

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: P908233

Luminaire Tested: DFN2DIP-HX4F0-090D040US840-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P908233  
REPORT IS A COMBINATION OF REPORTS P899310 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D040US840-RLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

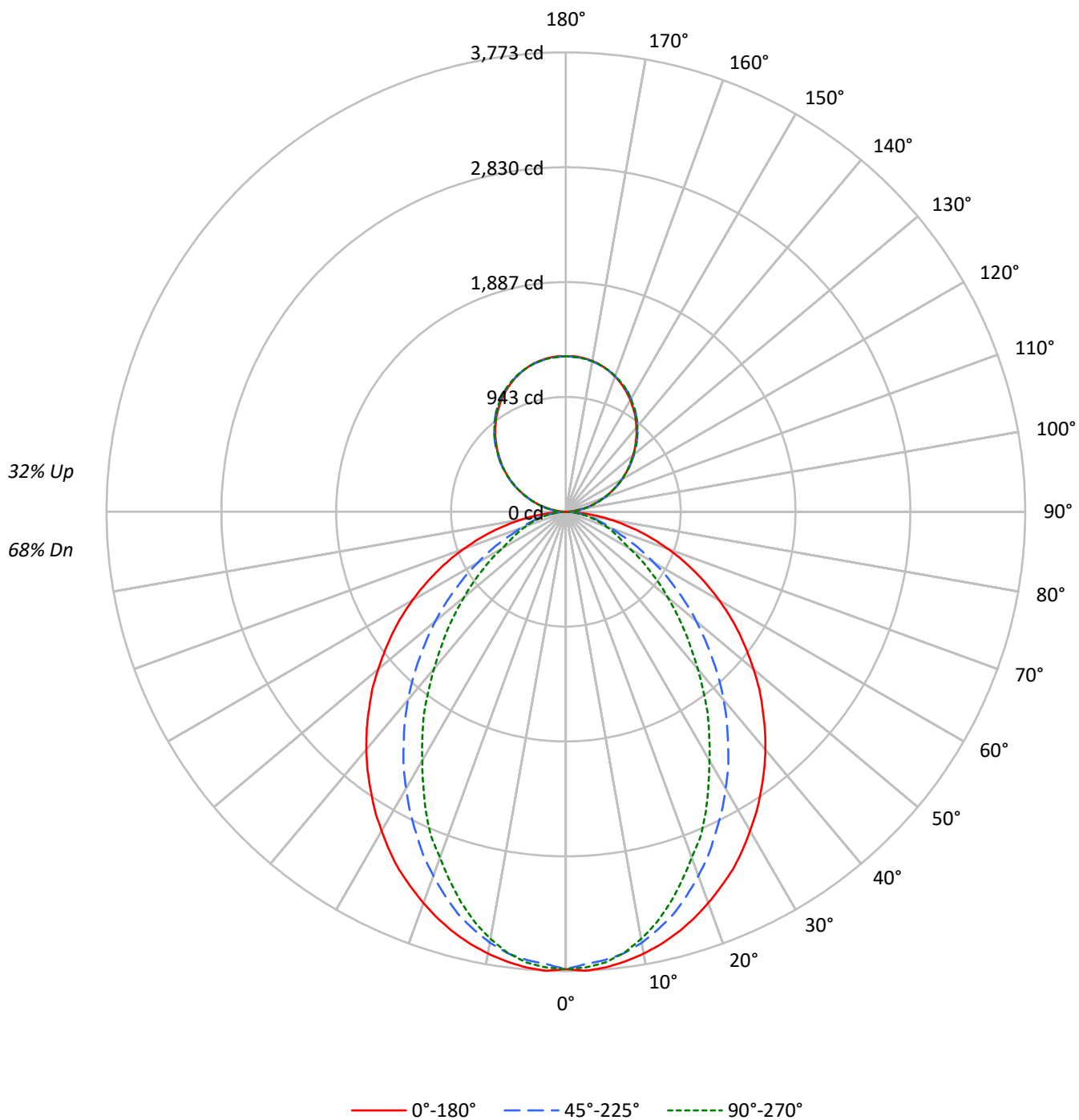
Lumens per Lamp: N/A  
Luminaire Lumens: 11300.4 lumens  
Efficiency: N/A  
Efficacy: 100.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 112.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9821  
Total Harmonic Distortion (THDi): 0.08  
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   | 112 | 112 | 112 | 112 | 105 | 105 | 105 | 105 | 94 | 94 | 94 | 83 | 83 | 83 | 73 | 73 | 73 |
| 1   | 103 | 98  | 95  | 91  | 97  | 93  | 90  | 87  | 83 | 81 | 78 | 74 | 72 | 70 | 66 | 64 | 63 |
| 2   | 94  | 87  | 81  | 76  | 89  | 82  | 77  | 72  | 74 | 70 | 66 | 66 | 63 | 60 | 59 | 56 | 54 |
| 3   | 86  | 77  | 70  | 64  | 81  | 73  | 67  | 61  | 66 | 61 | 56 | 59 | 55 | 51 | 52 | 49 | 47 |
| 4   | 79  | 69  | 61  | 55  | 75  | 65  | 58  | 53  | 59 | 53 | 49 | 53 | 48 | 45 | 47 | 44 | 41 |
| 5   | 73  | 62  | 53  | 48  | 69  | 59  | 51  | 46  | 53 | 47 | 43 | 48 | 43 | 39 | 43 | 39 | 36 |
| 6   | 68  | 56  | 48  | 42  | 64  | 53  | 46  | 40  | 48 | 42 | 38 | 44 | 39 | 35 | 39 | 35 | 32 |
| 7   | 63  | 51  | 43  | 37  | 59  | 48  | 41  | 36  | 44 | 38 | 33 | 40 | 35 | 31 | 36 | 32 | 29 |
| 8   | 58  | 46  | 38  | 33  | 55  | 44  | 37  | 32  | 40 | 34 | 30 | 37 | 32 | 28 | 33 | 29 | 26 |
| 9   | 55  | 42  | 35  | 30  | 52  | 41  | 34  | 29  | 37 | 31 | 27 | 34 | 29 | 25 | 31 | 27 | 24 |
| 10  | 51  | 39  | 32  | 27  | 48  | 37  | 31  | 26  | 34 | 29 | 25 | 32 | 27 | 23 | 29 | 25 | 22 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2793 | 2793 | 2793 |
| 5°  | 2798 | 2749 | 2767 |
| 10° | 2770 | 2695 | 2677 |
| 15° | 2732 | 2607 | 2538 |
| 20° | 2682 | 2484 | 2367 |
| 25° | 2631 | 2347 | 2202 |
| 30° | 2562 | 2206 | 1993 |
| 35° | 2494 | 2054 | 1809 |
| 40° | 2425 | 1897 | 1599 |
| 45° | 2345 | 1723 | 1408 |
| 50° | 2262 | 1548 | 1221 |
| 55° | 2176 | 1360 | 1042 |
| 60° | 2076 | 1163 | 858  |
| 65° | 1961 | 964  | 772  |
| 70° | 1821 | 778  | 699  |
| 75° | 1646 | 686  | 636  |
| 80° | 1393 | 576  | 553  |
| 85° | 973  | 386  | 416  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2345 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 352.1   | 3.1       |
| 10°-20°   | 966.5   | 8.6       |
| 20°-30°   | 1356.9  | 12.0      |
| 30°-40°   | 1479.1  | 13.1      |
| 40°-50°   | 1359.4  | 12.0      |
| 50°-60°   | 1067.6  | 9.4       |
| 60°-70°   | 694.9   | 6.1       |
| 70°-80°   | 357.7   | 3.2       |
| 80°-90°   | 94.9    | 0.8       |
| 90°-100°  | 79.1    | 0.7       |
| 100°-110° | 251.2   | 2.2       |
| 110°-120° | 429.8   | 3.8       |
| 120°-130° | 565.3   | 5.0       |
| 130°-140° | 634.5   | 5.6       |
| 140°-150° | 622.2   | 5.5       |
| 150°-160° | 522.0   | 4.6       |
| 160°-170° | 346.2   | 3.1       |
| 170°-180° | 121.0   | 1.1       |
| 0°-30°    | 2675.4  | 23.7      |
| 0°-40°    | 4154.5  | 36.8      |
| 0°-60°    | 6581.5  | 58.2      |
| 0°-90°    | 7729.1  | 68.4      |
| 90°-120°  | 760.1   | 6.7       |
| 90°-150°  | 2582.2  | 22.9      |
| 90°-180°  | 3571.0  | 31.6      |
| 0°-180°   | 11300.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3756 | 3756  | 3756 | 3756  | 3756 |      |
| 5°   | 3756 | 3739  | 3695 | 3726  | 3716 | 356  |
| 15°  | 3573 | 3535  | 3420 | 3355  | 3321 | 1007 |
| 25°  | 3243 | 3134  | 2910 | 2771  | 2720 | 1492 |
| 35°  | 2794 | 2621  | 2322 | 2108  | 2033 | 1749 |
| 45°  | 2284 | 2057  | 1700 | 1458  | 1377 | 1764 |
| 55°  | 1737 | 1472  | 1105 | 901   | 836  | 1552 |
| 65°  | 1173 | 897   | 592  | 476   | 466  | 1163 |
| 75°  | 625  | 387   | 272  | 248   | 245  | 661  |
| 85°  | 146  | 75    | 64   | 64    | 64   | 168  |
| 90°  | 1    | 14    | 38   | 35    | 37   | 11   |
| 95°  | 56   | 67    | 69   | 69    | 67   | 63   |
| 105° | 232  | 235   | 237  | 239   | 239  | 245  |
| 115° | 431  | 438   | 436  | 434   | 431  | 427  |
| 125° | 627  | 637   | 634  | 630   | 629  | 561  |
| 135° | 812  | 823   | 826  | 825   | 822  | 627  |
| 145° | 985  | 993   | 999  | 1000  | 996  | 616  |
| 155° | 1126 | 1130  | 1133 | 1138  | 1135 | 519  |
| 165° | 1226 | 1224  | 1224 | 1232  | 1227 | 346  |
| 175° | 1275 | 1272  | 1270 | 1278  | 1271 | 121  |
| 180° | 1278 | 1278  | 1278 | 1278  | 1278 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3756.4 | 3756.4 | 3756.4 | 3756.4 | 3756.4 |
| 2.5°   | 3773.4 | 3756.4 | 3718.8 | 3753.2 | 3746.3 |
| 5°     | 3756.4 | 3739.4 | 3695.1 | 3725.7 | 3715.6 |
| 7.5°   | 3725.7 | 3705.5 | 3657.9 | 3671.3 | 3654.3 |
| 10°    | 3685.0 | 3661.2 | 3593.4 | 3582.9 | 3562.7 |
| 12.5°  | 3634.1 | 3603.5 | 3511.5 | 3491.3 | 3453.7 |
| 15°    | 3572.8 | 3535.3 | 3419.9 | 3355.3 | 3321.4 |
| 17.5°  | 3501.4 | 3447.0 | 3304.1 | 3229.4 | 3175.0 |
| 20°    | 3419.9 | 3351.7 | 3181.8 | 3097.1 | 3022.0 |
| 22.5°  | 3331.5 | 3253.3 | 3056.0 | 2940.5 | 2889.7 |
| 25°    | 3243.2 | 3134.2 | 2909.9 | 2770.7 | 2719.5 |
| 27.5°  | 3137.9 | 3022.0 | 2773.9 | 2614.1 | 2535.9 |
| 30°    | 3025.7 | 2896.2 | 2624.2 | 2451.1 | 2359.1 |
| 32.5°  | 2916.7 | 2760.2 | 2481.7 | 2277.7 | 2192.5 |
| 35°    | 2794.5 | 2621.0 | 2322.0 | 2107.8 | 2032.8 |
| 37.5°  | 2675.4 | 2488.3 | 2172.3 | 1937.5 | 1852.8 |
| 40°    | 2549.6 | 2345.8 | 2015.8 | 1774.5 | 1686.2 |
| 42.5°  | 2420.4 | 2203.0 | 1859.6 | 1607.9 | 1523.1 |
| 45°    | 2284.5 | 2056.6 | 1699.8 | 1458.1 | 1376.6 |
| 47.5°  | 2155.4 | 1914.1 | 1546.9 | 1305.3 | 1230.6 |
| 50°    | 2012.6 | 1771.2 | 1397.2 | 1162.5 | 1091.4 |
| 52.5°  | 1873.0 | 1618.0 | 1254.5 | 1030.1 | 965.5  |
| 55°    | 1737.0 | 1471.9 | 1104.7 | 901.0  | 836.4  |
| 57.5°  | 1597.8 | 1325.9 | 972.4  | 781.9  | 727.5  |
| 60°    | 1454.9 | 1183.0 | 832.8  | 659.6  | 605.2  |
| 62.5°  | 1315.8 | 1043.8 | 713.8  | 550.8  | 523.7  |
| 65°    | 1172.9 | 897.4  | 591.5  | 476.1  | 465.6  |
| 67.5°  | 1036.9 | 761.3  | 476.1  | 418.0  | 407.9  |
| 70°    | 894.1  | 629.0  | 394.3  | 360.3  | 346.6  |
| 72.5°  | 758.1  | 506.3  | 329.6  | 302.6  | 295.8  |
| 75°    | 625.4  | 387.4  | 272.0  | 248.1  | 244.9  |
| 77.5°  | 493.0  | 275.2  | 214.2  | 200.6  | 193.7  |
| 80°    | 370.4  | 197.3  | 163.0  | 149.7  | 149.7  |
| 82.5°  | 258.2  | 132.7  | 112.2  | 105.3  | 105.3  |
| 85°    | 146.0  | 74.6   | 64.5   | 64.5   | 64.5   |
| 87.5°  | 54.4   | 27.1   | 27.1   | 23.8   | 23.8   |
| 90°    | 1.1    | 13.8   | 37.8   | 35.4   | 36.6   |
| 92.5°  | 23.8   | 32.3   | 33.5   | 34.6   | 34.6   |
| 95°    | 56.2   | 67.1   | 69.0   | 69.0   | 67.1   |
| 97.5°  | 93.6   | 103.6  | 107.9  | 107.9  | 107.9  |
| 100°   | 136.7  | 145.6  | 148.7  | 148.7  | 147.5  |
| 102.5° | 182.2  | 188.7  | 193.0  | 194.1  | 193.0  |
| 105°   | 231.9  | 234.9  | 237.2  | 239.1  | 239.1  |
| 107.5° | 281.1  | 285.8  | 285.8  | 286.5  | 281.1  |
| 110°   | 328.9  | 335.1  | 335.1  | 335.1  | 332.0  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 380.5  | 387.1  | 385.9  | 382.8  | 380.5  |
| 115°   | 431.3  | 437.6  | 435.6  | 434.4  | 431.3  |
| 117.5° | 481.8  | 490.3  | 484.9  | 481.8  | 478.8  |
| 120°   | 532.7  | 541.1  | 532.7  | 532.7  | 529.2  |
| 122.5° | 578.9  | 589.7  | 584.3  | 581.2  | 578.9  |
| 125°   | 627.4  | 637.0  | 634.0  | 630.5  | 629.3  |
| 127.5° | 674.8  | 686.7  | 682.5  | 677.8  | 674.8  |
| 130°   | 719.0  | 733.0  | 731.0  | 728.7  | 724.5  |
| 132.5° | 768.7  | 779.5  | 780.3  | 774.9  | 771.8  |
| 135°   | 811.5  | 823.4  | 825.8  | 824.6  | 821.5  |
| 137.5° | 859.3  | 868.9  | 870.8  | 870.0  | 865.5  |
| 140°   | 901.2  | 910.9  | 916.3  | 916.3  | 912.0  |
| 142.5° | 944.4  | 954.0  | 957.0  | 958.3  | 954.0  |
| 145°   | 985.2  | 992.9  | 999.1  | 1000.3 | 996.0  |
| 147.5° | 1021.8 | 1031.4 | 1036.0 | 1037.9 | 1033.7 |
| 150°   | 1059.6 | 1066.1 | 1070.4 | 1073.8 | 1070.4 |
| 152.5° | 1093.1 | 1099.5 | 1105.0 | 1109.2 | 1105.0 |
| 155°   | 1126.5 | 1129.6 | 1133.1 | 1138.5 | 1135.0 |
| 157.5° | 1155.5 | 1157.7 | 1159.6 | 1167.4 | 1162.0 |
| 160°   | 1181.2 | 1183.6 | 1184.7 | 1191.2 | 1186.6 |
| 162.5° | 1205.1 | 1205.1 | 1206.3 | 1213.6 | 1208.2 |
| 165°   | 1225.6 | 1224.4 | 1224.4 | 1232.0 | 1226.7 |
| 167.5° | 1244.1 | 1240.5 | 1240.5 | 1248.3 | 1242.8 |
| 170°   | 1257.9 | 1254.8 | 1253.6 | 1261.3 | 1254.8 |
| 172.5° | 1267.5 | 1264.5 | 1263.2 | 1271.0 | 1264.5 |
| 175°   | 1275.3 | 1272.1 | 1269.8 | 1277.5 | 1271.0 |
| 177.5° | 1279.5 | 1276.4 | 1274.0 | 1280.6 | 1274.0 |
| 180°   | 1277.5 | 1277.5 | 1277.5 | 1277.5 | 1277.5 |

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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 | 12.28            | 13.29 | 13.07 | 14.10 | 15.08 | 8.26           | 9.26  | 9.04  | 10.07 | 11.05 |
|                 | 3H   | 13.97            | 14.88 | 14.78 | 15.69 | 16.71 | 9.46           | 10.36 | 10.26 | 11.18 | 12.19 |
|                 | 4H   | 14.59            | 15.44 | 15.41 | 16.26 | 17.29 | 9.92           | 10.77 | 10.74 | 11.59 | 12.62 |
|                 | 6H   | 15.02            | 15.81 | 15.86 | 16.64 | 17.68 | 10.25          | 11.03 | 11.08 | 11.87 | 12.90 |
|                 | 8H   | 15.16            | 15.90 | 16.00 | 16.75 | 17.79 | 10.35          | 11.09 | 11.19 | 11.94 | 12.98 |
|                 | 12H  | 15.22            | 15.93 | 16.07 | 16.78 | 17.84 | 10.40          | 11.11 | 11.24 | 11.95 | 13.01 |
| 4H              | 2H   | 12.32            | 13.17 | 13.15 | 14.00 | 15.02 | 8.87           | 9.72  | 9.70  | 10.55 | 11.57 |
|                 | 3H   | 14.17            | 14.87 | 15.00 | 15.73 | 16.77 | 10.24          | 10.95 | 11.08 | 11.80 | 12.85 |
|                 | 4H   | 14.87            | 15.51 | 15.72 | 16.37 | 17.43 | 10.80          | 11.44 | 11.65 | 12.29 | 13.36 |
|                 | 6H   | 15.39            | 15.95 | 16.26 | 16.83 | 17.90 | 11.23          | 11.78 | 12.09 | 12.66 | 13.73 |
|                 | 8H   | 15.57            | 16.09 | 16.44 | 16.96 | 18.05 | 11.36          | 11.88 | 12.23 | 12.75 | 13.84 |
|                 | 12H  | 15.68            | 16.14 | 16.56 | 17.04 | 18.13 | 11.44          | 11.90 | 12.32 | 12.79 | 13.89 |
| 8H              | 4H   | 14.85            | 15.37 | 15.72 | 16.24 | 17.33 | 11.09          | 11.61 | 11.96 | 12.48 | 13.57 |
|                 | 6H   | 15.42            | 15.85 | 16.32 | 16.77 | 17.85 | 11.62          | 12.04 | 12.51 | 12.96 | 14.05 |
|                 | 8H   | 15.64            | 16.02 | 16.55 | 16.93 | 18.03 | 11.81          | 12.19 | 12.72 | 13.10 | 14.20 |
|                 | 12H  | 15.79            | 16.12 | 16.70 | 17.02 | 18.18 | 11.94          | 12.27 | 12.85 | 13.17 | 14.33 |
| 12H             | 4H   | 14.81            | 15.27 | 15.70 | 16.17 | 17.26 | 11.10          | 11.57 | 11.99 | 12.46 | 13.55 |
|                 | 6H   | 15.40            | 15.78 | 16.31 | 16.69 | 17.79 | 11.67          | 12.05 | 12.57 | 12.96 | 14.06 |
|                 | 8H   | 15.63            | 15.96 | 16.54 | 16.86 | 18.02 | 11.89          | 12.22 | 12.80 | 13.12 | 14.28 |