

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: P910261

Luminaire Tested: DFN2DIP-TR4F0-110D060US840-RLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P910261  
REPORT IS A COMBINATION OF REPORTS P901940 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-110D060US840-RLLONL  
Description: 4 foot, Triangle Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

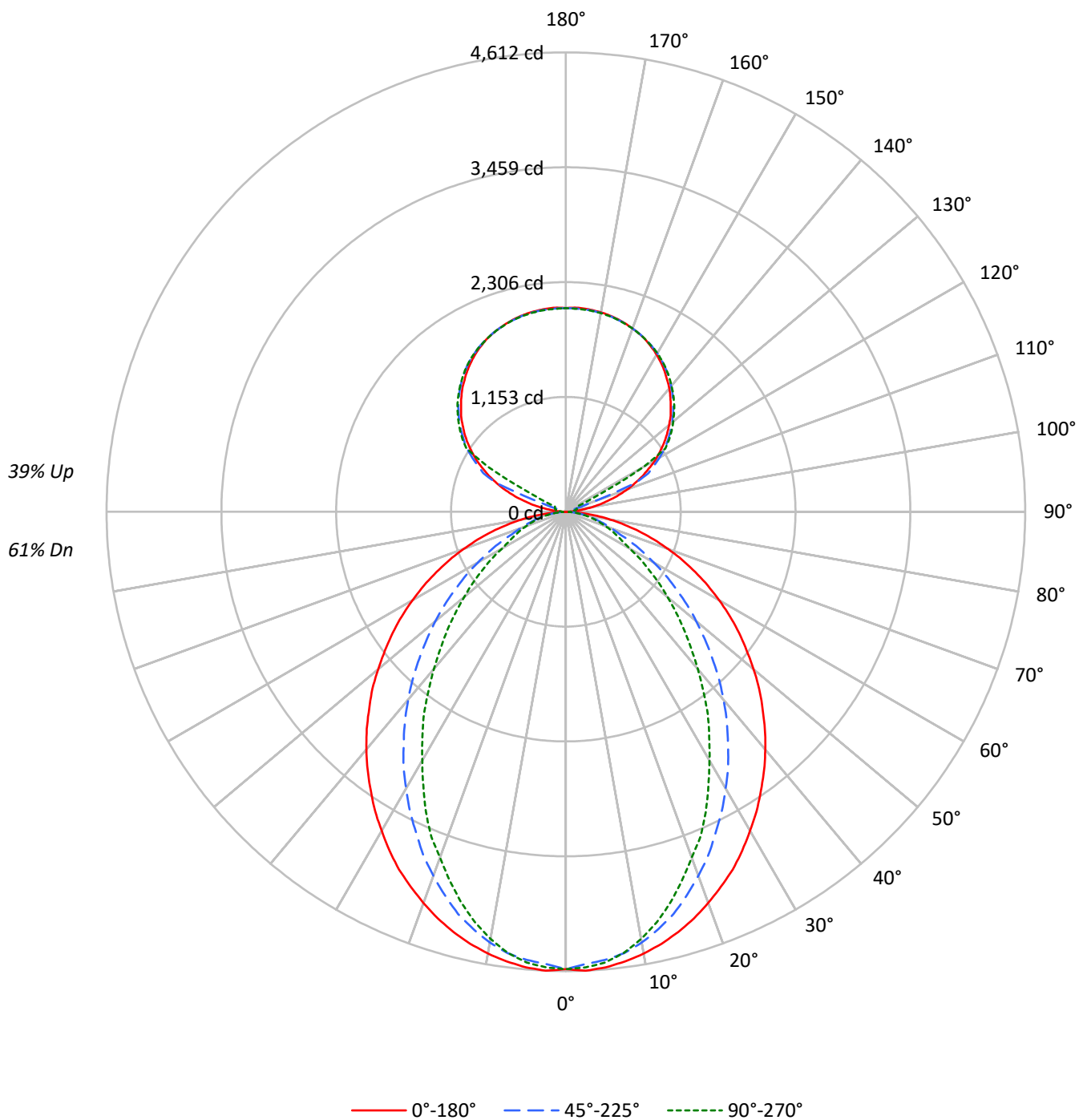
Lumens per Lamp: N/A  
Luminaire Lumens: 15440.8 lumens  
Efficiency: N/A  
Efficacy: 98.1 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 157.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9613  
Total Harmonic Distortion (THDi): 0.083  
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 | 77 | 77 | 77 | 66 | 66 | 66 |
| 1   | 101 | 97  | 93  | 90  | 94  | 91  | 87  | 85  | 79 | 77 | 75 | 69 | 67 | 66 | 60 | 58 | 57 |
| 2   | 92  | 85  | 79  | 74  | 86  | 80  | 75  | 70  | 70 | 66 | 63 | 61 | 58 | 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  | 59  | 54  | 73  | 63  | 56  | 51  | 56 | 51 | 46 | 49 | 45 | 42 | 43 | 40 | 37 |
| 5   | 72  | 60  | 52  | 46  | 67  | 57  | 50  | 44  | 51 | 45 | 40 | 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   | 61  | 49  | 41  | 36  | 58  | 47  | 40  | 35  | 42 | 36 | 32 | 37 | 32 | 29 | 33 | 29 | 26 |
| 8   | 57  | 45  | 37  | 32  | 54  | 43  | 36  | 31  | 38 | 33 | 28 | 34 | 29 | 26 | 30 | 26 | 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 | 21 | 26 | 22 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3647 | 3647 | 3647 |
| 5°  | 3653 | 3589 | 3612 |
| 10° | 3617 | 3519 | 3495 |
| 15° | 3567 | 3403 | 3313 |
| 20° | 3501 | 3242 | 3090 |
| 25° | 3434 | 3062 | 2874 |
| 30° | 3343 | 2878 | 2601 |
| 35° | 3255 | 2680 | 2361 |
| 40° | 3164 | 2475 | 2086 |
| 45° | 3060 | 2248 | 1837 |
| 50° | 2951 | 2018 | 1593 |
| 55° | 2838 | 1773 | 1359 |
| 60° | 2707 | 1516 | 1119 |
| 65° | 2556 | 1255 | 1007 |
| 70° | 2373 | 1012 | 911  |
| 75° | 2144 | 892  | 828  |
| 80° | 1811 | 748  | 718  |
| 85° | 1262 | 499  | 539  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 3060 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 430.3   | 2.8       |
| 10°-20°   | 1181.2  | 7.7       |
| 20°-30°   | 1658.4  | 10.7      |
| 30°-40°   | 1807.8  | 11.7      |
| 40°-50°   | 1661.5  | 10.8      |
| 50°-60°   | 1304.9  | 8.5       |
| 60°-70°   | 849.4   | 5.5       |
| 70°-80°   | 437.2   | 2.8       |
| 80°-90°   | 115.2   | 0.7       |
| 90°-100°  | 67.4    | 0.4       |
| 100°-110° | 251.4   | 1.6       |
| 110°-120° | 666.7   | 4.3       |
| 120°-130° | 1105.7  | 7.2       |
| 130°-140° | 1174.5  | 7.6       |
| 140°-150° | 1091.6  | 7.1       |
| 150°-160° | 877.6   | 5.7       |
| 160°-170° | 565.5   | 3.7       |
| 170°-180° | 194.6   | 1.3       |
| 0°-30°    | 3269.9  | 21.2      |
| 0°-40°    | 5077.7  | 32.9      |
| 0°-60°    | 8044.1  | 52.1      |
| 0°-90°    | 9445.9  | 61.2      |
| 90°-120°  | 985.5   | 6.4       |
| 90°-150°  | 4357.2  | 28.2      |
| 90°-180°  | 5995.0  | 38.8      |
| 0°-180°   | 15440.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4591 | 4591  | 4591 | 4591  | 4591 |      |
| 5°   | 4591 | 4570  | 4516 | 4554  | 4541 | 435  |
| 15°  | 4367 | 4321  | 4180 | 4101  | 4060 | 1231 |
| 25°  | 3964 | 3831  | 3556 | 3386  | 3324 | 1823 |
| 35°  | 3416 | 3203  | 2838 | 2576  | 2484 | 2138 |
| 45°  | 2792 | 2514  | 2078 | 1782  | 1683 | 2156 |
| 55°  | 2123 | 1799  | 1350 | 1101  | 1022 | 1897 |
| 65°  | 1434 | 1097  | 723  | 582   | 569  | 1421 |
| 75°  | 764  | 473   | 332  | 303   | 299  | 808  |
| 85°  | 178  | 91    | 79   | 79    | 79   | 205  |
| 90°  | 1    | 18    | 30   | 37    | 40   | 15   |
| 95°  | 96   | 47    | 58   | 65    | 64   | 114  |
| 105° | 450  | 494   | 90   | 106   | 112  | 481  |
| 115° | 851  | 876   | 913  | 228   | 121  | 838  |
| 125° | 1203 | 1222  | 1250 | 1261  | 1265 | 1073 |
| 135° | 1489 | 1512  | 1526 | 1540  | 1537 | 1150 |
| 145° | 1727 | 1725  | 1750 | 1761  | 1753 | 1080 |
| 155° | 1901 | 1888  | 1906 | 1915  | 1903 | 876  |
| 165° | 2004 | 1995  | 1999 | 2009  | 1999 | 566  |
| 175° | 2049 | 2039  | 2042 | 2052  | 2038 | 195  |
| 180° | 2045 | 2045  | 2045 | 2045  | 2045 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4591.2 | 4591.2 | 4591.2 | 4591.2 | 4591.2 |
| 2.5°   | 4611.9 | 4591.2 | 4545.3 | 4587.2 | 4578.8 |
| 5°     | 4591.2 | 4570.4 | 4516.2 | 4553.7 | 4541.4 |
| 7.5°   | 4553.7 | 4528.9 | 4470.8 | 4487.1 | 4466.3 |
| 10°    | 4503.9 | 4474.7 | 4391.9 | 4379.1 | 4354.4 |
| 12.5°  | 4441.7 | 4404.2 | 4291.8 | 4267.1 | 4221.2 |
| 15°    | 4366.8 | 4320.9 | 4179.8 | 4101.0 | 4059.5 |
| 17.5°  | 4279.5 | 4213.0 | 4038.4 | 3947.1 | 3880.5 |
| 20°    | 4179.8 | 4096.5 | 3888.9 | 3785.3 | 3693.6 |
| 22.5°  | 4071.9 | 3976.1 | 3735.1 | 3594.0 | 3531.8 |
| 25°    | 3963.8 | 3830.7 | 3556.5 | 3386.4 | 3323.8 |
| 27.5°  | 3835.2 | 3693.6 | 3390.3 | 3195.0 | 3099.4 |
| 30°    | 3698.0 | 3539.8 | 3207.4 | 2995.8 | 2883.4 |
| 32.5°  | 3564.9 | 3373.6 | 3033.2 | 2783.8 | 2679.8 |
| 35°    | 3415.5 | 3203.4 | 2838.0 | 2576.2 | 2484.5 |
| 37.5°  | 3270.0 | 3041.2 | 2655.0 | 2368.0 | 2264.5 |
| 40°    | 3116.1 | 2867.1 | 2463.8 | 2168.8 | 2060.8 |
| 42.5°  | 2958.3 | 2692.5 | 2272.9 | 1965.2 | 1861.6 |
| 45°    | 2792.2 | 2513.6 | 2077.6 | 1782.2 | 1682.6 |
| 47.5°  | 2634.3 | 2339.5 | 1890.7 | 1595.3 | 1504.1 |
| 50°    | 2459.7 | 2164.8 | 1707.8 | 1420.8 | 1333.9 |
| 52.5°  | 2289.2 | 1977.5 | 1533.2 | 1259.0 | 1180.0 |
| 55°    | 2122.9 | 1799.0 | 1350.2 | 1101.2 | 1022.3 |
| 57.5°  | 1952.9 | 1620.4 | 1188.4 | 955.7  | 889.1  |
| 60°    | 1778.3 | 1445.9 | 1017.8 | 806.3  | 739.7  |
| 62.5°  | 1608.1 | 1275.8 | 872.4  | 673.2  | 640.1  |
| 65°    | 1433.5 | 1096.7 | 723.0  | 581.9  | 569.1  |
| 67.5°  | 1267.4 | 930.6  | 581.9  | 510.9  | 498.6  |
| 70°    | 1092.8 | 768.8  | 481.8  | 440.4  | 423.6  |
| 72.5°  | 926.6  | 618.9  | 402.9  | 369.8  | 361.4  |
| 75°    | 764.4  | 473.4  | 332.3  | 303.3  | 299.3  |
| 77.5°  | 602.6  | 336.4  | 261.9  | 245.1  | 236.7  |
| 80°    | 452.7  | 241.2  | 199.2  | 183.0  | 183.0  |
| 82.5°  | 315.6  | 162.2  | 137.1  | 128.8  | 128.8  |
| 85°    | 178.5  | 91.3   | 78.9   | 78.9   | 78.9   |
| 87.5°  | 66.6   | 33.0   | 33.0   | 29.1   | 29.1   |
| 90°    | 1.4    | 17.8   | 29.5   | 37.1   | 39.9   |
| 92.5°  | 37.1   | 31.1   | 35.4   | 38.5   | 39.9   |
| 95°    | 96.1   | 47.3   | 57.7   | 65.2   | 63.6   |
| 97.5°  | 173.1  | 51.8   | 75.3   | 80.0   | 81.4   |
| 100°   | 262.0  | 59.2   | 84.3   | 96.1   | 99.1   |
| 102.5° | 359.5  | 356.7  | 87.4   | 103.5  | 108.1  |
| 105°   | 449.8  | 494.2  | 90.3   | 106.4  | 112.5  |
| 107.5° | 554.9  | 591.8  | 93.3   | 109.5  | 115.4  |
| 110°   | 655.6  | 686.5  | 259.0  | 111.1  | 116.8  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 750.2  | 776.8  | 751.6  | 113.8  | 118.5  |
| 115°   | 850.8  | 876.0  | 913.0  | 227.9  | 121.4  |
| 117.5° | 938.1  | 967.7  | 992.9  | 781.2  | 393.5  |
| 120°   | 1035.8 | 1057.9 | 1084.7 | 1102.4 | 902.6  |
| 122.5° | 1118.5 | 1142.3 | 1171.9 | 1180.7 | 1182.4 |
| 125°   | 1203.0 | 1222.2 | 1250.3 | 1260.7 | 1265.1 |
| 127.5° | 1279.9 | 1300.6 | 1322.9 | 1337.7 | 1339.1 |
| 130°   | 1352.4 | 1376.1 | 1392.3 | 1408.7 | 1407.2 |
| 132.5° | 1426.4 | 1445.7 | 1461.9 | 1475.2 | 1473.8 |
| 135°   | 1488.6 | 1512.4 | 1525.5 | 1540.4 | 1537.4 |
| 137.5° | 1553.6 | 1571.4 | 1586.3 | 1601.0 | 1596.7 |
| 140°   | 1617.2 | 1629.2 | 1645.4 | 1658.7 | 1651.3 |
| 142.5° | 1670.6 | 1681.0 | 1700.2 | 1711.9 | 1704.6 |
| 145°   | 1726.9 | 1725.3 | 1750.4 | 1760.8 | 1753.4 |
| 147.5° | 1775.5 | 1771.1 | 1796.2 | 1803.6 | 1797.9 |
| 150°   | 1823.0 | 1812.6 | 1836.3 | 1845.1 | 1837.8 |
| 152.5° | 1862.9 | 1851.1 | 1873.2 | 1882.2 | 1871.8 |
| 155°   | 1901.4 | 1888.1 | 1905.9 | 1914.7 | 1902.9 |
| 157.5° | 1932.5 | 1920.7 | 1934.0 | 1944.4 | 1932.5 |
| 160°   | 1959.1 | 1950.2 | 1959.1 | 1967.9 | 1957.6 |
| 162.5° | 1982.7 | 1973.9 | 1981.3 | 1991.7 | 1978.3 |
| 165°   | 2003.5 | 1994.7 | 1999.0 | 2009.4 | 1999.0 |
| 167.5° | 2019.7 | 2010.8 | 2015.4 | 2025.8 | 2012.4 |
| 170°   | 2033.2 | 2024.2 | 2027.2 | 2037.5 | 2024.2 |
| 172.5° | 2041.9 | 2033.2 | 2036.1 | 2046.5 | 2033.2 |
| 175°   | 2049.3 | 2038.9 | 2041.9 | 2052.2 | 2037.5 |
| 177.5° | 2052.2 | 2041.9 | 2043.5 | 2053.9 | 2040.5 |
| 180°   | 2044.9 | 2044.9 | 2044.9 | 2044.9 | 2044.9 |

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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 | 12.62            | 13.55 | 13.48 | 14.43 | 15.54 | 8.59           | 9.53  | 9.46  | 10.40 | 11.51 |
|                 | 3H   | 14.31            | 15.14 | 15.18 | 16.03 | 17.16 | 9.79           | 10.62 | 10.67 | 11.51 | 12.64 |
|                 | 4H   | 14.92            | 15.70 | 15.81 | 16.60 | 17.74 | 10.25          | 11.03 | 11.14 | 11.93 | 13.07 |
|                 | 6H   | 15.35            | 16.07 | 16.25 | 16.97 | 18.12 | 10.58          | 11.30 | 11.48 | 12.20 | 13.35 |
|                 | 8H   | 15.48            | 16.16 | 16.39 | 17.08 | 18.23 | 10.67          | 11.36 | 11.58 | 12.28 | 13.43 |
|                 | 12H  | 15.54            | 16.19 | 16.46 | 17.11 | 18.29 | 10.72          | 11.37 | 11.63 | 12.28 | 13.46 |
| 4H              | 2H   | 12.65            | 13.44 | 13.55 | 14.33 | 15.47 | 9.20           | 9.99  | 10.10 | 10.88 | 12.02 |
|                 | 3H   | 14.49            | 15.14 | 15.40 | 16.07 | 17.23 | 10.56          | 11.22 | 11.47 | 12.14 | 13.30 |
|                 | 4H   | 15.19            | 15.78 | 16.10 | 16.70 | 17.88 | 11.12          | 11.71 | 12.03 | 12.63 | 13.81 |
|                 | 6H   | 15.71            | 16.22 | 16.64 | 17.16 | 18.35 | 11.54          | 12.05 | 12.47 | 13.00 | 14.18 |
|                 | 8H   | 15.88            | 16.36 | 16.82 | 17.30 | 18.50 | 11.67          | 12.15 | 12.61 | 13.09 | 14.29 |
|                 | 12H  | 15.98            | 16.41 | 16.94 | 17.37 | 18.57 | 11.74          | 12.17 | 12.70 | 13.13 | 14.33 |
| 8H              | 4H   | 15.16            | 15.64 | 16.10 | 16.58 | 17.78 | 11.40          | 11.88 | 12.34 | 12.82 | 14.02 |
|                 | 6H   | 15.73            | 16.13 | 16.69 | 17.11 | 18.30 | 11.93          | 12.32 | 12.89 | 13.30 | 14.50 |
|                 | 8H   | 15.95            | 16.30 | 16.92 | 17.27 | 18.48 | 12.12          | 12.47 | 13.09 | 13.44 | 14.65 |
|                 | 12H  | 16.09            | 16.40 | 17.06 | 17.36 | 18.63 | 12.24          | 12.55 | 13.21 | 13.51 | 14.78 |
| 12H             | 4H   | 15.12            | 15.55 | 16.07 | 16.51 | 17.71 | 11.41          | 11.84 | 12.36 | 12.80 | 14.00 |
|                 | 6H   | 15.71            | 16.06 | 16.68 | 17.03 | 18.24 | 11.98          | 12.32 | 12.94 | 13.30 | 14.51 |
|                 | 8H   | 15.93            | 16.24 | 16.90 | 17.20 | 18.47 | 12.19          | 12.50 | 13.16 | 13.46 | 14.73 |