

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: P919773

Luminaire Tested: DFN2DIP-PN4F0-110D060US935-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P919773  
REPORT IS A COMBINATION OF REPORTS P901179 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-110D060US935-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

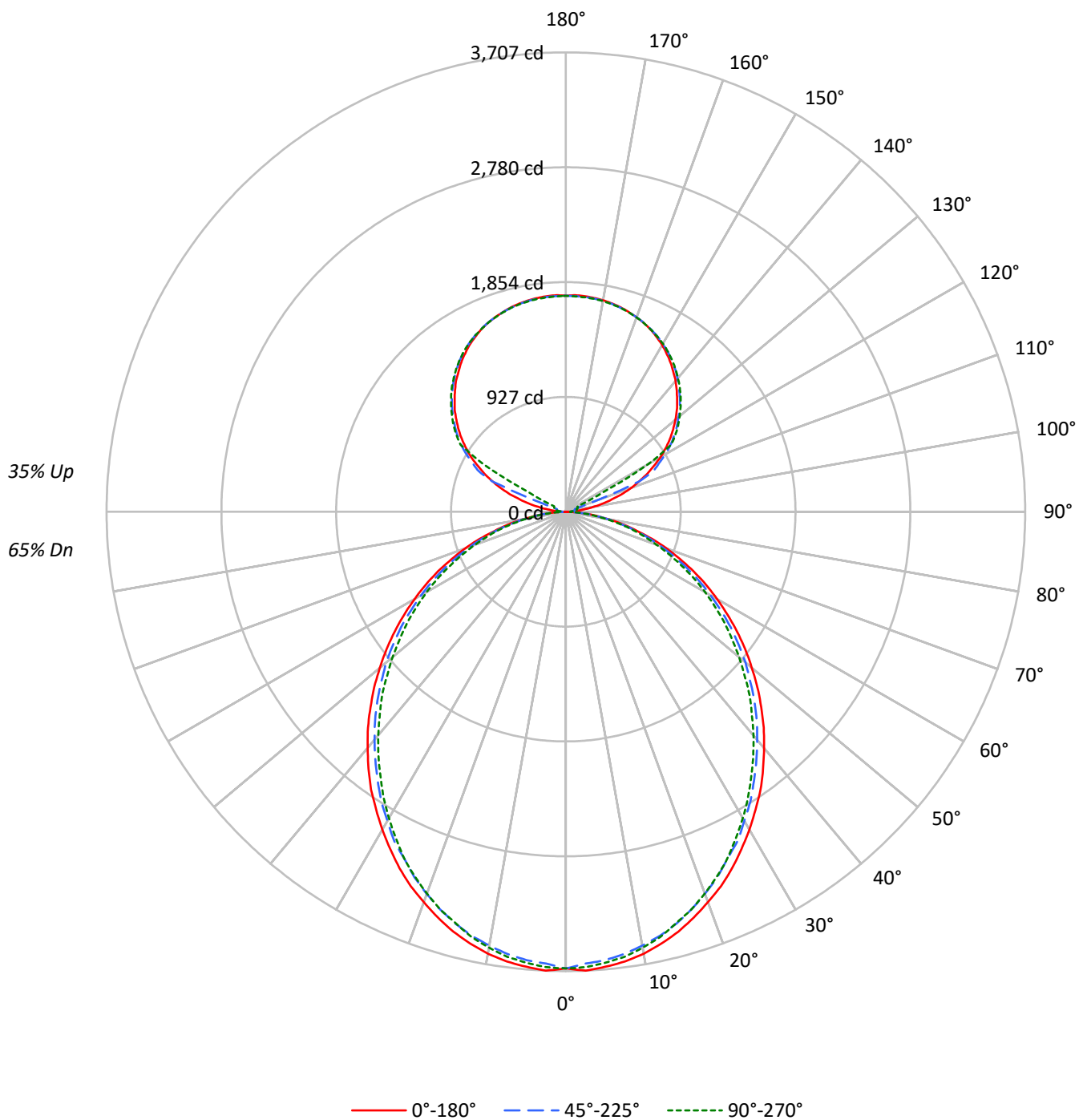
Lumens per Lamp: N/A  
Luminaire Lumens: 14490.6 lumens  
Efficiency: N/A  
Efficacy: 90.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 159.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.996  
Total Harmonic Distortion (THDi): 0.064  
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   | 111 | 111 | 111 | 111 | 104 | 104 | 104 | 104 | 92 | 92 | 92 | 80 | 80 | 80 | 70 | 70 | 70 |
| 1   | 101 | 97  | 93  | 89  | 95  | 91  | 88  | 84  | 80 | 78 | 75 | 71 | 69 | 67 | 62 | 60 | 59 |
| 2   | 92  | 84  | 78  | 73  | 86  | 80  | 74  | 69  | 70 | 66 | 62 | 62 | 59 | 56 | 54 | 52 | 50 |
| 3   | 84  | 74  | 67  | 61  | 79  | 70  | 63  | 58  | 62 | 57 | 53 | 55 | 51 | 47 | 48 | 45 | 42 |
| 4   | 77  | 66  | 58  | 51  | 72  | 62  | 55  | 49  | 55 | 49 | 45 | 49 | 44 | 41 | 43 | 39 | 36 |
| 5   | 71  | 59  | 50  | 44  | 66  | 56  | 48  | 42  | 50 | 43 | 39 | 44 | 39 | 35 | 39 | 35 | 32 |
| 6   | 65  | 53  | 44  | 39  | 61  | 50  | 42  | 37  | 45 | 39 | 34 | 40 | 35 | 31 | 35 | 31 | 28 |
| 7   | 60  | 48  | 40  | 34  | 57  | 45  | 38  | 33  | 41 | 34 | 30 | 36 | 31 | 27 | 32 | 28 | 25 |
| 8   | 56  | 43  | 36  | 30  | 53  | 41  | 34  | 29  | 37 | 31 | 27 | 33 | 28 | 25 | 30 | 25 | 22 |
| 9   | 52  | 40  | 32  | 27  | 49  | 38  | 31  | 26  | 34 | 28 | 24 | 31 | 26 | 22 | 27 | 23 | 20 |
| 10  | 49  | 37  | 29  | 24  | 46  | 35  | 28  | 23  | 31 | 26 | 22 | 28 | 23 | 20 | 25 | 21 | 18 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2690 | 2690 | 2690 |
| 5°  | 2694 | 2653 | 2671 |
| 10° | 2673 | 2618 | 2635 |
| 15° | 2633 | 2575 | 2579 |
| 20° | 2580 | 2515 | 2522 |
| 25° | 2527 | 2444 | 2456 |
| 30° | 2461 | 2378 | 2371 |
| 35° | 2398 | 2300 | 2281 |
| 40° | 2321 | 2221 | 2196 |
| 45° | 2244 | 2142 | 2109 |
| 50° | 2160 | 2058 | 2009 |
| 55° | 2072 | 1962 | 1916 |
| 60° | 1972 | 1848 | 1810 |
| 65° | 1863 | 1730 | 1685 |
| 70° | 1725 | 1586 | 1550 |
| 75° | 1533 | 1414 | 1427 |
| 80° | 1303 | 1195 | 1190 |
| 85° | 943  | 816  | 796  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2244 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 346.9   | 2.4       |
| 10°-20°   | 975.9   | 6.7       |
| 20°-30°   | 1434.2  | 9.9       |
| 30°-40°   | 1665.7  | 11.5      |
| 40°-50°   | 1663.7  | 11.5      |
| 50°-60°   | 1450.7  | 10.0      |
| 60°-70°   | 1072.4  | 7.4       |
| 70°-80°   | 606.7   | 4.2       |
| 80°-90°   | 163.2   | 1.1       |
| 90°-100°  | 57.5    | 0.4       |
| 100°-110° | 214.3   | 1.5       |
| 110°-120° | 568.4   | 3.9       |
| 120°-130° | 942.7   | 6.5       |
| 130°-140° | 1001.4  | 6.9       |
| 140°-150° | 930.7   | 6.4       |
| 150°-160° | 748.2   | 5.2       |
| 160°-170° | 482.1   | 3.3       |
| 170°-180° | 165.9   | 1.1       |
| 0°-30°    | 2757.0  | 19.0      |
| 0°-40°    | 4422.7  | 30.5      |
| 0°-60°    | 7537.0  | 52.0      |
| 0°-90°    | 9379.3  | 64.7      |
| 90°-120°  | 840.2   | 5.8       |
| 90°-150°  | 3714.9  | 25.6      |
| 90°-180°  | 5111.0  | 35.3      |
| 0°-180°   | 14490.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3685 | 3685  | 3685 | 3685  | 3685 |      |
| 5°   | 3685 | 3671  | 3632 | 3660  | 3654 | 350  |
| 15°  | 3508 | 3487  | 3441 | 3455  | 3437 | 988  |
| 25°  | 3175 | 3147  | 3087 | 3094  | 3087 | 1461 |
| 35°  | 2739 | 2704  | 2647 | 2626  | 2608 | 1711 |
| 45°  | 2229 | 2204  | 2151 | 2112  | 2098 | 1720 |
| 55°  | 1687 | 1666  | 1623 | 1580  | 1563 | 1508 |
| 65°  | 1138 | 1116  | 1081 | 1049  | 1031 | 1125 |
| 75°  | 595  | 588   | 570  | 549   | 556  | 635  |
| 85°  | 145  | 142   | 138  | 127   | 124  | 162  |
| 90°  | 1    | 15    | 25   | 32    | 34   | 13   |
| 95°  | 82   | 40    | 49   | 56    | 54   | 97   |
| 105° | 384  | 421   | 77   | 91    | 96   | 410  |
| 115° | 725  | 747   | 778  | 194   | 104  | 714  |
| 125° | 1026 | 1042  | 1066 | 1075  | 1079 | 915  |
| 135° | 1269 | 1289  | 1301 | 1313  | 1311 | 980  |
| 145° | 1472 | 1471  | 1492 | 1501  | 1495 | 921  |
| 155° | 1621 | 1610  | 1625 | 1632  | 1622 | 747  |
| 165° | 1708 | 1701  | 1704 | 1713  | 1704 | 483  |
| 175° | 1747 | 1738  | 1741 | 1750  | 1737 | 166  |
| 180° | 1743 | 1743  | 1743 | 1743  | 1743 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3685.2 | 3685.2 | 3685.2 | 3685.2 | 3685.2 |
| 2.5°   | 3706.6 | 3688.9 | 3649.9 | 3685.2 | 3678.4 |
| 5°     | 3685.2 | 3671.3 | 3632.2 | 3660.4 | 3653.6 |
| 7.5°   | 3660.4 | 3639.4 | 3600.3 | 3628.8 | 3621.7 |
| 10°    | 3621.7 | 3596.8 | 3554.4 | 3582.5 | 3572.0 |
| 12.5°  | 3568.3 | 3547.2 | 3504.8 | 3522.4 | 3515.3 |
| 15°    | 3508.1 | 3487.0 | 3440.8 | 3455.1 | 3437.4 |
| 17.5°  | 3433.7 | 3412.7 | 3366.4 | 3384.1 | 3366.4 |
| 20°    | 3352.1 | 3331.0 | 3281.4 | 3291.9 | 3278.1 |
| 22.5°  | 3270.9 | 3238.9 | 3192.7 | 3192.7 | 3185.5 |
| 25°    | 3175.0 | 3146.9 | 3086.7 | 3093.5 | 3086.7 |
| 27.5°  | 3068.6 | 3043.8 | 2997.9 | 2987.4 | 2969.8 |
| 30°    | 2962.6 | 2934.0 | 2881.0 | 2870.5 | 2856.2 |
| 32.5°  | 2849.0 | 2828.0 | 2771.2 | 2749.8 | 2735.5 |
| 35°    | 2739.3 | 2704.0 | 2647.1 | 2625.7 | 2608.0 |
| 37.5°  | 2615.2 | 2583.3 | 2526.5 | 2501.6 | 2484.0 |
| 40°    | 2487.8 | 2459.2 | 2402.4 | 2370.8 | 2356.6 |
| 42.5°  | 2363.7 | 2335.1 | 2278.7 | 2243.0 | 2222.0 |
| 45°    | 2229.1 | 2204.2 | 2150.9 | 2112.2 | 2097.9 |
| 47.5°  | 2097.9 | 2073.1 | 2016.3 | 1977.2 | 1956.1 |
| 50°    | 1959.5 | 1941.9 | 1892.2 | 1842.6 | 1825.0 |
| 52.5°  | 1825.0 | 1800.1 | 1754.3 | 1715.1 | 1690.3 |
| 55°    | 1687.0 | 1665.5 | 1623.1 | 1580.5 | 1562.9 |
| 57.5°  | 1548.6 | 1530.9 | 1484.7 | 1442.2 | 1427.9 |
| 60°    | 1410.2 | 1396.4 | 1346.7 | 1307.6 | 1297.1 |
| 62.5°  | 1275.7 | 1250.9 | 1215.5 | 1180.2 | 1165.9 |
| 65°    | 1137.6 | 1116.2 | 1080.9 | 1049.0 | 1031.3 |
| 67.5°  | 995.9  | 977.9  | 946.3  | 921.5  | 907.2  |
| 70°    | 864.7  | 850.4  | 818.5  | 793.7  | 779.7  |
| 72.5°  | 730.1  | 715.8  | 698.2  | 673.4  | 662.8  |
| 75°    | 595.1  | 588.4  | 570.3  | 549.3  | 556.5  |
| 77.5°  | 474.8  | 460.5  | 453.4  | 442.9  | 432.4  |
| 80°    | 354.6  | 350.8  | 343.6  | 333.1  | 326.0  |
| 82.5°  | 241.0  | 241.0  | 237.6  | 223.3  | 223.3  |
| 85°    | 145.2  | 141.7  | 138.4  | 127.4  | 124.1  |
| 87.5°  | 63.9   | 56.7   | 49.6   | 39.1   | 35.3   |
| 90°    | 1.2    | 15.2   | 25.1   | 31.6   | 34.0   |
| 92.5°  | 31.6   | 26.5   | 30.2   | 32.8   | 34.0   |
| 95°    | 82.0   | 40.3   | 49.2   | 55.6   | 54.2   |
| 97.5°  | 147.6  | 44.2   | 64.2   | 68.2   | 69.4   |
| 100°   | 223.3  | 50.5   | 71.9   | 82.0   | 84.5   |
| 102.5° | 306.5  | 304.1  | 74.5   | 88.3   | 92.1   |
| 105°   | 383.5  | 421.4  | 77.0   | 90.7   | 95.9   |
| 107.5° | 473.1  | 504.5  | 79.6   | 93.3   | 98.4   |
| 110°   | 559.0  | 585.3  | 220.8  | 94.7   | 99.6   |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 639.6  | 662.3  | 640.8  | 97.0   | 101.0  |
| 115°   | 725.4  | 746.8  | 778.4  | 194.3  | 103.5  |
| 117.5° | 799.8  | 825.0  | 846.5  | 666.1  | 335.5  |
| 120°   | 883.1  | 902.0  | 924.8  | 939.9  | 769.6  |
| 122.5° | 953.6  | 973.9  | 999.2  | 1006.7 | 1008.1 |
| 125°   | 1025.6 | 1042.1 | 1066.0 | 1074.9 | 1078.6 |
| 127.5° | 1091.2 | 1108.9 | 1127.9 | 1140.5 | 1141.7 |
| 130°   | 1153.0 | 1173.3 | 1187.1 | 1201.0 | 1199.8 |
| 132.5° | 1216.2 | 1232.6 | 1246.4 | 1257.7 | 1256.5 |
| 135°   | 1269.2 | 1289.4 | 1300.6 | 1313.4 | 1310.8 |
| 137.5° | 1324.6 | 1339.7 | 1352.5 | 1365.0 | 1361.3 |
| 140°   | 1378.8 | 1389.0 | 1402.8 | 1414.2 | 1407.9 |
| 142.5° | 1424.3 | 1433.2 | 1449.6 | 1459.6 | 1453.3 |
| 145°   | 1472.3 | 1470.9 | 1492.4 | 1501.2 | 1495.0 |
| 147.5° | 1513.8 | 1510.0 | 1531.5 | 1537.7 | 1532.8 |
| 150°   | 1554.3 | 1545.4 | 1565.6 | 1573.1 | 1566.8 |
| 152.5° | 1588.3 | 1578.2 | 1597.1 | 1604.7 | 1595.9 |
| 155°   | 1621.1 | 1609.8 | 1625.0 | 1632.5 | 1622.4 |
| 157.5° | 1647.6 | 1637.5 | 1648.9 | 1657.8 | 1647.6 |
| 160°   | 1670.3 | 1662.7 | 1670.3 | 1677.8 | 1669.0 |
| 162.5° | 1690.4 | 1682.9 | 1689.2 | 1698.1 | 1686.7 |
| 165°   | 1708.1 | 1700.6 | 1704.3 | 1713.2 | 1704.3 |
| 167.5° | 1722.0 | 1714.4 | 1718.3 | 1727.2 | 1715.7 |
| 170°   | 1733.4 | 1725.8 | 1728.4 | 1737.1 | 1725.8 |
| 172.5° | 1740.9 | 1733.4 | 1735.9 | 1744.8 | 1733.4 |
| 175°   | 1747.2 | 1738.4 | 1740.9 | 1749.7 | 1737.1 |
| 177.5° | 1749.7 | 1740.9 | 1742.2 | 1751.1 | 1739.7 |
| 180°   | 1743.4 | 1743.4 | 1743.4 | 1743.4 | 1743.4 |

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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 | 11.98            | 12.99 | 12.79 | 13.83 | 14.87 | 11.54          | 12.55 | 12.35 | 13.39 | 14.43 |
|                 | 3H   | 13.65            | 14.56 | 14.48 | 15.41 | 16.48 | 13.17          | 14.07 | 14.00 | 14.92 | 16.00 |
|                 | 4H   | 14.25            | 15.10 | 15.09 | 15.96 | 17.05 | 13.76          | 14.62 | 14.61 | 15.48 | 16.56 |
|                 | 6H   | 14.66            | 15.45 | 15.52 | 16.31 | 17.41 | 14.16          | 14.96 | 15.03 | 15.82 | 16.92 |
|                 | 8H   | 14.77            | 15.52 | 15.64 | 16.40 | 17.50 | 14.27          | 15.03 | 15.14 | 15.91 | 17.01 |
|                 | 12H  | 14.82            | 15.54 | 15.70 | 16.42 | 17.54 | 14.32          | 15.04 | 15.20 | 15.92 | 17.04 |
| 4H              | 2H   | 12.45            | 13.31 | 13.31 | 14.17 | 15.25 | 12.10          | 12.96 | 12.96 | 13.82 | 14.90 |
|                 | 3H   | 14.34            | 15.05 | 15.20 | 15.94 | 17.04 | 13.93          | 14.65 | 14.80 | 15.54 | 16.64 |
|                 | 4H   | 15.06            | 15.71 | 15.94 | 16.60 | 17.73 | 14.64          | 15.30 | 15.52 | 16.18 | 17.31 |
|                 | 6H   | 15.59            | 16.15 | 16.48 | 17.06 | 18.19 | 15.16          | 15.73 | 16.05 | 16.64 | 17.77 |
|                 | 8H   | 15.74            | 16.27 | 16.64 | 17.18 | 18.32 | 15.31          | 15.84 | 16.21 | 16.75 | 17.89 |
|                 | 12H  | 15.82            | 16.30 | 16.74 | 17.22 | 18.37 | 15.38          | 15.86 | 16.30 | 16.78 | 17.93 |
| 8H              | 4H   | 15.27            | 15.80 | 16.16 | 16.70 | 17.84 | 14.90          | 15.43 | 15.79 | 16.33 | 17.47 |
|                 | 6H   | 15.91            | 16.35 | 16.83 | 17.30 | 18.44 | 15.53          | 15.97 | 16.46 | 16.92 | 18.06 |
|                 | 8H   | 16.13            | 16.52 | 17.07 | 17.46 | 18.62 | 15.75          | 16.14 | 16.68 | 17.08 | 18.23 |
|                 | 12H  | 16.27            | 16.62 | 17.21 | 17.55 | 18.76 | 15.87          | 16.21 | 16.81 | 17.15 | 18.35 |
| 12H             | 4H   | 15.26            | 15.74 | 16.18 | 16.66 | 17.81 | 14.90          | 15.37 | 15.81 | 16.30 | 17.45 |
|                 | 6H   | 15.94            | 16.33 | 16.87 | 17.27 | 18.43 | 15.58          | 15.96 | 16.51 | 16.90 | 18.06 |
|                 | 8H   | 16.19            | 16.53 | 17.13 | 17.47 | 18.67 | 15.82          | 16.16 | 16.76 | 17.09 | 18.30 |