

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: P906845

Luminaire Tested: DFN2DIP-SQ4F0-110D060US835-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P906845  
REPORT IS A COMBINATION OF REPORTS P901589 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-110D060US835-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

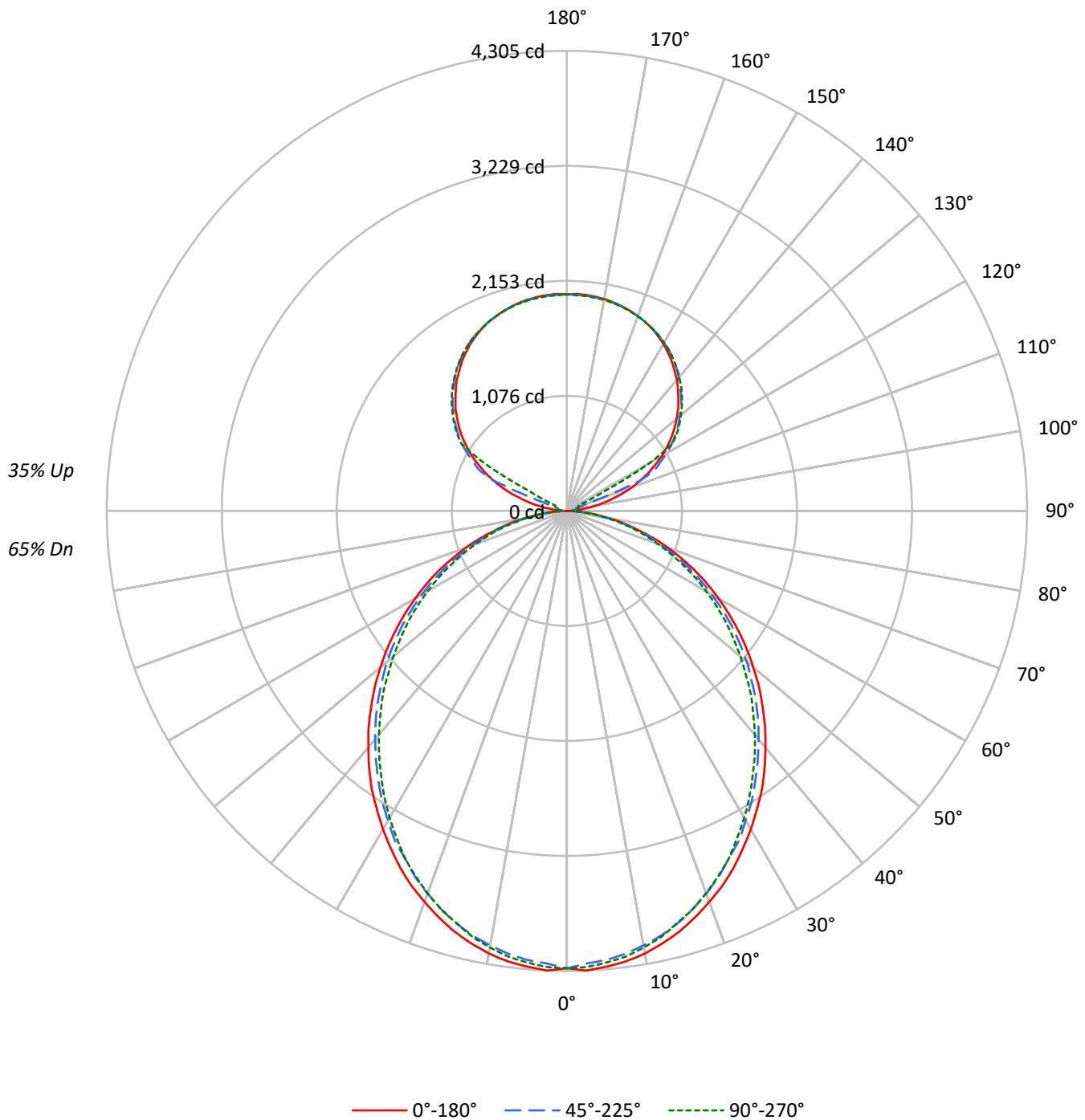
Lumens per Lamp: N/A  
Luminaire Lumens: 16830.0 lumens  
Efficiency: N/A  
Efficacy: 112.0 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 150.3  
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 |
| RCR |     |     |     |     |     |     |     |     |    |    |    |  |    |    |    |  |    |
| 0   | 111 | 111 | 111 | 111 | 104 | 104 | 104 | 104 | 92 | 92 | 92 |  | 80 | 80 | 80 |  | 70 |
| 1   | 101 | 97  | 93  | 89  | 95  | 91  | 88  | 84  | 80 | 78 | 75 |  | 71 | 69 | 67 |  | 62 |
| 2   | 92  | 84  | 78  | 73  | 86  | 80  | 74  | 69  | 70 | 66 | 62 |  | 62 | 59 | 56 |  | 54 |
| 3   | 84  | 74  | 67  | 61  | 79  | 70  | 63  | 58  | 62 | 57 | 53 |  | 55 | 51 | 47 |  | 48 |
| 4   | 77  | 66  | 58  | 51  | 72  | 62  | 55  | 49  | 55 | 49 | 45 |  | 49 | 44 | 41 |  | 43 |
| 5   | 71  | 59  | 50  | 44  | 66  | 56  | 48  | 42  | 50 | 43 | 39 |  | 44 | 39 | 35 |  | 39 |
| 6   | 65  | 53  | 44  | 39  | 61  | 50  | 42  | 37  | 45 | 39 | 34 |  | 40 | 35 | 31 |  | 35 |
| 7   | 60  | 48  | 40  | 34  | 57  | 45  | 38  | 33  | 41 | 34 | 30 |  | 36 | 31 | 27 |  | 32 |
| 8   | 56  | 43  | 36  | 30  | 53  | 41  | 34  | 29  | 37 | 31 | 27 |  | 33 | 28 | 25 |  | 30 |
| 9   | 52  | 40  | 32  | 27  | 49  | 38  | 31  | 26  | 34 | 28 | 24 |  | 31 | 26 | 22 |  | 27 |
| 10  | 49  | 37  | 29  | 24  | 46  | 35  | 28  | 23  | 31 | 26 | 22 |  | 28 | 23 | 20 |  | 25 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3003 | 3003 | 3003 |
| 5°  | 3008 | 2962 | 2982 |
| 10° | 2984 | 2923 | 2943 |
| 15° | 2940 | 2875 | 2880 |
| 20° | 2880 | 2809 | 2817 |
| 25° | 2821 | 2730 | 2743 |
| 30° | 2747 | 2656 | 2649 |
| 35° | 2677 | 2569 | 2549 |
| 40° | 2591 | 2481 | 2454 |
| 45° | 2505 | 2393 | 2358 |
| 50° | 2411 | 2300 | 2245 |
| 55° | 2313 | 2193 | 2142 |
| 60° | 2201 | 2066 | 2025 |
| 65° | 2080 | 1935 | 1885 |
| 70° | 1925 | 1774 | 1736 |
| 75° | 1711 | 1583 | 1600 |
| 80° | 1454 | 1339 | 1336 |
| 85° | 1051 | 916  | 898  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2505 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 402.8   | 2.4       |
| 10°-20°   | 1133.5  | 6.7       |
| 20°-30°   | 1665.7  | 9.9       |
| 30°-40°   | 1934.7  | 11.5      |
| 40°-50°   | 1932.3  | 11.5      |
| 50°-60°   | 1684.9  | 10.0      |
| 60°-70°   | 1245.5  | 7.4       |
| 70°-80°   | 704.7   | 4.2       |
| 80°-90°   | 189.5   | 1.1       |
| 90°-100°  | 66.8    | 0.4       |
| 100°-110° | 248.9   | 1.5       |
| 110°-120° | 660.2   | 3.9       |
| 120°-130° | 1094.9  | 6.5       |
| 130°-140° | 1163.0  | 6.9       |
| 140°-150° | 1080.9  | 6.4       |
| 150°-160° | 869.0   | 5.2       |
| 160°-170° | 560.0   | 3.3       |
| 170°-180° | 192.7   | 1.1       |
| 0°-30°    | 3202.1  | 19.0      |
| 0°-40°    | 5136.7  | 30.5      |
| 0°-60°    | 8753.8  | 52.0      |
| 0°-90°    | 10893.6 | 64.7      |
| 90°-120°  | 975.8   | 5.8       |
| 90°-150°  | 4314.7  | 25.6      |
| 90°-180°  | 5936.0  | 35.3      |
| 0°-180°   | 16830.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4280 | 4280  | 4280 | 4280  | 4280 |      |
| 5°   | 4280 | 4264  | 4219 | 4251  | 4244 | 406  |
| 15°  | 4074 | 4050  | 3996 | 4013  | 3992 | 1148 |
| 25°  | 3688 | 3655  | 3585 | 3593  | 3585 | 1697 |
| 35°  | 3182 | 3140  | 3074 | 3050  | 3029 | 1987 |
| 45°  | 2589 | 2560  | 2498 | 2453  | 2437 | 1998 |
| 55°  | 1959 | 1934  | 1885 | 1836  | 1815 | 1752 |
| 65°  | 1321 | 1296  | 1255 | 1218  | 1198 | 1306 |
| 75°  | 691  | 683   | 662  | 638   | 646  | 738  |
| 85°  | 169  | 165   | 161  | 148   | 144  | 188  |
| 90°  | 1    | 18    | 29   | 37    | 40   | 16   |
| 95°  | 95   | 47    | 57   | 65    | 63   | 113  |
| 105° | 445  | 489   | 89   | 105   | 111  | 476  |
| 115° | 842  | 867   | 904  | 226   | 120  | 829  |
| 125° | 1191 | 1210  | 1238 | 1248  | 1253 | 1062 |
| 135° | 1474 | 1498  | 1511 | 1525  | 1522 | 1139 |
| 145° | 1710 | 1708  | 1733 | 1744  | 1736 | 1069 |
| 155° | 1883 | 1870  | 1887 | 1896  | 1884 | 868  |
| 165° | 1984 | 1975  | 1980 | 1990  | 1980 | 560  |
| 175° | 2029 | 2019  | 2022 | 2032  | 2018 | 193  |
| 180° | 2025 | 2025  | 2025 | 2025  | 2025 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4280.2 | 4280.2 | 4280.2 | 4280.2 | 4280.2 |
| 2.5°   | 4305.0 | 4284.5 | 4239.1 | 4280.2 | 4272.3 |
| 5°     | 4280.2 | 4264.0 | 4218.6 | 4251.3 | 4243.5 |
| 7.5°   | 4251.3 | 4226.9 | 4181.5 | 4214.7 | 4206.4 |
| 10°    | 4206.4 | 4177.5 | 4128.2 | 4160.9 | 4148.7 |
| 12.5°  | 4144.4 | 4119.9 | 4070.6 | 4091.1 | 4082.8 |
| 15°    | 4074.5 | 4050.0 | 3996.3 | 4012.9 | 3992.4 |
| 17.5°  | 3988.0 | 3963.6 | 3909.9 | 3930.4 | 3909.9 |
| 20°    | 3893.3 | 3868.8 | 3811.2 | 3823.4 | 3807.3 |
| 22.5°  | 3799.0 | 3761.8 | 3708.1 | 3708.1 | 3699.8 |
| 25°    | 3687.6 | 3654.9 | 3585.0 | 3592.9 | 3585.0 |
| 27.5°  | 3564.0 | 3535.2 | 3481.9 | 3469.7 | 3449.2 |
| 30°    | 3440.9 | 3407.7 | 3346.1 | 3333.9 | 3317.3 |
| 32.5°  | 3309.0 | 3284.6 | 3218.6 | 3193.7 | 3177.1 |
| 35°    | 3181.5 | 3140.5 | 3074.5 | 3049.6 | 3029.1 |
| 37.5°  | 3037.4 | 3000.3 | 2934.4 | 2905.5 | 2885.0 |
| 40°    | 2889.4 | 2856.2 | 2790.3 | 2753.6 | 2737.0 |
| 42.5°  | 2745.3 | 2712.1 | 2646.6 | 2605.1 | 2580.7 |
| 45°    | 2589.0 | 2560.1 | 2498.1 | 2453.2 | 2436.6 |
| 47.5°  | 2436.6 | 2407.8 | 2341.8 | 2296.4 | 2271.9 |
| 50°    | 2275.9 | 2255.4 | 2197.7 | 2140.1 | 2119.6 |
| 52.5°  | 2119.6 | 2090.7 | 2037.5 | 1992.0 | 1963.2 |
| 55°    | 1959.3 | 1934.4 | 1885.1 | 1835.7 | 1815.2 |
| 57.5°  | 1798.6 | 1778.1 | 1724.4 | 1675.0 | 1658.4 |
| 60°    | 1637.9 | 1621.8 | 1564.1 | 1518.7 | 1506.5 |
| 62.5°  | 1481.6 | 1452.8 | 1411.7 | 1370.7 | 1354.1 |
| 65°    | 1321.3 | 1296.4 | 1255.4 | 1218.3 | 1197.8 |
| 67.5°  | 1156.7 | 1135.8 | 1099.1 | 1070.3 | 1053.7 |
| 70°    | 1004.3 | 987.7  | 950.6  | 921.8  | 905.6  |
| 72.5°  | 848.0  | 831.4  | 810.9  | 782.1  | 769.8  |
| 75°    | 691.2  | 683.4  | 662.4  | 638.0  | 646.3  |
| 77.5°  | 551.5  | 534.9  | 526.6  | 514.4  | 502.2  |
| 80°    | 411.8  | 407.4  | 399.1  | 386.9  | 378.6  |
| 82.5°  | 279.9  | 279.9  | 276.0  | 259.4  | 259.4  |
| 85°    | 168.6  | 164.6  | 160.7  | 148.0  | 144.1  |
| 87.5°  | 74.2   | 65.9   | 57.6   | 45.4   | 41.0   |
| 90°    | 1.4    | 17.6   | 29.2   | 36.7   | 39.5   |
| 92.5°  | 36.7   | 30.8   | 35.1   | 38.1   | 39.5   |
| 95°    | 95.2   | 46.8   | 57.1   | 64.6   | 63.0   |
| 97.5°  | 171.4  | 51.3   | 74.6   | 79.2   | 80.6   |
| 100°   | 259.4  | 58.6   | 83.5   | 95.2   | 98.1   |
| 102.5° | 356.0  | 353.2  | 86.5   | 102.5  | 107.0  |
| 105°   | 445.4  | 489.4  | 89.4   | 105.4  | 111.4  |
| 107.5° | 549.5  | 586.0  | 92.4   | 108.4  | 114.3  |
| 110°   | 649.2  | 679.8  | 256.5  | 110.0  | 115.7  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 742.9  | 769.2  | 744.3  | 112.7  | 117.3  |
| 115°   | 842.5  | 867.4  | 904.1  | 225.7  | 120.2  |
| 117.5° | 928.9  | 958.2  | 983.2  | 773.6  | 389.7  |
| 120°   | 1025.7 | 1047.6 | 1074.1 | 1091.6 | 893.8  |
| 122.5° | 1107.6 | 1131.1 | 1160.5 | 1169.2 | 1170.8 |
| 125°   | 1191.2 | 1210.3 | 1238.1 | 1248.4 | 1252.7 |
| 127.5° | 1267.4 | 1287.9 | 1310.0 | 1324.6 | 1326.0 |
| 130°   | 1339.2 | 1362.7 | 1378.7 | 1394.9 | 1393.5 |
| 132.5° | 1412.5 | 1431.6 | 1447.6 | 1460.8 | 1459.4 |
| 135°   | 1474.1 | 1497.6 | 1510.6 | 1525.4 | 1522.4 |
| 137.5° | 1538.4 | 1556.0 | 1570.8 | 1585.4 | 1581.1 |
| 140°   | 1601.4 | 1613.3 | 1629.3 | 1642.5 | 1635.2 |
| 142.5° | 1654.3 | 1664.6 | 1683.6 | 1695.2 | 1687.9 |
| 145°   | 1710.0 | 1708.4 | 1733.3 | 1743.6 | 1736.3 |
| 147.5° | 1758.2 | 1753.8 | 1778.7 | 1786.0 | 1780.3 |
| 150°   | 1805.2 | 1794.9 | 1818.4 | 1827.1 | 1819.8 |
| 152.5° | 1844.7 | 1833.0 | 1854.9 | 1863.8 | 1853.5 |
| 155°   | 1882.8 | 1869.7 | 1887.3 | 1896.0 | 1884.3 |
| 157.5° | 1913.6 | 1901.9 | 1915.1 | 1925.4 | 1913.6 |
| 160°   | 1940.0 | 1931.1 | 1940.0 | 1948.7 | 1938.5 |
| 162.5° | 1963.3 | 1954.6 | 1961.9 | 1972.2 | 1959.0 |
| 165°   | 1983.9 | 1975.2 | 1979.5 | 1989.8 | 1979.5 |
| 167.5° | 2000.0 | 1991.2 | 1995.7 | 2006.0 | 1992.7 |
| 170°   | 2013.3 | 2004.4 | 2007.4 | 2017.6 | 2004.4 |
| 172.5° | 2022.0 | 2013.3 | 2016.2 | 2026.5 | 2013.3 |
| 175°   | 2029.3 | 2019.0 | 2022.0 | 2032.2 | 2017.6 |
| 177.5° | 2032.2 | 2022.0 | 2023.5 | 2033.8 | 2020.6 |
| 180°   | 2024.9 | 2024.9 | 2024.9 | 2024.9 | 2024.9 |

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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 | 12.36            | 13.37 | 13.18 | 14.22 | 15.26 | 11.92          | 12.93 | 12.74 | 13.77 | 14.82 |
|                 | 3H   | 14.04            | 14.95 | 14.87 | 15.80 | 16.87 | 13.55          | 14.46 | 14.38 | 15.31 | 16.38 |
|                 | 4H   | 14.64            | 15.49 | 15.49 | 16.35 | 17.44 | 14.14          | 15.00 | 14.99 | 15.86 | 16.94 |
|                 | 6H   | 15.05            | 15.84 | 15.91 | 16.71 | 17.80 | 14.55          | 15.34 | 15.41 | 16.21 | 17.30 |
|                 | 8H   | 15.16            | 15.91 | 16.03 | 16.80 | 17.89 | 14.66          | 15.41 | 15.53 | 16.30 | 17.39 |
|                 | 12H  | 15.21            | 15.93 | 16.09 | 16.81 | 17.93 | 14.70          | 15.42 | 15.58 | 16.30 | 17.42 |
| 4H              | 2H   | 12.84            | 13.70 | 13.70 | 14.56 | 15.64 | 12.49          | 13.35 | 13.34 | 14.20 | 15.29 |
|                 | 3H   | 14.73            | 15.44 | 15.59 | 16.33 | 17.43 | 14.32          | 15.04 | 15.18 | 15.93 | 17.03 |
|                 | 4H   | 15.45            | 16.10 | 16.33 | 16.99 | 18.12 | 15.03          | 15.68 | 15.90 | 16.57 | 17.69 |
|                 | 6H   | 15.98            | 16.54 | 16.87 | 17.46 | 18.58 | 15.55          | 16.11 | 16.44 | 17.02 | 18.15 |
|                 | 8H   | 16.13            | 16.66 | 17.03 | 17.57 | 18.71 | 15.70          | 16.22 | 16.59 | 17.13 | 18.27 |
|                 | 12H  | 16.22            | 16.69 | 17.13 | 17.62 | 18.76 | 15.77          | 16.24 | 16.68 | 17.17 | 18.31 |
| 8H              | 4H   | 15.66            | 16.19 | 16.56 | 17.09 | 18.23 | 15.28          | 15.81 | 16.18 | 16.72 | 17.86 |
|                 | 6H   | 16.30            | 16.74 | 17.23 | 17.69 | 18.83 | 15.92          | 16.36 | 16.84 | 17.30 | 18.44 |
|                 | 8H   | 16.53            | 16.91 | 17.46 | 17.86 | 19.01 | 16.13          | 16.52 | 17.07 | 17.46 | 18.62 |
|                 | 12H  | 16.67            | 17.01 | 17.60 | 17.94 | 19.15 | 16.26          | 16.60 | 17.19 | 17.53 | 18.74 |
| 12H             | 4H   | 15.65            | 16.13 | 16.57 | 17.05 | 18.20 | 15.29          | 15.76 | 16.20 | 16.69 | 17.83 |
|                 | 6H   | 16.33            | 16.72 | 17.27 | 17.66 | 18.82 | 15.96          | 16.35 | 16.89 | 17.29 | 18.45 |
|                 | 8H   | 16.59            | 16.93 | 17.52 | 17.86 | 19.07 | 16.21          | 16.55 | 17.14 | 17.48 | 18.69 |