

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: P916147

Luminaire Tested: DFN2DIP-HX2F0-060D040US930-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P916147  
REPORT IS A COMBINATION OF REPORTS P900699 AND P897595  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX2F0-060D040US930-FLLONL  
Description: 2 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

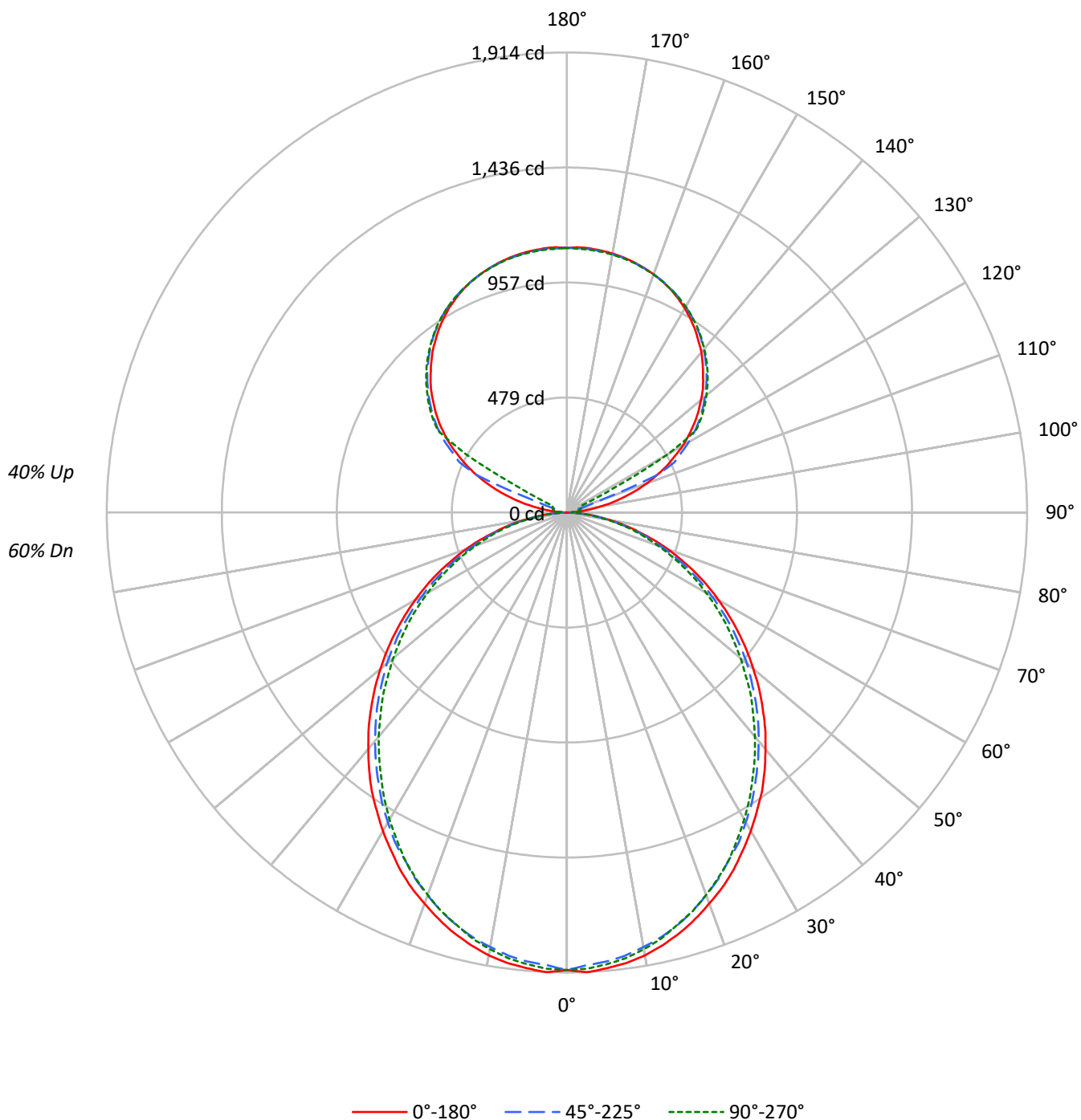
Lumens per Lamp: N/A  
Luminaire Lumens: 8071.4 lumens  
Efficiency: N/A  
Efficacy: 90.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 1.99' x L: 2.3' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 88.8  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9971  
Total Harmonic Distortion (THDi): 0.049  
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 | 102 | 102 | 102 | 102 | 89 | 89 | 89 | 77 | 77 | 77 | 65 | 65 | 65 |
| 1   | 100 | 96  | 92  | 88  | 93  | 90  | 86  | 83  | 78 | 75 | 73 | 67 | 66 | 64 | 58 | 56 | 55 |
| 2   | 91  | 84  | 77  | 72  | 85  | 78  | 73  | 68  | 68 | 64 | 61 | 59 | 56 | 53 | 51 | 49 | 47 |
| 3   | 83  | 73  | 66  | 60  | 77  | 69  | 62  | 57  | 60 | 55 | 51 | 52 | 48 | 45 | 45 | 42 | 40 |
| 4   | 76  | 65  | 57  | 51  | 71  | 61  | 54  | 48  | 54 | 48 | 44 | 47 | 42 | 39 | 40 | 37 | 34 |
| 5   | 70  | 58  | 50  | 44  | 65  | 55  | 47  | 42  | 48 | 42 | 38 | 42 | 37 | 34 | 36 | 33 | 30 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 42  | 36  | 43 | 37 | 33 | 38 | 33 | 30 | 33 | 29 | 26 |
| 7   | 60  | 47  | 39  | 33  | 56  | 44  | 37  | 32  | 39 | 33 | 29 | 35 | 30 | 26 | 30 | 26 | 23 |
| 8   | 55  | 43  | 35  | 30  | 52  | 40  | 33  | 28  | 36 | 30 | 26 | 32 | 27 | 23 | 28 | 24 | 21 |
| 9   | 52  | 39  | 32  | 26  | 48  | 37  | 30  | 25  | 33 | 27 | 23 | 29 | 24 | 21 | 26 | 22 | 19 |
| 10  | 48  | 36  | 29  | 24  | 45  | 34  | 27  | 23  | 30 | 25 | 21 | 27 | 22 | 19 | 24 | 20 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4485 | 4485 | 4485 |
| 5°  | 4485 | 4411 | 4444 |
| 10° | 4441 | 4341 | 4375 |
| 15° | 4369 | 4259 | 4273 |
| 20° | 4274 | 4149 | 4169 |
| 25° | 4178 | 4020 | 4050 |
| 30° | 4061 | 3899 | 3900 |
| 35° | 3949 | 3758 | 3743 |
| 40° | 3813 | 3615 | 3592 |
| 45° | 3676 | 3471 | 3438 |
| 50° | 3527 | 3320 | 3260 |
| 55° | 3370 | 3146 | 3094 |
| 60° | 3192 | 2940 | 2904 |
| 65° | 2996 | 2725 | 2680 |
| 70° | 2748 | 2463 | 2438 |
| 75° | 2407 | 2150 | 2203 |
| 80° | 1992 | 1750 | 1778 |
| 85° | 1352 | 1098 | 1100 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3676 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 179.1  | 2.2       |
| 10°-20°   | 504.1  | 6.2       |
| 20°-30°   | 740.8  | 9.2       |
| 30°-40°   | 860.4  | 10.7      |
| 40°-50°   | 859.3  | 10.6      |
| 50°-60°   | 749.3  | 9.3       |
| 60°-70°   | 553.9  | 6.9       |
| 70°-80°   | 313.4  | 3.9       |
| 80°-90°   | 84.6   | 1.0       |
| 90°-100°  | 36.3   | 0.4       |
| 100°-110° | 135.3  | 1.7       |
| 110°-120° | 358.8  | 4.4       |
| 120°-130° | 595.1  | 7.4       |
| 130°-140° | 632.1  | 7.8       |
| 140°-150° | 587.5  | 7.3       |
| 150°-160° | 472.3  | 5.9       |
| 160°-170° | 304.4  | 3.8       |
| 170°-180° | 104.8  | 1.3       |
| 0°-30°    | 1424.0 | 17.6      |
| 0°-40°    | 2284.3 | 28.3      |
| 0°-60°    | 3892.9 | 48.2      |
| 0°-90°    | 4844.8 | 60.0      |
| 90°-120°  | 530.4  | 6.6       |
| 90°-150°  | 2345.2 | 29.1      |
| 90°-180°  | 3227.0 | 40.0      |
| 0°-180°   | 8071.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1903 | 1903  | 1903 | 1903  | 1903 |      |
| 5°   | 1903 | 1896  | 1876 | 1891  | 1887 | 181  |
| 15°  | 1812 | 1801  | 1777 | 1785  | 1776 | 510  |
| 25°  | 1640 | 1625  | 1594 | 1598  | 1594 | 755  |
| 35°  | 1415 | 1397  | 1367 | 1356  | 1347 | 884  |
| 45°  | 1151 | 1138  | 1111 | 1091  | 1084 | 889  |
| 55°  | 871  | 860   | 838  | 816   | 807  | 779  |
| 65°  | 588  | 577   | 558  | 542   | 533  | 581  |
| 75°  | 307  | 304   | 295  | 284   | 287  | 328  |
| 85°  | 75   | 73    | 71   | 66    | 64   | 84   |
| 90°  | 1    | 10    | 16   | 20    | 21   | 7    |
| 95°  | 52   | 25    | 31   | 35    | 34   | 61   |
| 105° | 242  | 266   | 49   | 57    | 60   | 259  |
| 115° | 458  | 471   | 491  | 123   | 65   | 451  |
| 125° | 647  | 658   | 673  | 679   | 681  | 577  |
| 135° | 801  | 814   | 821  | 829   | 828  | 619  |
| 145° | 929  | 929   | 942  | 948   | 944  | 581  |
| 155° | 1023 | 1016  | 1026 | 1030  | 1024 | 472  |
| 165° | 1078 | 1074  | 1076 | 1082  | 1076 | 305  |
| 175° | 1103 | 1097  | 1099 | 1105  | 1097 | 105  |
| 180° | 1101 | 1101  | 1101 | 1101  | 1101 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1903.4 | 1903.4 | 1903.4 | 1903.4 | 1903.4 |
| 2.5°   | 1914.5 | 1905.4 | 1885.1 | 1903.4 | 1899.9 |
| 5°     | 1903.4 | 1896.2 | 1876.0 | 1890.6 | 1887.1 |
| 7.5°   | 1890.6 | 1879.8 | 1859.5 | 1874.3 | 1870.6 |
| 10°    | 1870.6 | 1857.8 | 1835.8 | 1850.4 | 1844.9 |
| 12.5°  | 1843.1 | 1832.1 | 1810.2 | 1819.3 | 1815.7 |
| 15°    | 1811.9 | 1801.1 | 1777.2 | 1784.6 | 1775.5 |
| 17.5°  | 1773.5 | 1762.7 | 1738.8 | 1747.8 | 1738.8 |
| 20°    | 1731.4 | 1720.5 | 1694.8 | 1700.3 | 1693.1 |
| 22.5°  | 1689.5 | 1672.9 | 1649.0 | 1649.0 | 1645.4 |
| 25°    | 1639.9 | 1625.4 | 1594.2 | 1597.7 | 1594.2 |
| 27.5°  | 1584.9 | 1572.1 | 1548.4 | 1543.0 | 1533.9 |
| 30°    | 1530.2 | 1515.4 | 1488.1 | 1482.6 | 1475.2 |
| 32.5°  | 1471.5 | 1460.7 | 1431.3 | 1420.2 | 1412.9 |
| 35°    | 1414.9 | 1396.6 | 1367.3 | 1356.2 | 1347.0 |
| 37.5°  | 1350.8 | 1334.2 | 1305.0 | 1292.1 | 1283.0 |
| 40°    | 1284.9 | 1270.2 | 1240.9 | 1224.6 | 1217.2 |
| 42.5°  | 1220.8 | 1206.1 | 1177.0 | 1158.5 | 1147.6 |
| 45°    | 1151.4 | 1138.5 | 1110.9 | 1091.0 | 1083.5 |
| 47.5°  | 1083.5 | 1070.7 | 1041.5 | 1021.2 | 1010.3 |
| 50°    | 1012.1 | 1003.0 | 977.4  | 951.7  | 942.6  |
| 52.5°  | 942.6  | 929.8  | 906.0  | 885.9  | 873.1  |
| 55°    | 871.3  | 860.2  | 838.3  | 816.4  | 807.2  |
| 57.5°  | 799.9  | 790.8  | 766.9  | 744.9  | 737.5  |
| 60°    | 728.4  | 721.2  | 695.6  | 675.4  | 669.9  |
| 62.5°  | 658.8  | 646.0  | 627.8  | 609.5  | 602.2  |
| 65°    | 587.6  | 576.6  | 558.3  | 541.8  | 532.6  |
| 67.5°  | 514.4  | 505.1  | 488.8  | 476.0  | 468.6  |
| 70°    | 446.6  | 439.3  | 422.7  | 409.9  | 402.8  |
| 72.5°  | 377.1  | 369.7  | 360.6  | 347.8  | 342.3  |
| 75°    | 307.4  | 303.9  | 294.6  | 283.7  | 287.4  |
| 77.5°  | 245.2  | 237.9  | 234.2  | 228.8  | 223.3  |
| 80°    | 183.1  | 181.2  | 177.5  | 172.0  | 168.4  |
| 82.5°  | 124.5  | 124.5  | 122.7  | 115.4  | 115.4  |
| 85°    | 74.9   | 73.2   | 71.4   | 65.8   | 64.1   |
| 87.5°  | 33.0   | 29.4   | 25.6   | 20.2   | 18.3   |
| 90°    | 0.7    | 9.5    | 15.9   | 20.0   | 21.4   |
| 92.5°  | 20.0   | 16.7   | 19.1   | 20.7   | 21.4   |
| 95°    | 51.7   | 25.4   | 31.0   | 35.1   | 34.2   |
| 97.5°  | 93.2   | 27.9   | 40.6   | 43.0   | 43.8   |
| 100°   | 141.0  | 31.9   | 45.4   | 51.7   | 53.3   |
| 102.5° | 193.5  | 192.0  | 47.0   | 55.7   | 58.1   |
| 105°   | 242.1  | 266.0  | 48.6   | 57.3   | 60.5   |
| 107.5° | 298.6  | 318.5  | 50.2   | 58.9   | 62.1   |
| 110°   | 352.9  | 369.5  | 139.4  | 59.8   | 62.9   |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 403.8  | 418.1  | 404.6  | 61.3   | 63.8   |
| 115°   | 457.9  | 471.4  | 491.4  | 122.6  | 65.4   |
| 117.5° | 504.9  | 520.8  | 534.4  | 420.4  | 211.8  |
| 120°   | 557.5  | 569.4  | 583.8  | 593.4  | 485.8  |
| 122.5° | 602.0  | 614.8  | 630.8  | 635.5  | 636.3  |
| 125°   | 647.4  | 657.9  | 672.9  | 678.6  | 680.9  |
| 127.5° | 688.8  | 700.0  | 712.0  | 720.0  | 720.7  |
| 130°   | 727.9  | 740.7  | 749.3  | 758.1  | 757.4  |
| 132.5° | 767.7  | 778.1  | 786.8  | 794.0  | 793.3  |
| 135°   | 801.2  | 814.0  | 821.1  | 829.1  | 827.5  |
| 137.5° | 836.2  | 845.7  | 853.8  | 861.7  | 859.3  |
| 140°   | 870.4  | 876.9  | 885.6  | 892.8  | 888.8  |
| 142.5° | 899.2  | 904.7  | 915.1  | 921.4  | 917.5  |
| 145°   | 929.4  | 928.6  | 942.1  | 947.7  | 943.7  |
| 147.5° | 955.6  | 953.2  | 966.8  | 970.8  | 967.7  |
| 150°   | 981.1  | 975.6  | 988.4  | 993.1  | 989.1  |
| 152.5° | 1002.7 | 996.3  | 1008.2 | 1013.0 | 1007.5 |
| 155°   | 1023.4 | 1016.3 | 1025.8 | 1030.5 | 1024.2 |
| 157.5° | 1040.1 | 1033.7 | 1041.0 | 1046.5 | 1040.1 |
| 160°   | 1054.4 | 1049.6 | 1054.4 | 1059.2 | 1053.6 |
| 162.5° | 1067.1 | 1062.4 | 1066.4 | 1072.0 | 1064.8 |
| 165°   | 1078.3 | 1073.6 | 1075.9 | 1081.5 | 1075.9 |
| 167.5° | 1087.1 | 1082.2 | 1084.8 | 1090.3 | 1083.1 |
| 170°   | 1094.3 | 1089.5 | 1091.0 | 1096.7 | 1089.5 |
| 172.5° | 1099.0 | 1094.3 | 1095.9 | 1101.5 | 1094.3 |
| 175°   | 1102.9 | 1097.4 | 1099.0 | 1104.6 | 1096.7 |
| 177.5° | 1104.6 | 1099.0 | 1099.8 | 1105.5 | 1098.3 |
| 180°   | 1100.7 | 1100.7 | 1100.7 | 1100.7 | 1100.7 |

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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 | 13.23            | 14.19 | 14.09 | 15.07 | 16.19 | 12.80          | 13.76 | 13.67 | 14.65 | 15.77 |
|                 | 3H   | 14.87            | 15.73 | 15.75 | 16.63 | 17.77 | 14.41          | 15.27 | 15.29 | 16.17 | 17.31 |
|                 | 4H   | 15.44            | 16.26 | 16.34 | 17.16 | 18.32 | 14.98          | 15.80 | 15.88 | 16.70 | 17.86 |
|                 | 6H   | 15.83            | 16.58 | 16.74 | 17.49 | 18.66 | 15.37          | 16.12 | 16.28 | 17.03 | 18.20 |
|                 | 8H   | 15.93            | 16.64 | 16.84 | 17.57 | 18.74 | 15.47          | 16.18 | 16.38 | 17.11 | 18.28 |
|                 | 12H  | 15.97            | 16.65 | 16.89 | 17.57 | 18.77 | 15.51          | 16.19 | 16.43 | 17.11 | 18.30 |
| 4H              | 2H   | 13.69            | 14.50 | 14.59 | 15.41 | 16.56 | 13.35          | 14.16 | 14.25 | 15.07 | 16.22 |
|                 | 3H   | 15.54            | 16.21 | 16.45 | 17.15 | 18.32 | 15.15          | 15.83 | 16.06 | 16.77 | 17.94 |
|                 | 4H   | 16.23            | 16.85 | 17.15 | 17.78 | 18.98 | 15.84          | 16.46 | 16.76 | 17.39 | 18.59 |
|                 | 6H   | 16.73            | 17.27 | 17.67 | 18.22 | 19.42 | 16.34          | 16.87 | 17.27 | 17.82 | 19.02 |
|                 | 8H   | 16.87            | 17.37 | 17.81 | 18.32 | 19.53 | 16.47          | 16.97 | 17.41 | 17.92 | 19.13 |
|                 | 12H  | 16.94            | 17.39 | 17.89 | 18.35 | 19.57 | 16.53          | 16.98 | 17.49 | 17.95 | 19.17 |
| 8H              | 4H   | 16.43            | 16.93 | 17.36 | 17.87 | 19.09 | 16.08          | 16.58 | 17.01 | 17.52 | 18.73 |
|                 | 6H   | 17.03            | 17.45 | 18.00 | 18.44 | 19.65 | 16.68          | 17.10 | 17.65 | 18.08 | 19.30 |
|                 | 8H   | 17.24            | 17.60 | 18.21 | 18.58 | 19.81 | 16.88          | 17.25 | 17.86 | 18.23 | 19.46 |
|                 | 12H  | 17.36            | 17.68 | 18.33 | 18.65 | 19.93 | 16.99          | 17.31 | 17.97 | 18.28 | 19.56 |
| 12H             | 4H   | 16.42            | 16.87 | 17.37 | 17.83 | 19.05 | 16.07          | 16.52 | 17.03 | 17.49 | 18.70 |
|                 | 6H   | 17.06            | 17.43 | 18.03 | 18.40 | 19.63 | 16.72          | 17.08 | 17.69 | 18.06 | 19.29 |
|                 | 8H   | 17.29            | 17.61 | 18.26 | 18.58 | 19.86 | 16.94          | 17.26 | 17.92 | 18.24 | 19.51 |