

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: P913170

Luminaire Tested: DFN2DIP-4P3F0-060D030US927-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P913170  
REPORT IS A COMBINATION OF REPORTS P899047 AND P895917  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P3F0-060D030US927-FLLFLL  
Description: 3 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

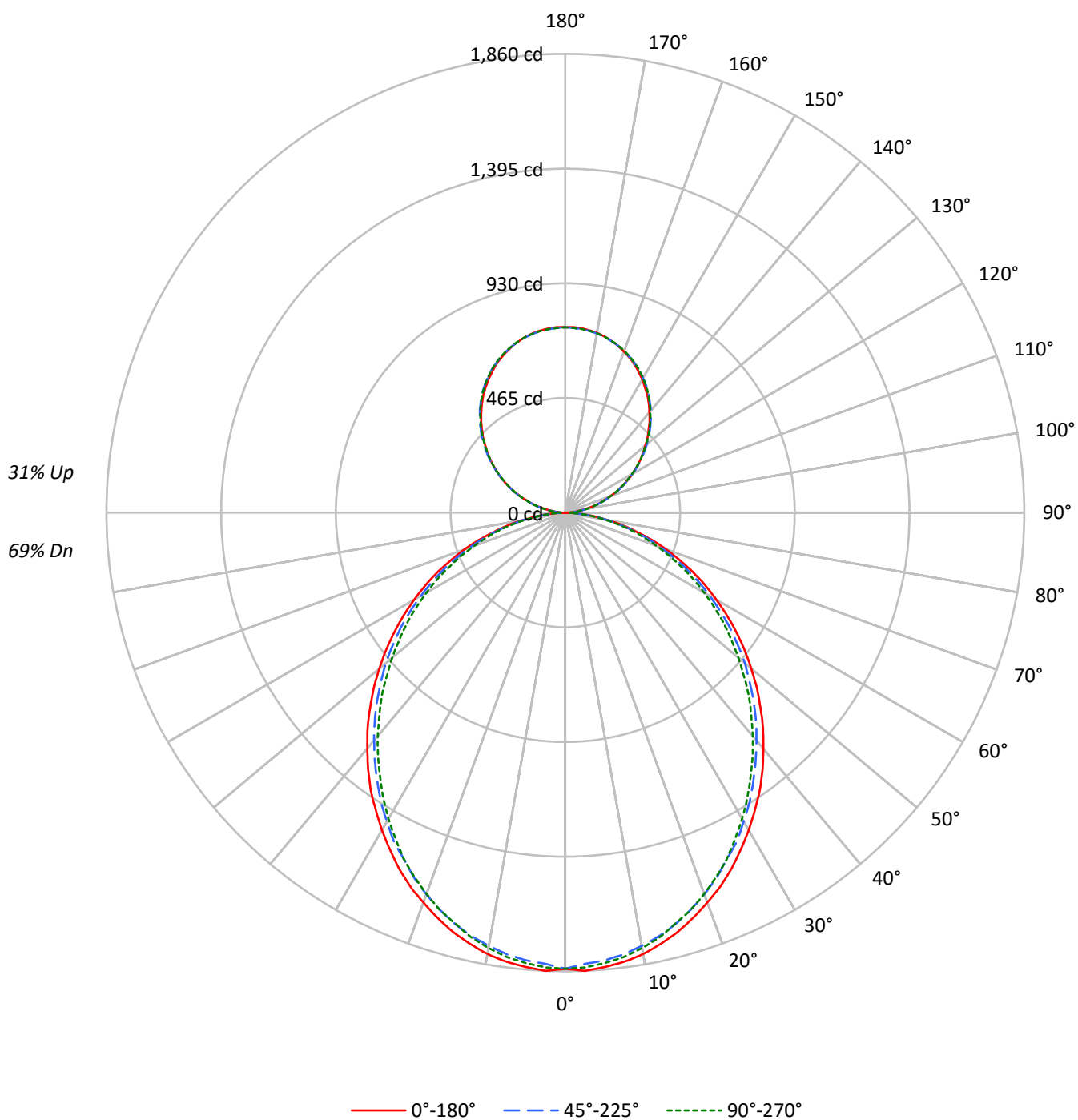
Lumens per Lamp: N/A  
Luminaire Lumens: 6808.8 lumens  
Efficiency: N/A  
Efficacy: 80.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.07' x L: 3.07' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 84.3  
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 | 106 | 106 | 106 | 106 | 94 | 94 | 94 | 83 | 83 | 83 | 74 | 74 | 74 |
| 1   | 102 | 98  | 94  | 90  | 96  | 92  | 89  | 86  | 83 | 80 | 77 | 74 | 71 | 70 | 65 | 64 | 62 |
| 2   | 93  | 85  | 79  | 74  | 88  | 81  | 75  | 70  | 72 | 68 | 64 | 65 | 61 | 58 | 57 | 55 | 52 |
| 3   | 85  | 75  | 67  | 61  | 80  | 71  | 64  | 59  | 64 | 58 | 54 | 57 | 53 | 49 | 51 | 48 | 45 |
| 4   | 78  | 67  | 58  | 52  | 73  | 63  | 56  | 50  | 57 | 51 | 46 | 51 | 46 | 42 | 46 | 42 | 39 |
| 5   | 71  | 59  | 51  | 45  | 67  | 56  | 49  | 43  | 51 | 45 | 40 | 46 | 41 | 37 | 41 | 37 | 34 |
| 6   | 66  | 53  | 45  | 39  | 62  | 51  | 43  | 38  | 46 | 40 | 35 | 41 | 36 | 32 | 37 | 33 | 30 |
| 7   | 61  | 48  | 40  | 34  | 58  | 46  | 39  | 33  | 42 | 36 | 31 | 38 | 33 | 29 | 34 | 30 | 26 |
| 8   | 57  | 44  | 36  | 31  | 54  | 42  | 35  | 30  | 38 | 32 | 28 | 35 | 29 | 26 | 31 | 27 | 24 |
| 9   | 53  | 40  | 33  | 27  | 50  | 39  | 31  | 26  | 35 | 29 | 25 | 32 | 27 | 23 | 29 | 25 | 21 |
| 10  | 50  | 37  | 30  | 25  | 47  | 36  | 29  | 24  | 32 | 27 | 22 | 30 | 25 | 21 | 27 | 23 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2108 | 2108 | 2108 |
| 5°  | 2110 | 2077 | 2092 |
| 10° | 2091 | 2048 | 2063 |
| 15° | 2059 | 2012 | 2018 |
| 20° | 2016 | 1964 | 1972 |
| 25° | 1974 | 1907 | 1919 |
| 30° | 1920 | 1853 | 1851 |
| 35° | 1870 | 1791 | 1780 |
| 40° | 1808 | 1727 | 1713 |
| 45° | 1746 | 1663 | 1643 |
| 50° | 1678 | 1596 | 1563 |
| 55° | 1607 | 1518 | 1489 |
| 60° | 1527 | 1427 | 1404 |
| 65° | 1439 | 1331 | 1304 |
| 70° | 1327 | 1215 | 1197 |
| 75° | 1173 | 1075 | 1096 |
| 80° | 986  | 898  | 906  |
| 85° | 694  | 595  | 594  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 1746 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 174.1  | 2.6       |
| 10°-20°   | 489.8  | 7.2       |
| 20°-30°   | 719.8  | 10.6      |
| 30°-40°   | 836.0  | 12.3      |
| 40°-50°   | 834.9  | 12.3      |
| 50°-60°   | 728.0  | 10.7      |
| 60°-70°   | 538.2  | 7.9       |
| 70°-80°   | 304.5  | 4.5       |
| 80°-90°   | 82.5   | 1.2       |
| 90°-100°  | 46.5   | 0.7       |
| 100°-110° | 147.8  | 2.2       |
| 110°-120° | 252.9  | 3.7       |
| 120°-130° | 332.6  | 4.9       |
| 130°-140° | 373.3  | 5.5       |
| 140°-150° | 366.1  | 5.4       |
| 150°-160° | 307.1  | 4.5       |
| 160°-170° | 203.7  | 3.0       |
| 170°-180° | 71.2   | 1.0       |
| 0°-30°    | 1383.6 | 20.3      |
| 0°-40°    | 2219.6 | 32.6      |
| 0°-60°    | 3782.5 | 55.6      |
| 0°-90°    | 4707.7 | 69.1      |
| 90°-120°  | 447.2  | 6.6       |
| 90°-150°  | 1519.2 | 22.3      |
| 90°-180°  | 2101.0 | 30.9      |
| 0°-180°   | 6808.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1849 | 1849  | 1849 | 1849  | 1849 |      |
| 5°   | 1849 | 1842  | 1823 | 1837  | 1834 | 176  |
| 15°  | 1760 | 1750  | 1727 | 1734  | 1725 | 496  |
| 25°  | 1593 | 1579  | 1549 | 1552  | 1549 | 733  |
| 35°  | 1375 | 1357  | 1328 | 1318  | 1309 | 858  |
| 45°  | 1119 | 1106  | 1079 | 1060  | 1053 | 863  |
| 55°  | 847  | 836   | 814  | 793   | 784  | 757  |
| 65°  | 571  | 560   | 542  | 526   | 518  | 564  |
| 75°  | 299  | 295   | 286  | 276   | 279  | 319  |
| 85°  | 73   | 71    | 69   | 64    | 62   | 81   |
| 90°  | 1    | 8     | 22   | 21    | 22   | 7    |
| 95°  | 33   | 40    | 41   | 41    | 40   | 37   |
| 105° | 136  | 138   | 140  | 141   | 141  | 144  |
| 115° | 254  | 257   | 256  | 256   | 254  | 251  |
| 125° | 369  | 375   | 373  | 371   | 370  | 330  |
| 135° | 477  | 484   | 486  | 485   | 483  | 369  |
| 145° | 580  | 584   | 588  | 588   | 586  | 362  |
| 155° | 663  | 665   | 667  | 670   | 668  | 305  |
| 165° | 721  | 720   | 720  | 725   | 722  | 203  |
| 175° | 750  | 748   | 747  | 752   | 748  | 71   |
| 180° | 752  | 752   | 752  | 752   | 752  |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1849.4 | 1849.4 | 1849.4 | 1849.4 | 1849.4 |
| 2.5°   | 1860.2 | 1851.3 | 1831.7 | 1849.4 | 1846.0 |
| 5°     | 1849.4 | 1842.5 | 1822.8 | 1837.0 | 1833.6 |
| 7.5°   | 1837.0 | 1826.5 | 1806.8 | 1821.1 | 1817.6 |
| 10°    | 1817.6 | 1805.1 | 1783.8 | 1797.9 | 1792.6 |
| 12.5°  | 1790.8 | 1780.2 | 1758.9 | 1767.8 | 1764.2 |
| 15°    | 1760.5 | 1750.0 | 1726.8 | 1734.0 | 1725.1 |
| 17.5°  | 1723.2 | 1712.7 | 1689.5 | 1698.3 | 1689.5 |
| 20°    | 1682.3 | 1671.7 | 1646.8 | 1652.1 | 1645.1 |
| 22.5°  | 1641.6 | 1625.5 | 1602.3 | 1602.3 | 1598.7 |
| 25°    | 1593.4 | 1579.3 | 1549.0 | 1552.4 | 1549.0 |
| 27.5°  | 1540.0 | 1527.6 | 1504.5 | 1499.3 | 1490.4 |
| 30°    | 1486.8 | 1472.4 | 1445.9 | 1440.6 | 1433.4 |
| 32.5°  | 1429.8 | 1419.3 | 1390.8 | 1380.0 | 1372.8 |
| 35°    | 1374.8 | 1357.0 | 1328.5 | 1317.7 | 1308.8 |
| 37.5°  | 1312.5 | 1296.4 | 1268.0 | 1255.4 | 1246.6 |
| 40°    | 1248.5 | 1234.1 | 1205.7 | 1189.9 | 1182.6 |
| 42.5°  | 1186.2 | 1171.9 | 1143.6 | 1125.7 | 1115.1 |
| 45°    | 1118.7 | 1106.2 | 1079.4 | 1060.0 | 1052.8 |
| 47.5°  | 1052.8 | 1040.4 | 1011.9 | 992.3  | 981.7  |
| 50°    | 983.4  | 974.5  | 949.7  | 924.7  | 915.8  |
| 52.5°  | 915.8  | 903.4  | 880.4  | 860.8  | 848.3  |
| 55°    | 846.6  | 835.8  | 814.5  | 793.2  | 784.3  |
| 57.5°  | 777.2  | 768.3  | 745.1  | 723.8  | 716.6  |
| 60°    | 707.7  | 700.8  | 675.9  | 656.2  | 650.9  |
| 62.5°  | 640.2  | 627.7  | 610.0  | 592.2  | 585.1  |
| 65°    | 570.9  | 560.2  | 542.5  | 526.4  | 517.5  |
| 67.5°  | 499.8  | 490.8  | 474.9  | 462.5  | 455.3  |
| 70°    | 434.0  | 426.8  | 410.7  | 398.3  | 391.3  |
| 72.5°  | 366.4  | 359.3  | 350.4  | 337.9  | 332.6  |
| 75°    | 298.7  | 295.3  | 286.2  | 275.7  | 279.2  |
| 77.5°  | 238.3  | 231.2  | 227.5  | 222.3  | 217.0  |
| 80°    | 177.9  | 176.0  | 172.5  | 167.2  | 163.6  |
| 82.5°  | 121.0  | 121.0  | 119.2  | 112.1  | 112.1  |
| 85°    | 72.8   | 71.1   | 69.4   | 63.9   | 62.3   |
| 87.5°  | 32.1   | 28.5   | 24.9   | 19.6   | 17.7   |
| 90°    | 0.7    | 8.2    | 22.2   | 20.8   | 21.5   |
| 92.5°  | 14.0   | 19.0   | 19.7   | 20.4   | 20.4   |
| 95°    | 33.1   | 39.5   | 40.6   | 40.6   | 39.5   |
| 97.5°  | 55.1   | 60.9   | 63.5   | 63.5   | 63.5   |
| 100°   | 80.4   | 85.6   | 87.5   | 87.5   | 86.8   |
| 102.5° | 107.2  | 111.1  | 113.5  | 114.2  | 113.5  |
| 105°   | 136.4  | 138.2  | 139.6  | 140.7  | 140.7  |
| 107.5° | 165.4  | 168.1  | 168.1  | 168.6  | 165.4  |
| 110°   | 193.5  | 197.2  | 197.2  | 197.2  | 195.4  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 223.9 | 227.8 | 227.0 | 225.2 | 223.9 |
| 115°   | 253.8 | 257.4 | 256.3 | 255.6 | 253.8 |
| 117.5° | 283.4 | 288.4 | 285.3 | 283.4 | 281.6 |
| 120°   | 313.4 | 318.4 | 313.4 | 313.4 | 311.3 |
| 122.5° | 340.6 | 346.9 | 343.7 | 341.9 | 340.6 |
| 125°   | 369.2 | 374.8 | 373.0 | 370.9 | 370.3 |
| 127.5° | 397.0 | 404.0 | 401.6 | 398.8 | 397.0 |
| 130°   | 423.0 | 431.2 | 430.1 | 428.7 | 426.2 |
| 132.5° | 452.3 | 458.6 | 459.1 | 455.9 | 454.1 |
| 135°   | 477.4 | 484.4 | 485.8 | 485.1 | 483.3 |
| 137.5° | 505.5 | 511.2 | 512.3 | 511.9 | 509.1 |
| 140°   | 530.2 | 535.9 | 539.1 | 539.1 | 536.5 |
| 142.5° | 555.6 | 561.3 | 563.1 | 563.8 | 561.3 |
| 145°   | 579.6 | 584.2 | 587.8 | 588.4 | 586.0 |
| 147.5° | 601.2 | 606.8 | 609.5 | 610.7 | 608.2 |
| 150°   | 623.4 | 627.2 | 629.7 | 631.8 | 629.7 |
| 152.5° | 643.1 | 646.9 | 650.1 | 652.6 | 650.1 |
| 155°   | 662.8 | 664.6 | 666.6 | 669.8 | 667.8 |
| 157.5° | 679.8 | 681.1 | 682.3 | 686.8 | 683.7 |
| 160°   | 695.0 | 696.3 | 697.0 | 700.8 | 698.1 |
| 162.5° | 709.0 | 709.0 | 709.7 | 714.0 | 710.8 |
| 165°   | 721.0 | 720.3 | 720.3 | 724.8 | 721.7 |
| 167.5° | 731.9 | 729.8 | 729.8 | 734.4 | 731.2 |
| 170°   | 740.1 | 738.2 | 737.6 | 742.1 | 738.2 |
| 172.5° | 745.7 | 743.9 | 743.2 | 747.7 | 743.9 |
| 175°   | 750.3 | 748.5 | 747.1 | 751.6 | 747.7 |
| 177.5° | 752.7 | 750.9 | 749.6 | 753.4 | 749.6 |
| 180°   | 751.6 | 751.6 | 751.6 | 751.6 | 751.6 |

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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 | 11.43            | 12.50 | 12.20 | 13.29 | 14.26 | 10.99          | 12.05 | 11.76 | 12.85 | 13.82 |
|                 | 3H   | 13.10            | 14.06 | 13.89 | 14.86 | 15.86 | 12.61          | 13.57 | 13.40 | 14.37 | 15.37 |
|                 | 4H   | 13.70            | 14.60 | 14.50 | 15.41 | 16.42 | 13.20          | 14.11 | 14.01 | 14.92 | 15.93 |
|                 | 6H   | 14.10            | 14.94 | 14.92 | 15.76 | 16.78 | 13.60          | 14.44 | 14.42 | 15.26 | 16.28 |
|                 | 8H   | 14.21            | 15.01 | 15.04 | 15.85 | 16.87 | 13.71          | 14.50 | 14.54 | 15.35 | 16.37 |
|                 | 12H  | 14.27            | 15.02 | 15.10 | 15.86 | 16.91 | 13.76          | 14.51 | 14.59 | 15.35 | 16.40 |
| 4H              | 2H   | 11.91            | 12.82 | 12.72 | 13.63 | 14.64 | 11.56          | 12.46 | 12.37 | 13.27 | 14.28 |
|                 | 3H   | 13.79            | 14.55 | 14.61 | 15.39 | 16.42 | 13.38          | 14.14 | 14.20 | 14.99 | 16.01 |
|                 | 4H   | 14.51            | 15.20 | 15.34 | 16.04 | 17.10 | 14.09          | 14.77 | 14.92 | 15.62 | 16.67 |
|                 | 6H   | 15.03            | 15.63 | 15.88 | 16.50 | 17.56 | 14.60          | 15.19 | 15.45 | 16.07 | 17.12 |
|                 | 8H   | 15.19            | 15.74 | 16.04 | 16.61 | 17.68 | 14.75          | 15.30 | 15.60 | 16.17 | 17.24 |
|                 | 12H  | 15.27            | 15.77 | 16.14 | 16.65 | 17.73 | 14.82          | 15.32 | 15.69 | 16.20 | 17.28 |
| 8H              | 4H   | 14.72            | 15.27 | 15.57 | 16.14 | 17.21 | 14.34          | 14.90 | 15.20 | 15.76 | 16.83 |
|                 | 6H   | 15.35            | 15.81 | 16.23 | 16.72 | 17.79 | 14.97          | 15.43 | 15.85 | 16.34 | 17.41 |
|                 | 8H   | 15.57            | 15.98 | 16.46 | 16.88 | 17.97 | 15.18          | 15.59 | 16.07 | 16.49 | 17.58 |
|                 | 12H  | 15.71            | 16.07 | 16.61 | 16.96 | 18.10 | 15.30          | 15.66 | 16.19 | 16.55 | 17.69 |
| 12H             | 4H   | 14.71            | 15.21 | 15.59 | 16.10 | 17.18 | 14.34          | 14.85 | 15.22 | 15.73 | 16.81 |
|                 | 6H   | 15.38            | 15.79 | 16.27 | 16.69 | 17.78 | 15.01          | 15.42 | 15.90 | 16.32 | 17.41 |
|                 | 8H   | 15.63            | 15.99 | 16.53 | 16.88 | 18.03 | 15.25          | 15.61 | 16.15 | 16.50 | 17.64 |