

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: P928788

Luminaire Tested: DFN2DIP-HX4F0-120D060US930-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928788  
REPORT IS A COMBINATION OF REPORTS P900871 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-120D060US930-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

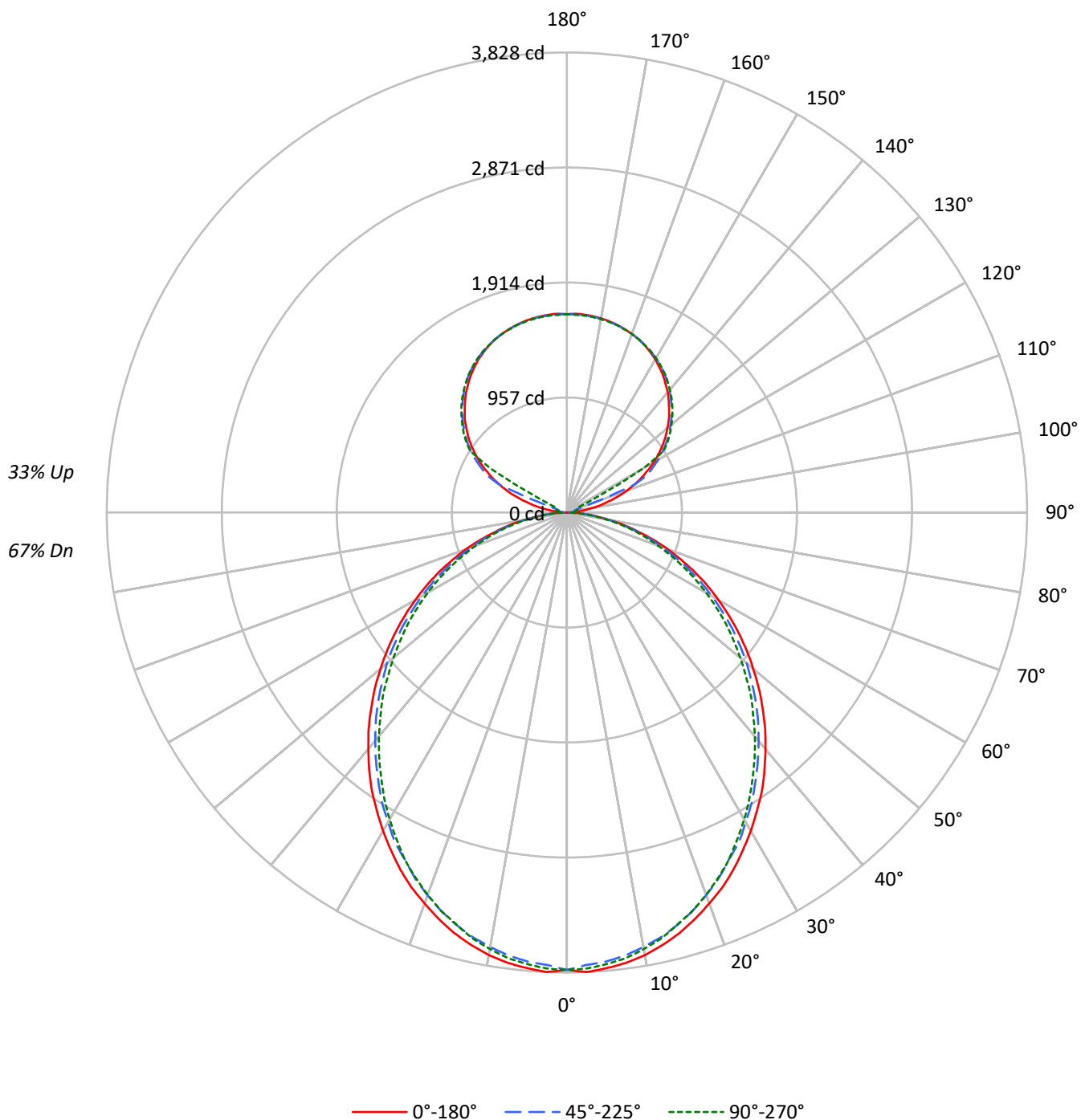
Lumens per Lamp: N/A  
Luminaire Lumens: 14523.2 lumens  
Efficiency: N/A  
Efficacy: 85.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 170.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9954  
Total Harmonic Distortion (THDi): 0.076  
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 | 105 | 105 | 105 | 105 | 93 | 93 | 93 |  | 82 | 82 | 82 |  | 71 |
| 1   | 102 | 97  | 93  | 90  | 95  | 92  | 88  | 85  | 81 | 79 | 76 |  | 72 | 70 | 68 |  | 63 |
| 2   | 92  | 85  | 79  | 73  | 87  | 80  | 75  | 70  | 71 | 67 | 63 |  | 63 | 60 | 57 |  | 56 |
| 3   | 84  | 75  | 67  | 61  | 79  | 71  | 64  | 58  | 63 | 58 | 53 |  | 56 | 52 | 48 |  | 49 |
| 4   | 77  | 66  | 58  | 52  | 72  | 63  | 55  | 50  | 56 | 50 | 45 |  | 50 | 45 | 41 |  | 44 |
| 5   | 71  | 59  | 51  | 44  | 67  | 56  | 48  | 43  | 50 | 44 | 39 |  | 45 | 40 | 36 |  | 40 |
| 6   | 66  | 53  | 45  | 39  | 62  | 50  | 43  | 37  | 45 | 39 | 34 |  | 41 | 35 | 32 |  | 36 |
| 7   | 61  | 48  | 40  | 34  | 57  | 46  | 38  | 33  | 41 | 35 | 30 |  | 37 | 32 | 28 |  | 33 |
| 8   | 56  | 44  | 36  | 30  | 53  | 42  | 34  | 29  | 38 | 31 | 27 |  | 34 | 29 | 25 |  | 30 |
| 9   | 53  | 40  | 32  | 27  | 50  | 38  | 31  | 26  | 35 | 29 | 24 |  | 31 | 26 | 23 |  | 28 |
| 10  | 49  | 37  | 29  | 24  | 46  | 35  | 28  | 24  | 32 | 26 | 22 |  | 29 | 24 | 20 |  | 26 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2830 | 2830 | 2830 |
| 5°  | 2834 | 2790 | 2809 |
| 10° | 2812 | 2753 | 2771 |
| 15° | 2770 | 2708 | 2712 |
| 20° | 2715 | 2645 | 2651 |
| 25° | 2660 | 2570 | 2581 |
| 30° | 2590 | 2501 | 2492 |
| 35° | 2524 | 2418 | 2397 |
| 40° | 2443 | 2335 | 2307 |
| 45° | 2363 | 2252 | 2216 |
| 50° | 2274 | 2164 | 2109 |
| 55° | 2182 | 2063 | 2011 |
| 60° | 2078 | 1943 | 1899 |
| 65° | 1964 | 1818 | 1767 |
| 70° | 1819 | 1667 | 1624 |
| 75° | 1618 | 1485 | 1493 |
| 80° | 1377 | 1255 | 1242 |
| 85° | 999  | 855  | 826  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2363 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 358.2   | 2.5       |
| 10°-20°   | 1007.7  | 6.9       |
| 20°-30°   | 1481.0  | 10.2      |
| 30°-40°   | 1720.1  | 11.8      |
| 40°-50°   | 1718.0  | 11.8      |
| 50°-60°   | 1498.0  | 10.3      |
| 60°-70°   | 1107.4  | 7.6       |
| 70°-80°   | 626.5   | 4.3       |
| 80°-90°   | 168.3   | 1.2       |
| 90°-100°  | 54.4    | 0.4       |
| 100°-110° | 202.9   | 1.4       |
| 110°-120° | 538.0   | 3.7       |
| 120°-130° | 892.3   | 6.1       |
| 130°-140° | 947.9   | 6.5       |
| 140°-150° | 880.9   | 6.1       |
| 150°-160° | 708.2   | 4.9       |
| 160°-170° | 456.4   | 3.1       |
| 170°-180° | 157.1   | 1.1       |
| 0°-30°    | 2846.9  | 19.6      |
| 0°-40°    | 4567.0  | 31.4      |
| 0°-60°    | 7783.0  | 53.6      |
| 0°-90°    | 9685.1  | 66.7      |
| 90°-120°  | 795.3   | 5.5       |
| 90°-150°  | 3516.4  | 24.2      |
| 90°-180°  | 4838.0  | 33.3      |
| 0°-180°   | 14523.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3806 | 3806  | 3806 | 3806  | 3806 |      |
| 5°   | 3806 | 3791  | 3751 | 3780  | 3773 | 361  |
| 15°  | 3623 | 3601  | 3553 | 3568  | 3550 | 1020 |
| 25°  | 3279 | 3250  | 3187 | 3194  | 3187 | 1509 |
| 35°  | 2829 | 2792  | 2734 | 2711  | 2693 | 1766 |
| 45°  | 2302 | 2276  | 2221 | 2181  | 2166 | 1776 |
| 55°  | 1742 | 1720  | 1676 | 1632  | 1614 | 1557 |
| 65°  | 1175 | 1153  | 1116 | 1083  | 1065 | 1162 |
| 75°  | 615  | 608   | 589  | 567   | 575  | 656  |
| 85°  | 150  | 146   | 143  | 132   | 128  | 167  |
| 90°  | 1    | 14    | 24   | 30    | 32   | 13   |
| 95°  | 78   | 38    | 46   | 53    | 51   | 92   |
| 105° | 363  | 399   | 73   | 86    | 91   | 388  |
| 115° | 687  | 707   | 737  | 184   | 98   | 676  |
| 125° | 971  | 986   | 1009 | 1017  | 1021 | 866  |
| 135° | 1201 | 1220  | 1231 | 1243  | 1241 | 928  |
| 145° | 1394 | 1392  | 1413 | 1421  | 1415 | 872  |
| 155° | 1534 | 1524  | 1538 | 1545  | 1536 | 707  |
| 165° | 1617 | 1610  | 1613 | 1622  | 1613 | 457  |
| 175° | 1654 | 1646  | 1648 | 1656  | 1644 | 157  |
| 180° | 1650 | 1650  | 1650 | 1650  | 1650 |      |

TEST NUMBER: P928788

CATALOG NUMBER: DFN2DIP-HX4F0-120D060US930-FLLONL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3805.5 | 3805.5 | 3805.5 | 3805.5 | 3805.5 |
| 2.5°   | 3827.6 | 3809.3 | 3769.0 | 3805.5 | 3798.5 |
| 5°     | 3805.5 | 3791.1 | 3750.7 | 3779.8 | 3772.8 |
| 7.5°   | 3779.8 | 3758.0 | 3717.7 | 3747.2 | 3739.9 |
| 10°    | 3739.9 | 3714.2 | 3670.4 | 3699.4 | 3688.6 |
| 12.5°  | 3684.7 | 3662.9 | 3619.1 | 3637.3 | 3629.9 |
| 15°    | 3622.6 | 3600.8 | 3553.1 | 3567.8 | 3549.6 |
| 17.5°  | 3545.7 | 3524.0 | 3476.2 | 3494.5 | 3476.2 |
| 20°    | 3461.5 | 3439.7 | 3388.5 | 3399.4 | 3385.0 |
| 22.5°  | 3377.6 | 3344.6 | 3296.8 | 3296.8 | 3289.5 |
| 25°    | 3278.6 | 3249.5 | 3187.4 | 3194.4 | 3187.4 |
| 27.5°  | 3168.7 | 3143.1 | 3095.8 | 3084.9 | 3066.7 |
| 30°    | 3059.3 | 3029.8 | 2975.0 | 2964.2 | 2949.4 |
| 32.5°  | 2942.0 | 2920.3 | 2861.6 | 2839.5 | 2824.8 |
| 35°    | 2828.6 | 2792.2 | 2733.5 | 2711.4 | 2693.2 |
| 37.5°  | 2700.5 | 2667.6 | 2608.9 | 2583.3 | 2565.0 |
| 40°    | 2569.0 | 2539.5 | 2480.8 | 2448.2 | 2433.4 |
| 42.5°  | 2440.8 | 2411.3 | 2353.1 | 2316.2 | 2294.5 |
| 45°    | 2301.8 | 2276.2 | 2221.0 | 2181.1 | 2166.4 |
| 47.5°  | 2166.4 | 2140.7 | 2082.1 | 2041.7 | 2020.0 |
| 50°    | 2023.5 | 2005.2 | 1954.0 | 1902.7 | 1884.4 |
| 52.5°  | 1884.4 | 1858.9 | 1811.5 | 1771.1 | 1745.5 |
| 55°    | 1742.0 | 1719.9 | 1676.0 | 1632.1 | 1613.9 |
| 57.5°  | 1599.1 | 1580.9 | 1533.1 | 1489.2 | 1474.5 |
| 60°    | 1456.2 | 1441.9 | 1390.6 | 1350.3 | 1339.4 |
| 62.5°  | 1317.3 | 1291.6 | 1255.2 | 1218.7 | 1203.9 |
| 65°    | 1174.8 | 1152.7 | 1116.1 | 1083.1 | 1065.0 |
| 67.5°  | 1028.4 | 1009.8 | 977.2  | 951.6  | 936.8  |
| 70°    | 892.9  | 878.2  | 845.2  | 819.6  | 805.2  |
| 72.5°  | 754.0  | 739.2  | 720.9  | 695.4  | 684.4  |
| 75°    | 614.6  | 607.6  | 588.9  | 567.2  | 574.6  |
| 77.5°  | 490.3  | 475.6  | 468.2  | 457.3  | 446.5  |
| 80°    | 366.1  | 362.2  | 354.9  | 344.0  | 336.6  |
| 82.5°  | 248.8  | 248.8  | 245.4  | 230.6  | 230.6  |
| 85°    | 149.9  | 146.4  | 142.9  | 131.6  | 128.1  |
| 87.5°  | 66.0   | 58.6   | 51.3   | 40.3   | 36.5   |
| 90°    | 1.1    | 14.3   | 23.8   | 29.9   | 32.2   |
| 92.5°  | 29.9   | 25.1   | 28.6   | 31.1   | 32.2   |
| 95°    | 77.6   | 38.1   | 46.5   | 52.6   | 51.3   |
| 97.5°  | 139.7  | 41.8   | 60.8   | 64.5   | 65.7   |
| 100°   | 211.4  | 47.8   | 68.1   | 77.6   | 80.0   |
| 102.5° | 290.1  | 287.9  | 70.5   | 83.5   | 87.2   |
| 105°   | 363.0  | 398.9  | 72.9   | 85.9   | 90.8   |
| 107.5° | 447.8  | 477.6  | 75.3   | 88.3   | 93.2   |
| 110°   | 529.1  | 554.0  | 209.0  | 89.6   | 94.3   |

TEST NUMBER: P928788

CATALOG NUMBER: DFN2DIP-HX4F0-120D060US930-FLLONL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 605.5  | 626.9  | 606.6  | 91.9   | 95.6   |
| 115°   | 686.6  | 706.9  | 736.8  | 183.9  | 98.0   |
| 117.5° | 757.1  | 780.9  | 801.3  | 630.5  | 317.6  |
| 120°   | 835.9  | 853.8  | 875.4  | 889.7  | 728.4  |
| 122.5° | 902.7  | 921.8  | 945.8  | 952.9  | 954.2  |
| 125°   | 970.8  | 986.4  | 1009.1 | 1017.4 | 1021.0 |
| 127.5° | 1032.9 | 1049.6 | 1067.6 | 1079.5 | 1080.7 |
| 130°   | 1091.4 | 1110.6 | 1123.6 | 1136.8 | 1135.7 |
| 132.5° | 1151.2 | 1166.8 | 1179.8 | 1190.6 | 1189.4 |
| 135°   | 1201.4 | 1220.5 | 1231.1 | 1243.2 | 1240.8 |
| 137.5° | 1253.8 | 1268.1 | 1280.2 | 1292.1 | 1288.6 |
| 140°   | 1305.1 | 1314.8 | 1327.9 | 1338.6 | 1332.7 |
| 142.5° | 1348.3 | 1356.6 | 1372.1 | 1381.6 | 1375.6 |
| 145°   | 1393.6 | 1392.3 | 1412.6 | 1421.0 | 1415.1 |
| 147.5° | 1432.9 | 1429.3 | 1449.6 | 1455.6 | 1450.9 |
| 150°   | 1471.2 | 1462.8 | 1482.0 | 1489.1 | 1483.1 |
| 152.5° | 1503.4 | 1493.9 | 1511.7 | 1519.0 | 1510.6 |
| 155°   | 1534.5 | 1523.8 | 1538.1 | 1545.2 | 1535.7 |
| 157.5° | 1559.6 | 1550.0 | 1560.8 | 1569.2 | 1559.6 |
| 160°   | 1581.1 | 1573.8 | 1581.1 | 1588.2 | 1579.9 |
| 162.5° | 1600.1 | 1593.0 | 1598.9 | 1607.3 | 1596.6 |
| 165°   | 1616.9 | 1609.8 | 1613.3 | 1621.7 | 1613.3 |
| 167.5° | 1630.0 | 1622.8 | 1626.5 | 1634.9 | 1624.1 |
| 170°   | 1640.8 | 1633.6 | 1636.0 | 1644.3 | 1633.6 |
| 172.5° | 1647.9 | 1640.8 | 1643.2 | 1651.6 | 1640.8 |
| 175°   | 1653.9 | 1645.5 | 1647.9 | 1656.2 | 1644.3 |
| 177.5° | 1656.2 | 1647.9 | 1649.2 | 1657.5 | 1646.8 |
| 180°   | 1650.3 | 1650.3 | 1650.3 | 1650.3 | 1650.3 |

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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 | 12.30            | 13.33 | 13.10 | 14.16 | 15.17 | 11.87          | 12.90 | 12.67 | 13.72 | 14.73 |
|                 | 3H   | 13.97            | 14.90 | 14.79 | 15.73 | 16.77 | 13.50          | 14.43 | 14.31 | 15.26 | 16.30 |
|                 | 4H   | 14.57            | 15.45 | 15.40 | 16.29 | 17.34 | 14.10          | 14.97 | 14.93 | 15.81 | 16.86 |
|                 | 6H   | 14.98            | 15.79 | 15.82 | 16.64 | 17.70 | 14.50          | 15.31 | 15.34 | 16.16 | 17.22 |
|                 | 8H   | 15.09            | 15.86 | 15.94 | 16.73 | 17.79 | 14.61          | 15.39 | 15.46 | 16.25 | 17.32 |
|                 | 12H  | 15.14            | 15.88 | 16.00 | 16.74 | 17.83 | 14.66          | 15.40 | 15.52 | 16.26 | 17.35 |
| 4H              | 2H   | 12.78            | 13.66 | 13.62 | 14.50 | 15.55 | 12.44          | 13.31 | 13.27 | 14.15 | 15.20 |
|                 | 3H   | 14.66            | 15.40 | 15.51 | 16.27 | 17.34 | 14.27          | 15.00 | 15.12 | 15.88 | 16.94 |
|                 | 4H   | 15.39            | 16.05 | 16.25 | 16.92 | 18.02 | 14.98          | 15.65 | 15.84 | 16.52 | 17.61 |
|                 | 6H   | 15.91            | 16.49 | 16.79 | 17.38 | 18.48 | 15.50          | 16.08 | 16.38 | 16.97 | 18.07 |
|                 | 8H   | 16.07            | 16.61 | 16.94 | 17.50 | 18.61 | 15.65          | 16.19 | 16.53 | 17.08 | 18.19 |
|                 | 12H  | 16.15            | 16.64 | 17.05 | 17.54 | 18.66 | 15.73          | 16.21 | 16.62 | 17.12 | 18.24 |
| 8H              | 4H   | 15.60            | 16.14 | 16.48 | 17.03 | 18.14 | 15.24          | 15.78 | 16.11 | 16.67 | 17.78 |
|                 | 6H   | 16.24            | 16.69 | 17.14 | 17.62 | 18.73 | 15.88          | 16.32 | 16.78 | 17.25 | 18.36 |
|                 | 8H   | 16.46            | 16.86 | 17.38 | 17.78 | 18.91 | 16.09          | 16.49 | 17.01 | 17.41 | 18.54 |
|                 | 12H  | 16.60            | 16.95 | 17.52 | 17.87 | 19.05 | 16.22          | 16.57 | 17.14 | 17.48 | 18.66 |
| 12H             | 4H   | 15.59            | 16.08 | 16.49 | 16.99 | 18.10 | 15.24          | 15.73 | 16.14 | 16.63 | 17.75 |
|                 | 6H   | 16.27            | 16.67 | 17.18 | 17.59 | 18.72 | 15.92          | 16.31 | 16.83 | 17.24 | 18.37 |
|                 | 8H   | 16.52            | 16.87 | 17.44 | 17.79 | 18.96 | 16.16          | 16.51 | 17.08 | 17.43 | 18.61 |