29 | 26 | 28 | 25 | 23 |
| 8   | 56  | 43  | 36  | 31  | 51 | 41 | 34 | 29 | 36 | 30 | 26 | 31 | 26 | 23 | 26 | 23 | 20 |
| 9   | 52  | 40  | 32  | 28  | 48 | 37 | 31 | 26 | 33 | 27 | 24 | 28 | 24 | 21 | 24 | 21 | 19 |
| 10  | 48  | 37  | 30  | 25  | 45 | 34 | 28 | 24 | 30 | 25 | 21 | 26 | 22 | 19 | 23 | 19 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2844 | 2844 | 2844 |
| 5°  | 2848 | 2799 | 2817 |
| 10° | 2820 | 2744 | 2726 |
| 15° | 2781 | 2654 | 2584 |
| 20° | 2730 | 2529 | 2411 |
| 25° | 2677 | 2389 | 2244 |
| 30° | 2606 | 2246 | 2031 |
| 35° | 2537 | 2092 | 1844 |
| 40° | 2467 | 1932 | 1630 |
| 45° | 2385 | 1755 | 1436 |
| 50° | 2301 | 1576 | 1246 |
| 55° | 2212 | 1385 | 1063 |
| 60° | 2110 | 1185 | 876  |
| 65° | 1992 | 982  | 789  |
| 70° | 1850 | 792  | 715  |
| 75° | 1671 | 699  | 651  |
| 80° | 1411 | 588  | 567  |
| 85° | 983  | 394  | 429  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2385 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 365.1   | 2.4       |
| 10°-20°   | 1002.2  | 6.5       |
| 20°-30°   | 1407.1  | 9.1       |
| 30°-40°   | 1533.9  | 9.9       |
| 40°-50°   | 1409.8  | 9.1       |
| 50°-60°   | 1107.2  | 7.1       |
| 60°-70°   | 720.7   | 4.6       |
| 70°-80°   | 371.0   | 2.4       |
| 80°-90°   | 102.3   | 0.7       |
| 90°-100°  | 166.0   | 1.1       |
| 100°-110° | 527.5   | 3.4       |
| 110°-120° | 902.7   | 5.8       |
| 120°-130° | 1187.2  | 7.6       |
| 130°-140° | 1332.5  | 8.6       |
| 140°-150° | 1306.7  | 8.4       |
| 150°-160° | 1096.1  | 7.1       |
| 160°-170° | 726.9   | 4.7       |
| 170°-180° | 254.1   | 1.6       |
| 0°-30°    | 2774.5  | 17.9      |
| 0°-40°    | 4308.3  | 27.8      |
| 0°-60°    | 6825.3  | 44.0      |
| 0°-90°    | 8019.2  | 51.7      |
| 90°-120°  | 1596.2  | 10.3      |
| 90°-150°  | 5422.6  | 34.9      |
| 90°-180°  | 7500.0  | 48.3      |
| 0°-180°   | 15518.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3896 | 3896  | 3896 | 3896  | 3896 |      |
| 5°   | 3896 | 3878  | 3832 | 3864  | 3853 | 369  |
| 15°  | 3705 | 3666  | 3546 | 3480  | 3444 | 1044 |
| 25°  | 3363 | 3250  | 3018 | 2873  | 2820 | 1547 |
| 35°  | 2898 | 2718  | 2408 | 2186  | 2108 | 1814 |
| 45°  | 2369 | 2133  | 1763 | 1512  | 1428 | 1830 |
| 55°  | 1801 | 1526  | 1146 | 934   | 867  | 1610 |
| 65°  | 1216 | 931   | 613  | 494   | 483  | 1206 |
| 75°  | 649  | 402   | 282  | 257   | 254  | 686  |
| 85°  | 152  | 77    | 67   | 67    | 67   | 174  |
| 90°  | 2    | 29    | 79   | 74    | 77   | 15   |
| 95°  | 118  | 141   | 145  | 145   | 141  | 131  |
| 105° | 487  | 493   | 498  | 502   | 502  | 514  |
| 115° | 906  | 919   | 915  | 912   | 906  | 896  |
| 125° | 1318 | 1338  | 1331 | 1324  | 1322 | 1177 |
| 135° | 1704 | 1729  | 1734 | 1732  | 1725 | 1317 |
| 145° | 2069 | 2085  | 2098 | 2100  | 2092 | 1293 |
| 155° | 2366 | 2372  | 2380 | 2391  | 2384 | 1089 |
| 165° | 2574 | 2571  | 2571 | 2587  | 2576 | 726  |
| 175° | 2678 | 2671  | 2667 | 2683  | 2669 | 254  |
| 180° | 2683 | 2683  | 2683 | 2683  | 2683 |      |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3895.5 | 3895.5 | 3895.5 | 3895.5 | 3895.5 |
| 2.5°   | 3913.1 | 3895.5 | 3856.6 | 3892.1 | 3885.1 |
| 5°     | 3895.5 | 3877.9 | 3831.9 | 3863.8 | 3853.2 |
| 7.5°   | 3863.8 | 3842.7 | 3793.4 | 3807.2 | 3789.7 |
| 10°    | 3821.4 | 3796.7 | 3726.4 | 3715.6 | 3694.7 |
| 12.5°  | 3768.8 | 3736.9 | 3641.5 | 3620.6 | 3581.7 |
| 15°    | 3705.1 | 3666.2 | 3546.5 | 3479.6 | 3444.4 |
| 17.5°  | 3631.0 | 3574.6 | 3426.5 | 3349.0 | 3292.6 |
| 20°    | 3546.5 | 3475.8 | 3299.7 | 3211.8 | 3134.0 |
| 22.5°  | 3454.9 | 3373.7 | 3169.1 | 3049.5 | 2996.7 |
| 25°    | 3363.3 | 3250.4 | 3017.6 | 2873.2 | 2820.2 |
| 27.5°  | 3254.0 | 3134.0 | 2876.6 | 2710.9 | 2629.8 |
| 30°    | 3137.7 | 3003.4 | 2721.4 | 2541.9 | 2446.6 |
| 32.5°  | 3024.8 | 2862.4 | 2573.7 | 2362.0 | 2273.7 |
| 35°    | 2897.9 | 2718.1 | 2408.0 | 2185.8 | 2108.0 |
| 37.5°  | 2774.6 | 2580.4 | 2252.8 | 2009.3 | 1921.4 |
| 40°    | 2644.0 | 2432.7 | 2090.5 | 1840.2 | 1748.6 |
| 42.5°  | 2510.1 | 2284.5 | 1928.5 | 1667.5 | 1579.5 |
| 45°    | 2369.1 | 2132.7 | 1762.8 | 1512.2 | 1427.7 |
| 47.5°  | 2235.2 | 1985.0 | 1604.2 | 1353.6 | 1276.2 |
| 50°    | 2087.1 | 1836.8 | 1449.0 | 1205.5 | 1131.8 |
| 52.5°  | 1942.3 | 1677.9 | 1300.9 | 1068.2 | 1001.3 |
| 55°    | 1801.3 | 1526.4 | 1145.7 | 934.3  | 867.3  |
| 57.5°  | 1657.0 | 1374.9 | 1008.4 | 810.9  | 754.4  |
| 60°    | 1508.8 | 1226.8 | 863.7  | 684.1  | 627.6  |
| 62.5°  | 1364.4 | 1082.4 | 740.2  | 571.2  | 543.1  |
| 65°    | 1216.4 | 930.6  | 613.4  | 493.7  | 482.9  |
| 67.5°  | 1075.3 | 789.6  | 493.7  | 433.5  | 423.0  |
| 70°    | 927.2  | 652.3  | 408.8  | 373.6  | 359.5  |
| 72.5°  | 786.2  | 525.1  | 341.9  | 313.8  | 306.7  |
| 75°    | 648.6  | 401.7  | 282.0  | 257.3  | 253.9  |
| 77.5°  | 511.3  | 285.4  | 222.2  | 207.9  | 200.9  |
| 80°    | 384.1  | 204.6  | 169.1  | 155.2  | 155.2  |
| 82.5°  | 267.8  | 137.6  | 116.3  | 109.2  | 109.2  |
| 85°    | 151.5  | 77.4   | 66.9   | 66.9   | 66.9   |
| 87.5°  | 56.5   | 28.1   | 28.1   | 24.7   | 24.7   |
| 90°    | 2.5    | 29.1   | 79.3   | 74.4   | 76.8   |
| 92.5°  | 50.1   | 68.0   | 70.4   | 72.8   | 72.8   |
| 95°    | 118.1  | 140.7  | 144.8  | 144.8  | 140.7  |
| 97.5°  | 196.5  | 217.5  | 226.5  | 226.5  | 226.5  |
| 100°   | 287.1  | 305.8  | 312.2  | 312.2  | 309.8  |
| 102.5° | 382.6  | 396.3  | 405.2  | 407.6  | 405.2  |
| 105°   | 486.9  | 493.3  | 498.2  | 502.3  | 502.3  |
| 107.5° | 590.4  | 600.1  | 600.1  | 601.7  | 590.4  |
| 110°   | 690.7  | 703.7  | 703.7  | 703.7  | 697.2  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 799.1  | 812.8  | 810.4  | 804.0  | 799.1  |
| 115°   | 905.9  | 918.8  | 914.7  | 912.4  | 905.9  |
| 117.5° | 1011.8 | 1029.6 | 1018.3 | 1011.8 | 1005.3 |
| 120°   | 1118.6 | 1136.3 | 1118.6 | 1118.6 | 1111.3 |
| 122.5° | 1215.6 | 1238.3 | 1227.0 | 1220.5 | 1215.6 |
| 125°   | 1317.6 | 1337.8 | 1331.3 | 1324.0 | 1321.6 |
| 127.5° | 1417.0 | 1442.1 | 1433.2 | 1423.5 | 1417.0 |
| 130°   | 1510.0 | 1539.2 | 1535.1 | 1530.2 | 1521.4 |
| 132.5° | 1614.4 | 1637.0 | 1638.6 | 1627.3 | 1620.9 |
| 135°   | 1704.1 | 1729.2 | 1734.1 | 1731.6 | 1725.2 |
| 137.5° | 1804.4 | 1824.7 | 1828.7 | 1827.1 | 1817.4 |
| 140°   | 1892.6 | 1912.8 | 1924.1 | 1924.1 | 1915.2 |
| 142.5° | 1983.2 | 2003.4 | 2009.9 | 2012.3 | 2003.4 |
| 145°   | 2069.0 | 2085.1 | 2098.0 | 2100.5 | 2091.6 |
| 147.5° | 2145.8 | 2166.0 | 2175.7 | 2179.7 | 2170.9 |
| 150°   | 2225.1 | 2238.8 | 2247.7 | 2254.9 | 2247.7 |
| 152.5° | 2295.4 | 2309.1 | 2320.4 | 2329.4 | 2320.4 |
| 155°   | 2365.8 | 2372.2 | 2379.5 | 2390.9 | 2383.6 |
| 157.5° | 2426.4 | 2431.3 | 2435.3 | 2451.5 | 2440.1 |
| 160°   | 2480.6 | 2485.5 | 2487.9 | 2501.6 | 2491.9 |
| 162.5° | 2530.7 | 2530.7 | 2533.2 | 2548.5 | 2537.2 |
| 165°   | 2573.6 | 2571.2 | 2571.2 | 2587.4 | 2576.1 |
| 167.5° | 2612.4 | 2605.2 | 2605.2 | 2621.3 | 2610.0 |
| 170°   | 2641.6 | 2635.1 | 2632.7 | 2648.8 | 2635.1 |
| 172.5° | 2661.7 | 2655.3 | 2652.9 | 2669.1 | 2655.3 |
| 175°   | 2678.0 | 2671.4 | 2666.6 | 2682.9 | 2669.1 |
| 177.5° | 2686.8 | 2680.4 | 2675.5 | 2689.3 | 2675.5 |
| 180°   | 2682.9 | 2682.9 | 2682.9 | 2682.9 | 2682.9 |

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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 | 10.94            | 11.78 | 11.89 | 12.74 | 13.99 | 6.90           | 7.75  | 7.85  | 8.71  | 9.96  |
|                 | 3H   | 12.62            | 13.38 | 13.58 | 14.35 | 15.62 | 8.09           | 8.85  | 9.06  | 9.82  | 11.09 |
|                 | 4H   | 13.23            | 13.94 | 14.21 | 14.92 | 16.20 | 8.55           | 9.26  | 9.52  | 10.23 | 11.51 |
|                 | 6H   | 13.66            | 14.31 | 14.64 | 15.29 | 16.59 | 8.87           | 9.52  | 9.85  | 10.50 | 11.80 |
|                 | 8H   | 13.78            | 14.41 | 14.78 | 15.40 | 16.70 | 8.96           | 9.58  | 9.95  | 10.58 | 11.87 |
|                 | 12H  | 13.85            | 14.44 | 14.84 | 15.43 | 16.75 | 9.00           | 9.60  | 10.00 | 10.59 | 11.90 |
| 4H              | 2H   | 10.96            | 11.67 | 11.94 | 12.65 | 13.93 | 7.50           | 8.22  | 8.48  | 9.19  | 10.47 |
|                 | 3H   | 12.79            | 13.39 | 13.78 | 14.39 | 15.68 | 8.85           | 9.45  | 9.84  | 10.45 | 11.75 |
|                 | 4H   | 13.49            | 14.03 | 14.49 | 15.03 | 16.34 | 9.40           | 9.95  | 10.40 | 10.94 | 12.26 |
|                 | 6H   | 14.01            | 14.47 | 15.02 | 15.49 | 16.81 | 9.83           | 10.29 | 10.83 | 11.31 | 12.63 |
|                 | 8H   | 14.18            | 14.62 | 15.19 | 15.63 | 16.96 | 9.95           | 10.39 | 10.97 | 11.40 | 12.73 |
|                 | 12H  | 14.28            | 14.67 | 15.31 | 15.70 | 17.04 | 10.02          | 10.41 | 11.05 | 11.44 | 12.78 |
| 8H              | 4H   | 13.46            | 13.89 | 14.47 | 14.90 | 16.24 | 9.69           | 10.12 | 10.70 | 11.13 | 12.47 |
|                 | 6H   | 14.03            | 14.38 | 15.06 | 15.44 | 16.77 | 10.21          | 10.57 | 11.24 | 11.62 | 12.95 |
|                 | 8H   | 14.24            | 14.56 | 15.29 | 15.60 | 16.95 | 10.40          | 10.71 | 11.44 | 11.76 | 13.10 |
|                 | 12H  | 14.39            | 14.66 | 15.43 | 15.70 | 17.09 | 10.52          | 10.80 | 11.57 | 11.83 | 13.22 |
| 12H             | 4H   | 13.41            | 13.80 | 14.44 | 14.83 | 16.17 | 9.69           | 10.08 | 10.72 | 11.11 | 12.45 |
|                 | 6H   | 14.00            | 14.32 | 15.04 | 15.36 | 16.71 | 10.26          | 10.57 | 11.30 | 11.61 | 12.96 |
|                 | 8H   | 14.22            | 14.50 | 15.27 | 15.54 | 16.93 | 10.47          | 10.75 | 11.52 | 11.78 | 13.17 |