

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: P912020

Luminaire Tested: DFN2DIP-SQ3F0-100D060US850-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P912020  
REPORT IS A COMBINATION OF REPORTS P899909 AND P896733  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ3F0-100D060US850-FLLFLL  
Description: 3 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

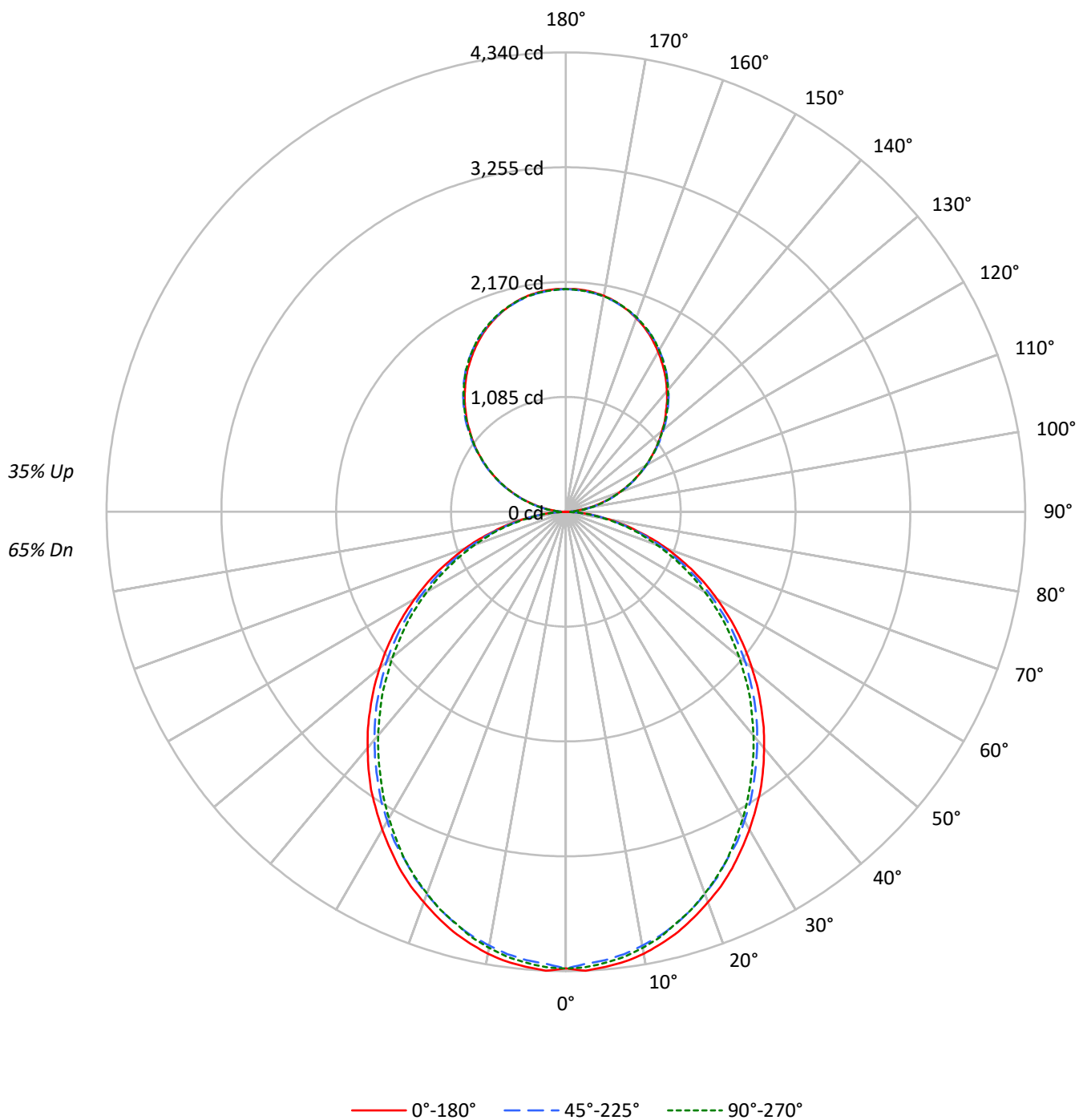
Lumens per Lamp: N/A  
Luminaire Lumens: 16867.9 lumens  
Efficiency: N/A  
Efficacy: 117.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.06' x L: 3.06' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 143.6  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9781  
Total Harmonic Distortion (THDi): 0.075  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P912020

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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  | 81 | 78 | 75 | 71 | 69 | 67 | 62 | 60 | 59 |
| 2   | 92  | 85  | 78  | 73  | 86  | 80  | 74  | 69  | 71 | 66 | 63 | 62 | 59 | 56 | 55 | 52 | 50 |
| 3   | 84  | 74  | 67  | 61  | 79  | 70  | 63  | 58  | 62 | 57 | 53 | 55 | 51 | 47 | 48 | 45 | 42 |
| 4   | 77  | 66  | 58  | 52  | 72  | 62  | 55  | 49  | 55 | 50 | 45 | 49 | 44 | 41 | 43 | 40 | 37 |
| 5   | 71  | 59  | 50  | 44  | 66  | 56  | 48  | 42  | 50 | 44 | 39 | 44 | 39 | 35 | 39 | 35 | 32 |
| 6   | 65  | 53  | 45  | 39  | 61  | 50  | 43  | 37  | 45 | 39 | 34 | 40 | 35 | 31 | 35 | 31 | 28 |
| 7   | 60  | 48  | 40  | 34  | 57  | 45  | 38  | 33  | 41 | 35 | 30 | 36 | 31 | 28 | 32 | 28 | 25 |
| 8   | 56  | 44  | 36  | 30  | 53  | 41  | 34  | 29  | 37 | 31 | 27 | 33 | 28 | 25 | 30 | 26 | 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  | 32 | 26 | 22 | 28 | 24 | 20 | 25 | 21 | 19 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4944 | 4944 | 4944 |
| 5°  | 4949 | 4872 | 4907 |
| 10° | 4906 | 4803 | 4839 |
| 15° | 4831 | 4721 | 4733 |
| 20° | 4730 | 4608 | 4625 |
| 25° | 4630 | 4473 | 4501 |
| 30° | 4505 | 4348 | 4343 |
| 35° | 4386 | 4200 | 4176 |
| 40° | 4241 | 4051 | 4017 |
| 45° | 4096 | 3901 | 3855 |
| 50° | 3937 | 3744 | 3667 |
| 55° | 3770 | 3562 | 3493 |
| 60° | 3582 | 3346 | 3294 |
| 65° | 3375 | 3123 | 3060 |
| 70° | 3113 | 2850 | 2807 |
| 75° | 2750 | 2522 | 2571 |
| 80° | 2311 | 2104 | 2125 |
| 85° | 1627 | 1394 | 1391 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 4096 cd/sqm

TEST NUMBER: P912020

CATALOG NUMBER: DFN2DIP-SQ3F0-100D060US850-FLLFLL

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 406.1   | 2.4       |
| 10°-20°   | 1142.7  | 6.8       |
| 20°-30°   | 1679.4  | 10.0      |
| 30°-40°   | 1950.5  | 11.6      |
| 40°-50°   | 1948.1  | 11.5      |
| 50°-60°   | 1698.7  | 10.1      |
| 60°-70°   | 1255.7  | 7.4       |
| 70°-80°   | 710.4   | 4.2       |
| 80°-90°   | 193.5   | 1.1       |
| 90°-100°  | 130.2   | 0.8       |
| 100°-110° | 413.7   | 2.5       |
| 110°-120° | 708.0   | 4.2       |
| 120°-130° | 931.2   | 5.5       |
| 130°-140° | 1045.3  | 6.2       |
| 140°-150° | 1025.0  | 6.1       |
| 150°-160° | 859.8   | 5.1       |
| 160°-170° | 570.2   | 3.4       |
| 170°-180° | 199.3   | 1.2       |
| 0°-30°    | 3228.3  | 19.1      |
| 0°-40°    | 5178.7  | 30.7      |
| 0°-60°    | 8825.5  | 52.3      |
| 0°-90°    | 10985.1 | 65.1      |
| 90°-120°  | 1252.0  | 7.4       |
| 90°-150°  | 4253.5  | 25.2      |
| 90°-180°  | 5883.0  | 34.9      |
| 0°-180°   | 16867.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4315 | 4315  | 4315 | 4315  | 4315 |      |
| 5°   | 4315 | 4299  | 4253 | 4286  | 4278 | 410  |
| 15°  | 4108 | 4083  | 4029 | 4046  | 4025 | 1157 |
| 25°  | 3718 | 3685  | 3614 | 3622  | 3614 | 1711 |
| 35°  | 3208 | 3166  | 3100 | 3075  | 3054 | 2003 |
| 45°  | 2610 | 2581  | 2518 | 2473  | 2456 | 2014 |
| 55°  | 1975 | 1950  | 1900 | 1851  | 1830 | 1766 |
| 65°  | 1332 | 1307  | 1266 | 1228  | 1208 | 1317 |
| 75°  | 697  | 689   | 668  | 643   | 652  | 744  |
| 85°  | 170  | 166   | 162  | 149   | 145  | 190  |
| 90°  | 2    | 23    | 62   | 58    | 60   | 16   |
| 95°  | 93   | 110   | 114  | 114   | 110  | 103  |
| 105° | 382  | 387   | 391  | 394   | 394  | 403  |
| 115° | 710  | 721   | 718  | 716   | 710  | 703  |
| 125° | 1034 | 1049  | 1044 | 1039  | 1037 | 924  |
| 135° | 1337 | 1356  | 1360 | 1358  | 1353 | 1033 |
| 145° | 1623 | 1636  | 1646 | 1648  | 1641 | 1014 |
| 155° | 1856 | 1861  | 1866 | 1875  | 1870 | 854  |
| 165° | 2019 | 2017  | 2017 | 2030  | 2021 | 569  |
| 175° | 2101 | 2096  | 2092 | 2104  | 2094 | 200  |
| 180° | 2104 | 2104  | 2104 | 2104  | 2104 |      |

TEST NUMBER: P912020

CATALOG NUMBER: DFN2DIP-SQ3F0-100D060US850-FLLFLL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4315.2 | 4315.2 | 4315.2 | 4315.2 | 4315.2 |
| 2.5°   | 4340.3 | 4319.6 | 4273.8 | 4315.2 | 4307.2 |
| 5°     | 4315.2 | 4298.9 | 4253.1 | 4286.2 | 4278.2 |
| 7.5°   | 4286.2 | 4261.4 | 4215.6 | 4249.1 | 4240.8 |
| 10°    | 4240.8 | 4211.8 | 4162.0 | 4195.0 | 4182.7 |
| 12.5°  | 4178.3 | 4153.6 | 4103.9 | 4124.6 | 4116.2 |
| 15°    | 4107.8 | 4083.2 | 4029.0 | 4045.7 | 4025.1 |
| 17.5°  | 4020.7 | 3996.1 | 3941.8 | 3962.6 | 3941.8 |
| 20°    | 3925.1 | 3900.5 | 3842.4 | 3854.7 | 3838.4 |
| 22.5°  | 3830.0 | 3792.7 | 3738.4 | 3738.4 | 3730.1 |
| 25°    | 3717.8 | 3684.8 | 3614.3 | 3622.2 | 3614.3 |
| 27.5°  | 3593.2 | 3564.1 | 3510.4 | 3498.1 | 3477.4 |
| 30°    | 3469.1 | 3435.6 | 3373.5 | 3361.2 | 3344.4 |
| 32.5°  | 3336.1 | 3311.5 | 3244.9 | 3219.9 | 3203.1 |
| 35°    | 3207.6 | 3166.2 | 3099.7 | 3074.6 | 3053.9 |
| 37.5°  | 3062.3 | 3024.8 | 2958.4 | 2929.3 | 2908.6 |
| 40°    | 2913.0 | 2879.5 | 2813.1 | 2776.2 | 2759.4 |
| 42.5°  | 2767.7 | 2734.2 | 2668.3 | 2626.4 | 2601.8 |
| 45°    | 2610.1 | 2581.1 | 2518.5 | 2473.2 | 2456.5 |
| 47.5°  | 2456.5 | 2427.5 | 2361.0 | 2315.1 | 2290.5 |
| 50°    | 2294.5 | 2273.8 | 2215.7 | 2157.6 | 2136.9 |
| 52.5°  | 2136.9 | 2107.9 | 2054.1 | 2008.4 | 1979.3 |
| 55°    | 1975.4 | 1950.3 | 1900.5 | 1850.7 | 1830.1 |
| 57.5°  | 1813.3 | 1792.6 | 1738.5 | 1688.8 | 1672.0 |
| 60°    | 1651.3 | 1635.0 | 1576.9 | 1531.1 | 1518.8 |
| 62.5°  | 1493.7 | 1464.7 | 1423.3 | 1381.9 | 1365.2 |
| 65°    | 1332.1 | 1307.1 | 1265.7 | 1228.2 | 1207.6 |
| 67.5°  | 1166.2 | 1145.0 | 1108.1 | 1079.1 | 1062.3 |
| 70°    | 1012.5 | 995.8  | 958.4  | 929.3  | 913.0  |
| 72.5°  | 854.9  | 838.2  | 817.6  | 788.5  | 776.1  |
| 75°    | 696.9  | 689.0  | 667.8  | 643.2  | 651.5  |
| 77.5°  | 556.1  | 539.3  | 530.9  | 518.6  | 506.3  |
| 80°    | 415.1  | 410.8  | 402.3  | 390.0  | 381.7  |
| 82.5°  | 282.2  | 282.2  | 278.2  | 261.5  | 261.5  |
| 85°    | 169.9  | 166.0  | 162.0  | 149.3  | 145.3  |
| 87.5°  | 74.9   | 66.4   | 58.1   | 45.8   | 41.4   |
| 90°    | 1.9    | 22.8   | 62.2   | 58.3   | 60.2   |
| 92.5°  | 39.4   | 53.3   | 55.2   | 57.1   | 57.1   |
| 95°    | 92.6   | 110.3  | 113.6  | 113.6  | 110.3  |
| 97.5°  | 154.2  | 170.7  | 177.7  | 177.7  | 177.7  |
| 100°   | 225.2  | 239.8  | 244.9  | 244.9  | 243.0  |
| 102.5° | 300.1  | 310.9  | 317.8  | 319.7  | 317.8  |
| 105°   | 381.9  | 387.0  | 390.8  | 394.0  | 394.0  |
| 107.5° | 463.1  | 470.8  | 470.8  | 472.0  | 463.1  |
| 110°   | 541.9  | 551.9  | 551.9  | 551.9  | 546.8  |

TEST NUMBER: P912020

CATALOG NUMBER: DFN2DIP-SQ3F0-100D060US850-FLLFLL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 626.8  | 637.6  | 635.7  | 630.6  | 626.8  |
| 115°   | 710.5  | 720.7  | 717.5  | 715.6  | 710.5  |
| 117.5° | 793.7  | 807.7  | 798.7  | 793.7  | 788.6  |
| 120°   | 877.4  | 891.4  | 877.4  | 877.4  | 871.7  |
| 122.5° | 953.5  | 971.3  | 962.4  | 957.4  | 953.5  |
| 125°   | 1033.5 | 1049.3 | 1044.2 | 1038.6 | 1036.7 |
| 127.5° | 1111.6 | 1131.2 | 1124.2 | 1116.7 | 1111.6 |
| 130°   | 1184.5 | 1207.4 | 1204.2 | 1200.4 | 1193.4 |
| 132.5° | 1266.4 | 1284.1 | 1285.3 | 1276.5 | 1271.4 |
| 135°   | 1336.8 | 1356.4 | 1360.2 | 1358.3 | 1353.2 |
| 137.5° | 1415.4 | 1431.3 | 1434.5 | 1433.2 | 1425.6 |
| 140°   | 1484.6 | 1500.5 | 1509.3 | 1509.3 | 1502.4 |
| 142.5° | 1555.6 | 1571.5 | 1576.6 | 1578.4 | 1571.5 |
| 145°   | 1622.9 | 1635.6 | 1645.8 | 1647.6 | 1640.7 |
| 147.5° | 1683.1 | 1699.0 | 1706.6 | 1709.7 | 1702.8 |
| 150°   | 1745.3 | 1756.1 | 1763.1 | 1768.7 | 1763.1 |
| 152.5° | 1800.5 | 1811.3 | 1820.2 | 1827.2 | 1820.2 |
| 155°   | 1855.7 | 1860.8 | 1866.4 | 1875.4 | 1869.7 |
| 157.5° | 1903.3 | 1907.1 | 1910.3 | 1923.0 | 1914.1 |
| 160°   | 1945.9 | 1949.6 | 1951.5 | 1962.3 | 1954.7 |
| 162.5° | 1985.1 | 1985.1 | 1987.0 | 1999.1 | 1990.2 |
| 165°   | 2018.7 | 2016.8 | 2016.8 | 2029.6 | 2020.7 |
| 167.5° | 2049.2 | 2043.6 | 2043.6 | 2056.2 | 2047.3 |
| 170°   | 2072.1 | 2067.0 | 2065.1 | 2077.7 | 2067.0 |
| 172.5° | 2087.9 | 2082.8 | 2080.9 | 2093.6 | 2082.8 |
| 175°   | 2100.6 | 2095.6 | 2091.7 | 2104.4 | 2093.6 |
| 177.5° | 2107.5 | 2102.6 | 2098.7 | 2109.4 | 2098.7 |
| 180°   | 2104.4 | 2104.4 | 2104.4 | 2104.4 | 2104.4 |

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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 | 14.08            | 15.10 | 14.89 | 15.93 | 16.97 | 13.64          | 14.65 | 14.45 | 15.49 | 16.53 |
|                 | 3H   | 15.75            | 16.66 | 16.58 | 17.51 | 18.57 | 15.26          | 16.17 | 16.09 | 17.02 | 18.08 |
|                 | 4H   | 16.34            | 17.20 | 17.18 | 18.06 | 19.13 | 15.84          | 16.71 | 16.69 | 17.56 | 18.64 |
|                 | 6H   | 16.74            | 17.54 | 17.60 | 18.40 | 19.49 | 16.24          | 17.04 | 17.10 | 17.90 | 18.99 |
|                 | 8H   | 16.85            | 17.61 | 17.72 | 18.49 | 19.58 | 16.35          | 17.11 | 17.21 | 17.99 | 19.08 |
|                 | 12H  | 16.90            | 17.62 | 17.77 | 18.50 | 19.61 | 16.39          | 17.11 | 17.26 | 17.99 | 19.11 |
| 4H              | 2H   | 14.56            | 15.42 | 15.40 | 16.27 | 17.35 | 14.20          | 15.06 | 15.05 | 15.92 | 16.99 |
|                 | 3H   | 16.43            | 17.15 | 17.29 | 18.04 | 19.13 | 16.02          | 16.74 | 16.88 | 17.63 | 18.72 |
|                 | 4H   | 17.15            | 17.80 | 18.02 | 18.69 | 19.81 | 16.72          | 17.38 | 17.60 | 18.26 | 19.38 |
|                 | 6H   | 17.67            | 18.23 | 18.55 | 19.14 | 20.26 | 17.23          | 17.80 | 18.12 | 18.71 | 19.83 |
|                 | 8H   | 17.82            | 18.35 | 18.71 | 19.25 | 20.38 | 17.38          | 17.91 | 18.27 | 18.81 | 19.95 |
|                 | 12H  | 17.90            | 18.37 | 18.81 | 19.30 | 20.44 | 17.45          | 17.92 | 18.36 | 18.85 | 19.99 |
| 8H              | 4H   | 17.35            | 17.88 | 18.24 | 18.78 | 19.92 | 16.97          | 17.50 | 17.87 | 18.41 | 19.54 |
|                 | 6H   | 17.98            | 18.42 | 18.90 | 19.37 | 20.50 | 17.60          | 18.04 | 18.52 | 18.98 | 20.12 |
|                 | 8H   | 18.20            | 18.59 | 19.13 | 19.53 | 20.68 | 17.81          | 18.20 | 18.74 | 19.14 | 20.29 |
|                 | 12H  | 18.34            | 18.68 | 19.27 | 19.61 | 20.81 | 17.93          | 18.27 | 18.86 | 19.20 | 20.40 |
| 12H             | 4H   | 17.34            | 17.82 | 18.26 | 18.74 | 19.88 | 16.97          | 17.45 | 17.89 | 18.37 | 19.52 |
|                 | 6H   | 18.01            | 18.40 | 18.94 | 19.34 | 20.49 | 17.64          | 18.03 | 18.57 | 18.97 | 20.12 |
|                 | 8H   | 18.26            | 18.60 | 19.19 | 19.53 | 20.73 | 17.88          | 18.22 | 18.81 | 19.15 | 20.35 |