

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: P917010

Luminaire Tested: DFN2DIP-PN4F0-100D060US930-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P917010  
REPORT IS A COMBINATION OF REPORTS P899658 AND P896497  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-100D060US930-RLLFLL  
Description: 4 foot, Pentagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

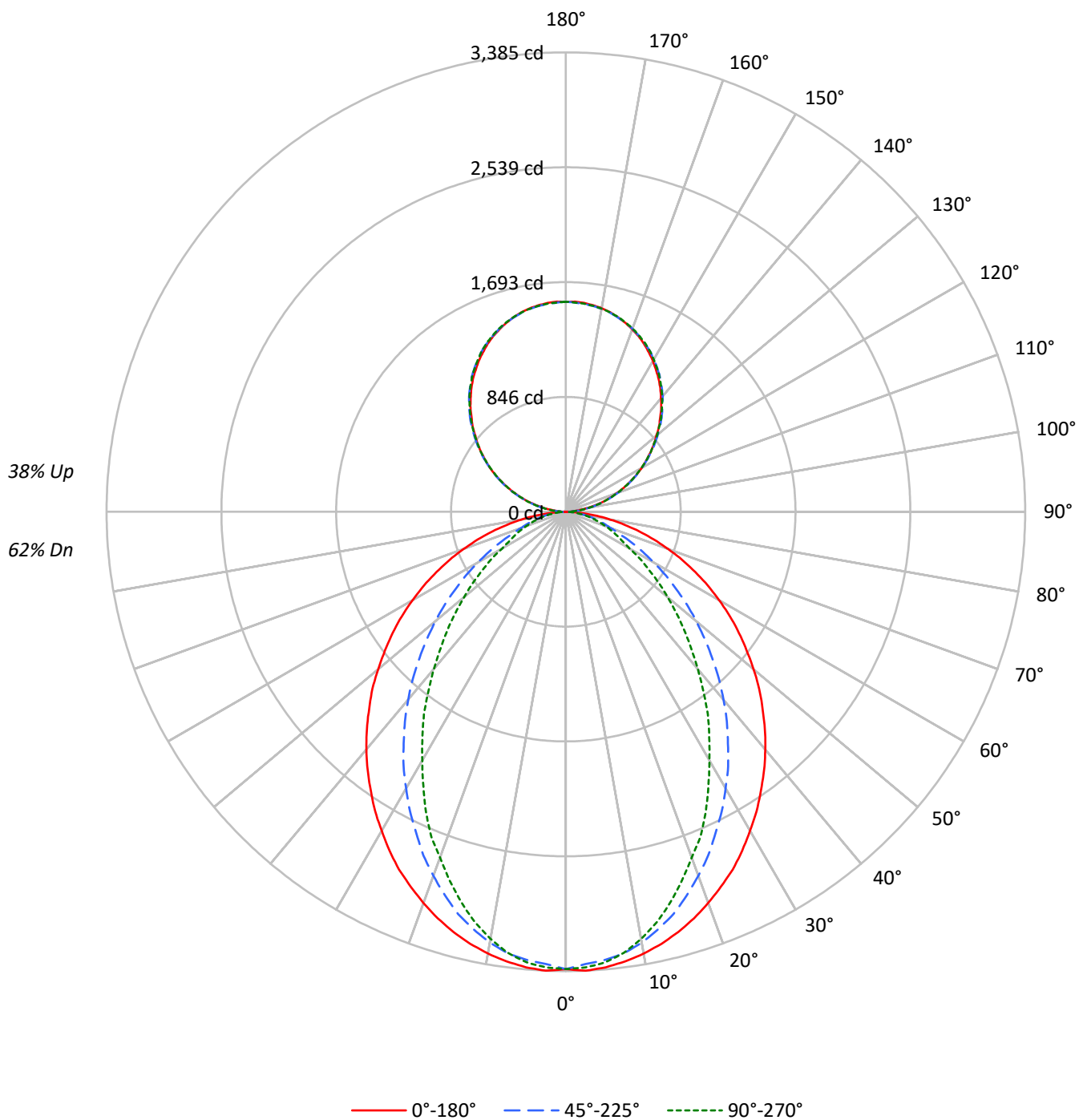
Lumens per Lamp: N/A  
Luminaire Lumens: 11259.3 lumens  
Efficiency: N/A  
Efficacy: 77.1 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 146.1  
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



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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   | 110 | 110 | 110 | 110 | 103 | 103 | 103 | 103 | 90 | 90 | 90 | 78 | 78 | 78 | 67 | 67 | 67 |
| 1   | 101 | 97  | 93  | 90  | 94  | 91  | 88  | 85  | 80 | 77 | 75 | 69 | 68 | 66 | 60 | 59 | 58 |
| 2   | 92  | 85  | 79  | 74  | 86  | 80  | 75  | 70  | 71 | 67 | 63 | 62 | 59 | 56 | 53 | 51 | 49 |
| 3   | 85  | 75  | 68  | 63  | 79  | 71  | 65  | 60  | 63 | 58 | 54 | 55 | 51 | 48 | 48 | 45 | 43 |
| 4   | 78  | 67  | 60  | 54  | 73  | 63  | 57  | 51  | 56 | 51 | 46 | 49 | 45 | 42 | 43 | 40 | 37 |
| 5   | 72  | 60  | 52  | 46  | 67  | 57  | 50  | 44  | 51 | 45 | 41 | 45 | 40 | 37 | 39 | 36 | 33 |
| 6   | 66  | 54  | 46  | 41  | 62  | 51  | 44  | 39  | 46 | 40 | 36 | 41 | 36 | 32 | 36 | 32 | 29 |
| 7   | 62  | 49  | 42  | 36  | 58  | 47  | 40  | 35  | 42 | 36 | 32 | 37 | 33 | 29 | 33 | 29 | 26 |
| 8   | 57  | 45  | 37  | 32  | 54  | 43  | 36  | 31  | 38 | 33 | 28 | 34 | 30 | 26 | 30 | 27 | 24 |
| 9   | 53  | 41  | 34  | 29  | 50  | 39  | 32  | 28  | 35 | 30 | 26 | 32 | 27 | 24 | 28 | 24 | 22 |
| 10  | 50  | 38  | 31  | 26  | 47  | 36  | 30  | 25  | 33 | 27 | 23 | 29 | 25 | 22 | 26 | 22 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2460 | 2460 | 2460 |
| 5°  | 2464 | 2421 | 2437 |
| 10° | 2439 | 2374 | 2358 |
| 15° | 2406 | 2296 | 2236 |
| 20° | 2361 | 2188 | 2086 |
| 25° | 2316 | 2067 | 1941 |
| 30° | 2255 | 1943 | 1757 |
| 35° | 2195 | 1809 | 1595 |
| 40° | 2134 | 1671 | 1410 |
| 45° | 2063 | 1518 | 1242 |
| 50° | 1990 | 1364 | 1077 |
| 55° | 1914 | 1198 | 920  |
| 60° | 1825 | 1025 | 758  |
| 65° | 1723 | 849  | 682  |
| 70° | 1600 | 685  | 618  |
| 75° | 1445 | 605  | 563  |
| 80° | 1221 | 509  | 490  |
| 85° | 850  | 341  | 372  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2063 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 315.8   | 2.8       |
| 10°-20°   | 866.9   | 7.7       |
| 20°-30°   | 1217.2  | 10.8      |
| 30°-40°   | 1326.8  | 11.8      |
| 40°-50°   | 1219.5  | 10.8      |
| 50°-60°   | 957.7   | 8.5       |
| 60°-70°   | 623.4   | 5.5       |
| 70°-80°   | 320.9   | 2.8       |
| 80°-90°   | 86.3    | 0.8       |
| 90°-100°  | 95.7    | 0.9       |
| 100°-110° | 304.2   | 2.7       |
| 110°-120° | 520.6   | 4.6       |
| 120°-130° | 684.6   | 6.1       |
| 130°-140° | 768.4   | 6.8       |
| 140°-150° | 753.5   | 6.7       |
| 150°-160° | 632.1   | 5.6       |
| 160°-170° | 419.2   | 3.7       |
| 170°-180° | 146.5   | 1.3       |
| 0°-30°    | 2399.9  | 21.3      |
| 0°-40°    | 3726.7  | 33.1      |
| 0°-60°    | 5903.9  | 52.4      |
| 0°-90°    | 6934.4  | 61.6      |
| 90°-120°  | 920.5   | 8.2       |
| 90°-150°  | 3127.0  | 27.8      |
| 90°-180°  | 4325.0  | 38.4      |
| 0°-180°   | 11259.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3370 | 3370  | 3370 | 3370  | 3370 |      |
| 5°   | 3370 | 3354  | 3315 | 3342  | 3333 | 320  |
| 15°  | 3205 | 3171  | 3068 | 3010  | 2979 | 903  |
| 25°  | 2909 | 2812  | 2610 | 2485  | 2440 | 1338 |
| 35°  | 2507 | 2351  | 2083 | 1891  | 1823 | 1569 |
| 45°  | 2049 | 1845  | 1525 | 1308  | 1235 | 1583 |
| 55°  | 1558 | 1320  | 991  | 808   | 750  | 1392 |
| 65°  | 1052 | 805   | 531  | 427   | 418  | 1043 |
| 75°  | 561  | 348   | 244  | 223   | 220  | 593  |
| 85°  | 131  | 67    | 58   | 58    | 58   | 150  |
| 90°  | 1    | 17    | 46   | 43    | 44   | 11   |
| 95°  | 68   | 81    | 84   | 84    | 81   | 76   |
| 105° | 281  | 284   | 287  | 290   | 290  | 296  |
| 115° | 522  | 530   | 528  | 526   | 522  | 517  |
| 125° | 760  | 771   | 768  | 764   | 762  | 679  |
| 135° | 983  | 997   | 1000 | 999   | 995  | 760  |
| 145° | 1193 | 1202  | 1210 | 1211  | 1206 | 745  |
| 155° | 1364 | 1368  | 1372 | 1379  | 1374 | 628  |
| 165° | 1484 | 1483  | 1483 | 1492  | 1486 | 419  |
| 175° | 1544 | 1541  | 1538 | 1547  | 1539 | 147  |
| 180° | 1547 | 1547  | 1547 | 1547  | 1547 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3369.6 | 3369.6 | 3369.6 | 3369.6 | 3369.6 |
| 2.5°   | 3384.8 | 3369.6 | 3336.0 | 3366.7 | 3360.6 |
| 5°     | 3369.6 | 3354.4 | 3314.6 | 3342.2 | 3333.0 |
| 7.5°   | 3342.2 | 3324.0 | 3281.2 | 3293.2 | 3278.1 |
| 10°    | 3305.5 | 3284.2 | 3223.4 | 3214.0 | 3195.9 |
| 12.5°  | 3260.0 | 3232.4 | 3149.9 | 3131.8 | 3098.1 |
| 15°    | 3204.9 | 3171.3 | 3067.7 | 3009.8 | 2979.4 |
| 17.5°  | 3140.9 | 3092.0 | 2963.9 | 2896.9 | 2848.1 |
| 20°    | 3067.7 | 3006.6 | 2854.2 | 2778.2 | 2710.9 |
| 22.5°  | 2988.5 | 2918.3 | 2741.3 | 2637.8 | 2592.2 |
| 25°    | 2909.2 | 2811.6 | 2610.3 | 2485.4 | 2439.5 |
| 27.5°  | 2814.7 | 2710.9 | 2488.3 | 2345.0 | 2274.8 |
| 30°    | 2714.1 | 2597.9 | 2354.0 | 2198.8 | 2116.3 |
| 32.5°  | 2616.5 | 2476.0 | 2226.3 | 2043.1 | 1966.7 |
| 35°    | 2506.7 | 2351.2 | 2082.9 | 1890.8 | 1823.4 |
| 37.5°  | 2400.0 | 2232.0 | 1948.6 | 1738.1 | 1662.0 |
| 40°    | 2287.1 | 2104.3 | 1808.2 | 1591.8 | 1512.5 |
| 42.5°  | 2171.2 | 1976.1 | 1668.2 | 1442.3 | 1366.3 |
| 45°    | 2049.3 | 1844.8 | 1524.9 | 1308.1 | 1234.9 |
| 47.5°  | 1933.5 | 1717.0 | 1387.6 | 1170.8 | 1103.9 |
| 50°    | 1805.3 | 1588.9 | 1253.4 | 1042.8 | 979.0  |
| 52.5°  | 1680.1 | 1451.4 | 1125.3 | 924.0  | 866.1  |
| 55°    | 1558.1 | 1320.4 | 991.0  | 808.2  | 750.2  |
| 57.5°  | 1433.3 | 1189.3 | 872.3  | 701.4  | 652.6  |
| 60°    | 1305.1 | 1061.2 | 747.1  | 591.7  | 542.9  |
| 62.5°  | 1180.2 | 936.3  | 640.3  | 494.1  | 469.8  |
| 65°    | 1052.1 | 804.9  | 530.6  | 427.1  | 417.7  |
| 67.5°  | 930.2  | 683.0  | 427.1  | 375.0  | 365.9  |
| 70°    | 802.0  | 564.3  | 353.6  | 323.2  | 311.0  |
| 72.5°  | 680.0  | 454.2  | 295.7  | 271.4  | 265.3  |
| 75°    | 561.0  | 347.5  | 243.9  | 222.6  | 219.6  |
| 77.5°  | 442.3  | 246.9  | 192.2  | 179.9  | 173.7  |
| 80°    | 332.2  | 177.0  | 146.3  | 134.3  | 134.3  |
| 82.5°  | 231.6  | 119.0  | 100.6  | 94.5   | 94.5   |
| 85°    | 131.0  | 66.9   | 57.9   | 57.9   | 57.9   |
| 87.5°  | 48.8   | 24.3   | 24.3   | 21.4   | 21.4   |
| 90°    | 1.4    | 16.8   | 45.7   | 42.9   | 44.3   |
| 92.5°  | 28.9   | 39.2   | 40.6   | 42.0   | 42.0   |
| 95°    | 68.1   | 81.1   | 83.5   | 83.5   | 81.1   |
| 97.5°  | 113.3  | 125.5  | 130.6  | 130.6  | 130.6  |
| 100°   | 165.6  | 176.3  | 180.0  | 180.0  | 178.6  |
| 102.5° | 220.6  | 228.5  | 233.7  | 235.1  | 233.7  |
| 105°   | 280.8  | 284.5  | 287.3  | 289.7  | 289.7  |
| 107.5° | 340.5  | 346.1  | 346.1  | 347.0  | 340.5  |
| 110°   | 398.4  | 405.8  | 405.8  | 405.8  | 402.0  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 460.8  | 468.7  | 467.3  | 463.6  | 460.8  |
| 115°   | 522.4  | 529.9  | 527.5  | 526.1  | 522.4  |
| 117.5° | 583.5  | 593.8  | 587.2  | 583.5  | 579.8  |
| 120°   | 645.1  | 655.3  | 645.1  | 645.1  | 640.8  |
| 122.5° | 701.0  | 714.0  | 707.5  | 703.8  | 701.0  |
| 125°   | 759.8  | 771.4  | 767.7  | 763.5  | 762.1  |
| 127.5° | 817.2  | 831.6  | 826.5  | 820.9  | 817.2  |
| 130°   | 870.8  | 887.6  | 885.3  | 882.5  | 877.3  |
| 132.5° | 931.0  | 944.0  | 944.9  | 938.4  | 934.7  |
| 135°   | 982.8  | 997.2  | 1000.0 | 998.6  | 994.8  |
| 137.5° | 1040.6 | 1052.2 | 1054.6 | 1053.6 | 1048.1 |
| 140°   | 1091.4 | 1103.1 | 1109.6 | 1109.6 | 1104.5 |
| 142.5° | 1143.6 | 1155.3 | 1159.0 | 1160.4 | 1155.3 |
| 145°   | 1193.1 | 1202.4 | 1209.9 | 1211.3 | 1206.2 |
| 147.5° | 1237.4 | 1249.0 | 1254.7 | 1256.9 | 1251.8 |
| 150°   | 1283.1 | 1291.0 | 1296.2 | 1300.3 | 1296.2 |
| 152.5° | 1323.6 | 1331.6 | 1338.1 | 1343.3 | 1338.1 |
| 155°   | 1364.2 | 1368.0 | 1372.1 | 1378.8 | 1374.5 |
| 157.5° | 1399.2 | 1402.1 | 1404.4 | 1413.7 | 1407.2 |
| 160°   | 1430.5 | 1433.3 | 1434.7 | 1442.6 | 1437.0 |
| 162.5° | 1459.4 | 1459.4 | 1460.8 | 1469.7 | 1463.1 |
| 165°   | 1484.1 | 1482.7 | 1482.7 | 1492.1 | 1485.6 |
| 167.5° | 1506.5 | 1502.4 | 1502.4 | 1511.6 | 1505.1 |
| 170°   | 1523.3 | 1519.6 | 1518.2 | 1527.5 | 1519.6 |
| 172.5° | 1535.0 | 1531.2 | 1529.8 | 1539.1 | 1531.2 |
| 175°   | 1544.3 | 1540.6 | 1537.7 | 1547.1 | 1539.1 |
| 177.5° | 1549.4 | 1545.7 | 1542.9 | 1550.8 | 1542.9 |
| 180°   | 1547.1 | 1547.1 | 1547.1 | 1547.1 | 1547.1 |

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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 | 11.30            | 12.23 | 12.16 | 13.11 | 14.21 | 7.26           | 8.20  | 8.12  | 9.07  | 10.17 |
|                 | 3H   | 12.99            | 13.82 | 13.86 | 14.71 | 15.83 | 8.46           | 9.30  | 9.33  | 10.18 | 11.31 |
|                 | 4H   | 13.60            | 14.39 | 14.49 | 15.28 | 16.42 | 8.92           | 9.71  | 9.80  | 10.60 | 11.73 |
|                 | 6H   | 14.03            | 14.76 | 14.93 | 15.65 | 16.80 | 9.24           | 9.97  | 10.14 | 10.87 | 12.02 |
|                 | 8H   | 14.16            | 14.85 | 15.07 | 15.77 | 16.92 | 9.34           | 10.03 | 10.24 | 10.94 | 12.09 |
|                 | 12H  | 14.23            | 14.89 | 15.14 | 15.79 | 16.97 | 9.38           | 10.04 | 10.30 | 10.95 | 12.12 |
| 4H              | 2H   | 11.33            | 12.12 | 12.22 | 13.01 | 14.14 | 7.87           | 8.66  | 8.76  | 9.55  | 10.69 |
|                 | 3H   | 13.17            | 13.83 | 14.07 | 14.75 | 15.90 | 9.23           | 9.89  | 10.14 | 10.81 | 11.96 |
|                 | 4H   | 13.87            | 14.47 | 14.78 | 15.38 | 16.56 | 9.79           | 10.38 | 10.70 | 11.30 | 12.48 |
|                 | 6H   | 14.39            | 14.91 | 15.32 | 15.85 | 17.03 | 10.21          | 10.73 | 11.14 | 11.67 | 12.85 |
|                 | 8H   | 14.57            | 15.05 | 15.50 | 15.99 | 17.18 | 10.34          | 10.82 | 11.27 | 11.76 | 12.95 |
|                 | 12H  | 14.67            | 15.11 | 15.62 | 16.06 | 17.26 | 10.41          | 10.85 | 11.36 | 11.80 | 13.00 |
| 8H              | 4H   | 13.85            | 14.33 | 14.78 | 15.26 | 16.45 | 10.08          | 10.56 | 11.01 | 11.49 | 12.68 |
|                 | 6H   | 14.42            | 14.81 | 15.37 | 15.79 | 16.98 | 10.60          | 11.00 | 11.56 | 11.97 | 13.16 |
|                 | 8H   | 14.64            | 14.99 | 15.60 | 15.96 | 17.16 | 10.79          | 11.14 | 11.76 | 12.11 | 13.32 |
|                 | 12H  | 14.78            | 15.09 | 15.75 | 16.05 | 17.31 | 10.92          | 11.22 | 11.88 | 12.19 | 13.44 |
| 12H             | 4H   | 13.80            | 14.23 | 14.75 | 15.19 | 16.38 | 10.09          | 10.52 | 11.03 | 11.47 | 12.67 |
|                 | 6H   | 14.39            | 14.74 | 15.36 | 15.71 | 16.92 | 10.65          | 11.00 | 11.62 | 11.97 | 13.18 |
|                 | 8H   | 14.62            | 14.93 | 15.59 | 15.89 | 17.15 | 10.87          | 11.17 | 11.83 | 12.14 | 13.39 |