

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: P921090

Luminaire Tested: DFN2DIP-TR4F0-090D040US935-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P921090  
REPORT IS A COMBINATION OF REPORTS P900379 AND P897293  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-090D040US935-FLLFLL  
Description: 4 foot, Triangle Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

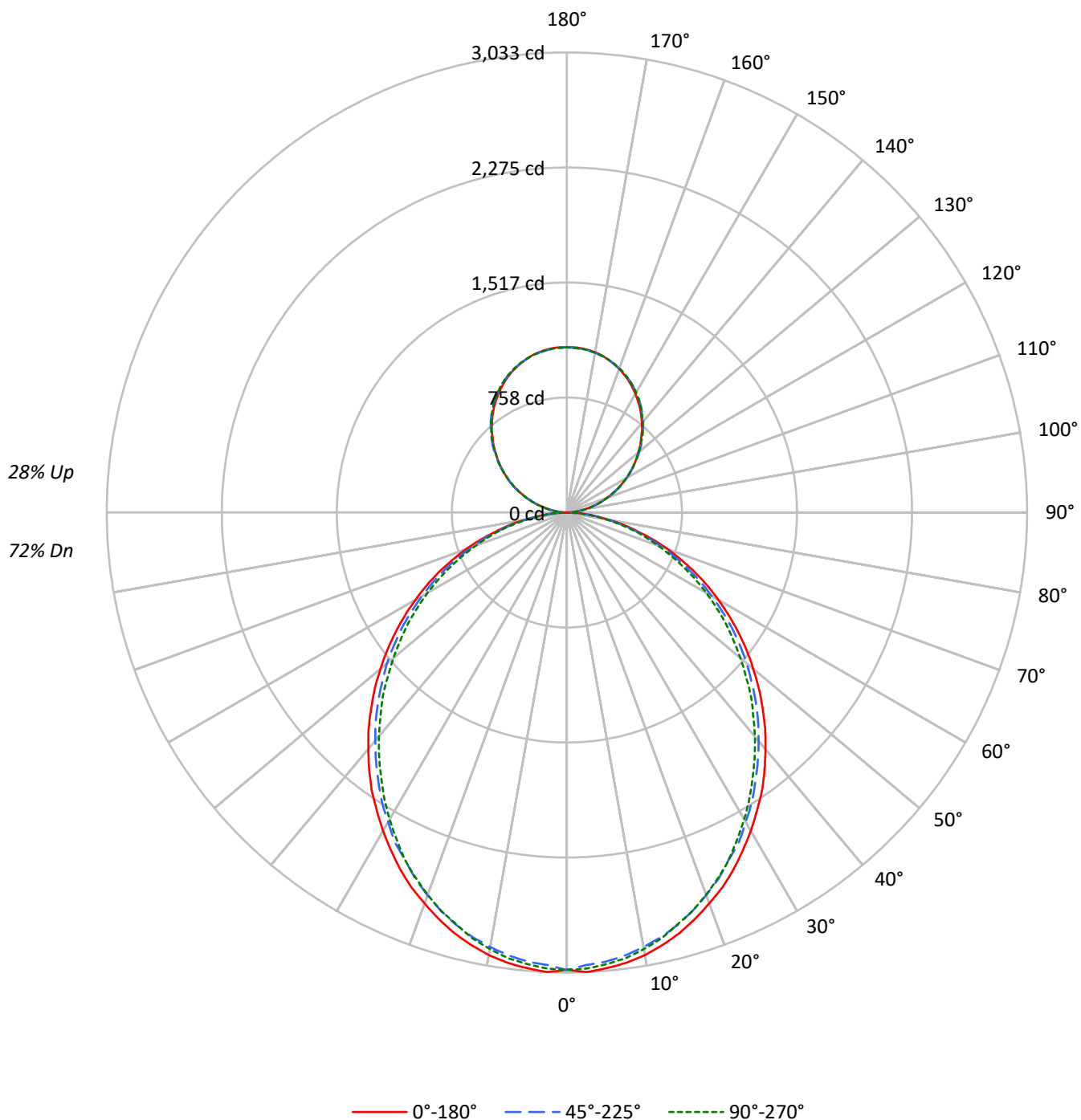
Lumens per Lamp: N/A  
Luminaire Lumens: 10719.5 lumens  
Efficiency: N/A  
Efficacy: 91.0 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 117.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.099  
Total Harmonic Distortion (THDi): 0.979  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P921090

CATALOG NUMBER: DFN2DIP-TR4F0-090D040US935-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P921090

CATALOG NUMBER: DFN2DIP-TR4F0-090D040US935-FLLFLL

**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   | 112 | 112 | 112 | 112 | 106 | 106 | 106 | 106 | 95 | 95 | 95 | 85 | 85 | 85 | 76 | 76 | 76 |
| 1   | 103 | 98  | 94  | 91  | 97  | 93  | 90  | 86  | 84 | 81 | 79 | 75 | 73 | 71 | 67 | 66 | 64 |
| 2   | 93  | 86  | 79  | 74  | 88  | 81  | 76  | 71  | 73 | 69 | 65 | 66 | 63 | 59 | 59 | 56 | 54 |
| 3   | 85  | 75  | 68  | 62  | 81  | 72  | 65  | 59  | 65 | 59 | 55 | 58 | 54 | 50 | 52 | 49 | 46 |
| 4   | 78  | 67  | 59  | 52  | 74  | 64  | 56  | 51  | 58 | 52 | 47 | 52 | 47 | 43 | 47 | 43 | 40 |
| 5   | 72  | 60  | 51  | 45  | 68  | 57  | 49  | 44  | 52 | 45 | 41 | 47 | 42 | 38 | 42 | 38 | 35 |
| 6   | 66  | 54  | 45  | 39  | 63  | 51  | 44  | 38  | 47 | 40 | 35 | 42 | 37 | 33 | 38 | 34 | 31 |
| 7   | 61  | 49  | 40  | 35  | 58  | 47  | 39  | 34  | 42 | 36 | 31 | 39 | 33 | 29 | 35 | 31 | 27 |
| 8   | 57  | 44  | 36  | 31  | 54  | 42  | 35  | 30  | 39 | 33 | 28 | 35 | 30 | 26 | 32 | 28 | 24 |
| 9   | 53  | 41  | 33  | 28  | 50  | 39  | 32  | 27  | 36 | 30 | 25 | 33 | 27 | 24 | 30 | 25 | 22 |
| 10  | 50  | 37  | 30  | 25  | 47  | 36  | 29  | 24  | 33 | 27 | 23 | 30 | 25 | 21 | 28 | 23 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2395 | 2395 | 2395 |
| 5°  | 2399 | 2362 | 2378 |
| 10° | 2380 | 2330 | 2346 |
| 15° | 2345 | 2292 | 2295 |
| 20° | 2298 | 2238 | 2244 |
| 25° | 2251 | 2175 | 2184 |
| 30° | 2192 | 2115 | 2108 |
| 35° | 2136 | 2045 | 2028 |
| 40° | 2067 | 1975 | 1952 |
| 45° | 1999 | 1904 | 1874 |
| 50° | 1924 | 1829 | 1783 |
| 55° | 1845 | 1743 | 1700 |
| 60° | 1756 | 1641 | 1605 |
| 65° | 1660 | 1535 | 1493 |
| 70° | 1537 | 1407 | 1372 |
| 75° | 1366 | 1252 | 1260 |
| 80° | 1161 | 1055 | 1047 |
| 85° | 839  | 716  | 694  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 1999 cd/sqm

TEST NUMBER: P921090

CATALOG NUMBER: DFN2DIP-TR4F0-090D040US935-FLLFLL

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 283.8   | 2.6       |
| 10°-20°   | 798.5   | 7.4       |
| 20°-30°   | 1173.4  | 10.9      |
| 30°-40°   | 1362.9  | 12.7      |
| 40°-50°   | 1361.2  | 12.7      |
| 50°-60°   | 1186.9  | 11.1      |
| 60°-70°   | 877.4   | 8.2       |
| 70°-80°   | 496.4   | 4.6       |
| 80°-90°   | 134.1   | 1.3       |
| 90°-100°  | 67.4    | 0.6       |
| 100°-110° | 214.2   | 2.0       |
| 110°-120° | 366.5   | 3.4       |
| 120°-130° | 482.0   | 4.5       |
| 130°-140° | 541.0   | 5.0       |
| 140°-150° | 530.5   | 4.9       |
| 150°-160° | 445.0   | 4.2       |
| 160°-170° | 295.1   | 2.8       |
| 170°-180° | 103.2   | 1.0       |
| 0°-30°    | 2255.7  | 21.0      |
| 0°-40°    | 3618.6  | 33.8      |
| 0°-60°    | 6166.7  | 57.5      |
| 0°-90°    | 7674.6  | 71.6      |
| 90°-120°  | 648.0   | 6.0       |
| 90°-150°  | 2201.5  | 20.5      |
| 90°-180°  | 3045.0  | 28.4      |
| 0°-180°   | 10719.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3015 | 3015  | 3015 | 3015  | 3015 |      |
| 5°   | 3015 | 3004  | 2972 | 2995  | 2989 | 286  |
| 15°  | 2870 | 2853  | 2815 | 2827  | 2812 | 808  |
| 25°  | 2598 | 2575  | 2526 | 2531  | 2526 | 1195 |
| 35°  | 2241 | 2212  | 2166 | 2148  | 2134 | 1400 |
| 45°  | 1824 | 1804  | 1760 | 1728  | 1716 | 1408 |
| 55°  | 1380 | 1363  | 1328 | 1293  | 1279 | 1234 |
| 65°  | 931  | 913   | 884  | 858   | 844  | 920  |
| 75°  | 487  | 481   | 467  | 449   | 455  | 520  |
| 85°  | 119  | 116   | 113  | 104   | 102  | 132  |
| 90°  | 1    | 12    | 32   | 30    | 31   | 10   |
| 95°  | 48   | 57    | 59   | 59    | 57   | 53   |
| 105° | 198  | 200   | 202  | 204   | 204  | 209  |
| 115° | 368  | 373   | 371  | 370   | 368  | 364  |
| 125° | 535  | 543   | 540  | 538   | 537  | 478  |
| 135° | 692  | 702   | 704  | 703   | 700  | 535  |
| 145° | 840  | 846   | 852  | 853   | 849  | 525  |
| 155° | 960  | 963   | 966  | 971   | 968  | 442  |
| 165° | 1045 | 1044  | 1044 | 1050  | 1046 | 295  |
| 175° | 1087 | 1085  | 1083 | 1089  | 1084 | 103  |
| 180° | 1089 | 1089  | 1089 | 1089  | 1089 |      |

TEST NUMBER: P921090

CATALOG NUMBER: DFN2DIP-TR4F0-090D040US935-FLLFLL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3015.1 | 3015.1 | 3015.1 | 3015.1 | 3015.1 |
| 2.5°   | 3032.7 | 3018.2 | 2986.3 | 3015.1 | 3009.6 |
| 5°     | 3015.1 | 3003.8 | 2971.8 | 2994.9 | 2989.3 |
| 7.5°   | 2994.9 | 2977.7 | 2945.6 | 2969.1 | 2963.2 |
| 10°    | 2963.2 | 2942.9 | 2908.1 | 2931.2 | 2922.6 |
| 12.5°  | 2919.5 | 2902.3 | 2867.6 | 2881.9 | 2876.2 |
| 15°    | 2870.3 | 2853.1 | 2815.2 | 2826.9 | 2812.4 |
| 17.5°  | 2809.3 | 2792.1 | 2754.3 | 2768.8 | 2754.3 |
| 20°    | 2742.6 | 2725.4 | 2684.8 | 2693.4 | 2682.0 |
| 22.5°  | 2676.2 | 2650.1 | 2612.2 | 2612.2 | 2606.3 |
| 25°    | 2597.7 | 2574.6 | 2525.5 | 2531.0 | 2525.5 |
| 27.5°  | 2510.7 | 2490.4 | 2452.9 | 2444.3 | 2429.8 |
| 30°    | 2424.0 | 2400.5 | 2357.2 | 2348.5 | 2336.9 |
| 32.5°  | 2331.1 | 2313.8 | 2267.4 | 2249.9 | 2238.2 |
| 35°    | 2241.3 | 2212.3 | 2165.8 | 2148.4 | 2133.9 |
| 37.5°  | 2139.8 | 2113.6 | 2067.1 | 2046.9 | 2032.4 |
| 40°    | 2035.4 | 2012.1 | 1965.6 | 1939.7 | 1928.1 |
| 42.5°  | 1933.9 | 1910.6 | 1864.4 | 1835.2 | 1818.0 |
| 45°    | 1823.8 | 1803.5 | 1759.8 | 1728.1 | 1716.5 |
| 47.5°  | 1716.5 | 1696.2 | 1649.7 | 1617.7 | 1600.5 |
| 50°    | 1603.3 | 1588.8 | 1548.2 | 1507.6 | 1493.1 |
| 52.5°  | 1493.1 | 1472.8 | 1435.3 | 1403.3 | 1383.0 |
| 55°    | 1380.3 | 1362.7 | 1327.9 | 1293.2 | 1278.8 |
| 57.5°  | 1267.0 | 1252.6 | 1214.8 | 1180.0 | 1168.3 |
| 60°    | 1153.8 | 1142.5 | 1101.8 | 1069.9 | 1061.3 |
| 62.5°  | 1043.7 | 1023.4 | 994.5  | 965.6  | 953.9  |
| 65°    | 930.8  | 913.3  | 884.3  | 858.2  | 843.8  |
| 67.5°  | 814.8  | 800.1  | 774.2  | 754.0  | 742.3  |
| 70°    | 707.5  | 695.8  | 669.7  | 649.4  | 638.0  |
| 72.5°  | 597.4  | 585.7  | 571.2  | 551.0  | 542.3  |
| 75°    | 487.0  | 481.4  | 466.7  | 449.4  | 455.3  |
| 77.5°  | 388.5  | 376.9  | 371.0  | 362.4  | 353.8  |
| 80°    | 290.1  | 287.0  | 281.1  | 272.5  | 266.7  |
| 82.5°  | 197.2  | 197.2  | 194.4  | 182.7  | 182.7  |
| 85°    | 118.7  | 116.0  | 113.2  | 104.3  | 101.5  |
| 87.5°  | 52.3   | 46.4   | 40.6   | 32.0   | 28.9   |
| 90°    | 0.9    | 11.8   | 32.2   | 30.2   | 31.2   |
| 92.5°  | 20.3   | 27.6   | 28.6   | 29.5   | 29.5   |
| 95°    | 48.0   | 57.2   | 58.8   | 58.8   | 57.2   |
| 97.5°  | 79.8   | 88.3   | 92.0   | 92.0   | 92.0   |
| 100°   | 116.6  | 124.2  | 126.7  | 126.7  | 125.8  |
| 102.5° | 155.3  | 160.9  | 164.5  | 165.5  | 164.5  |
| 105°   | 197.7  | 200.3  | 202.2  | 203.9  | 203.9  |
| 107.5° | 239.7  | 243.7  | 243.7  | 244.3  | 239.7  |
| 110°   | 280.4  | 285.7  | 285.7  | 285.7  | 283.1  |

TEST NUMBER: P921090

CATALOG NUMBER: DFN2DIP-TR4F0-090D040US935-FLLFLL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 324.4  | 330.0  | 329.0  | 326.4  | 324.4  |
| 115°   | 367.7  | 373.1  | 371.3  | 370.4  | 367.7  |
| 117.5° | 410.8  | 418.0  | 413.5  | 410.8  | 408.2  |
| 120°   | 454.2  | 461.3  | 454.2  | 454.2  | 451.2  |
| 122.5° | 493.5  | 502.7  | 498.2  | 495.5  | 493.5  |
| 125°   | 534.9  | 543.1  | 540.5  | 537.5  | 536.6  |
| 127.5° | 575.3  | 585.5  | 581.9  | 577.9  | 575.3  |
| 130°   | 613.0  | 624.9  | 623.3  | 621.3  | 617.7  |
| 132.5° | 655.4  | 664.6  | 665.3  | 660.6  | 658.1  |
| 135°   | 691.9  | 702.1  | 704.0  | 703.0  | 700.4  |
| 137.5° | 732.6  | 740.8  | 742.4  | 741.7  | 737.9  |
| 140°   | 768.4  | 776.6  | 781.2  | 781.2  | 777.6  |
| 142.5° | 805.2  | 813.4  | 816.0  | 817.0  | 813.4  |
| 145°   | 840.0  | 846.5  | 851.8  | 852.8  | 849.2  |
| 147.5° | 871.2  | 879.3  | 883.3  | 884.9  | 881.3  |
| 150°   | 903.4  | 909.0  | 912.6  | 915.5  | 912.6  |
| 152.5° | 931.9  | 937.5  | 942.1  | 945.7  | 942.1  |
| 155°   | 960.4  | 963.1  | 966.0  | 970.7  | 967.7  |
| 157.5° | 985.2  | 987.0  | 988.7  | 995.3  | 990.7  |
| 160°   | 1007.1 | 1009.1 | 1010.0 | 1015.6 | 1011.7 |
| 162.5° | 1027.4 | 1027.4 | 1028.5 | 1034.7 | 1030.1 |
| 165°   | 1044.9 | 1043.9 | 1043.9 | 1050.4 | 1045.9 |
| 167.5° | 1060.7 | 1057.6 | 1057.6 | 1064.3 | 1059.6 |
| 170°   | 1072.5 | 1069.8 | 1068.8 | 1075.4 | 1069.8 |
| 172.5° | 1080.6 | 1078.1 | 1077.0 | 1083.7 | 1078.1 |
| 175°   | 1087.3 | 1084.6 | 1082.6 | 1089.2 | 1083.7 |
| 177.5° | 1090.9 | 1088.2 | 1086.2 | 1091.8 | 1086.2 |
| 180°   | 1089.2 | 1089.2 | 1089.2 | 1089.2 | 1089.2 |

TEST NUMBER: P921090

CATALOG NUMBER: DFN2DIP-TR4F0-090D040US935-FLLFLL

**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 | 12.09            | 13.19 | 12.84 | 13.96 | 14.88 | 11.66          | 12.76 | 12.41 | 13.52 | 14.45 |
|                 | 3H   | 13.77            | 14.75 | 14.53 | 15.53 | 16.49 | 13.30          | 14.28 | 14.06 | 15.06 | 16.02 |
|                 | 4H   | 14.37            | 15.30 | 15.14 | 16.08 | 17.05 | 13.89          | 14.82 | 14.67 | 15.61 | 16.58 |
|                 | 6H   | 14.78            | 15.64 | 15.57 | 16.43 | 17.41 | 14.30          | 15.16 | 15.09 | 15.96 | 16.94 |
|                 | 8H   | 14.89            | 15.71 | 15.69 | 16.52 | 17.51 | 14.42          | 15.23 | 15.22 | 16.05 | 17.03 |
|                 | 12H  | 14.95            | 15.73 | 15.75 | 16.53 | 17.54 | 14.47          | 15.25 | 15.27 | 16.05 | 17.06 |
| 4H              | 2H   | 12.58            | 13.51 | 13.36 | 14.30 | 15.27 | 12.24          | 13.17 | 13.02 | 13.95 | 14.92 |
|                 | 3H   | 14.47            | 15.24 | 15.26 | 16.07 | 17.05 | 14.08          | 14.85 | 14.87 | 15.67 | 16.66 |
|                 | 4H   | 15.19            | 15.90 | 16.00 | 16.72 | 17.73 | 14.79          | 15.49 | 15.59 | 16.31 | 17.33 |
|                 | 6H   | 15.72            | 16.33 | 16.55 | 17.18 | 18.20 | 15.31          | 15.92 | 16.14 | 16.77 | 17.79 |
|                 | 8H   | 15.87            | 16.45 | 16.70 | 17.29 | 18.32 | 15.46          | 16.03 | 16.29 | 16.88 | 17.91 |
|                 | 12H  | 15.96            | 16.47 | 16.81 | 17.34 | 18.37 | 15.54          | 16.05 | 16.39 | 16.91 | 17.95 |
| 8H              | 4H   | 15.41            | 15.98 | 16.24 | 16.82 | 17.85 | 15.05          | 15.62 | 15.88 | 16.46 | 17.49 |
|                 | 6H   | 16.05            | 16.52 | 16.91 | 17.40 | 18.44 | 15.69          | 16.16 | 16.54 | 17.04 | 18.07 |
|                 | 8H   | 16.27            | 16.69 | 17.14 | 17.57 | 18.62 | 15.90          | 16.32 | 16.77 | 17.20 | 18.25 |
|                 | 12H  | 16.41            | 16.78 | 17.28 | 17.65 | 18.76 | 16.03          | 16.40 | 16.90 | 17.27 | 18.37 |
| 12H             | 4H   | 15.40            | 15.92 | 16.25 | 16.78 | 17.82 | 15.05          | 15.57 | 15.90 | 16.43 | 17.47 |
|                 | 6H   | 16.08            | 16.50 | 16.95 | 17.38 | 18.43 | 15.73          | 16.15 | 16.60 | 17.03 | 18.08 |
|                 | 8H   | 16.33            | 16.70 | 17.20 | 17.57 | 18.68 | 15.98          | 16.35 | 16.85 | 17.22 | 18.32 |