

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: P921927

Luminaire Tested: DFN2DIP-HX4F0-120D040US940-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P921927  
REPORT IS A COMBINATION OF REPORTS P899316 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-120D040US940-RLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

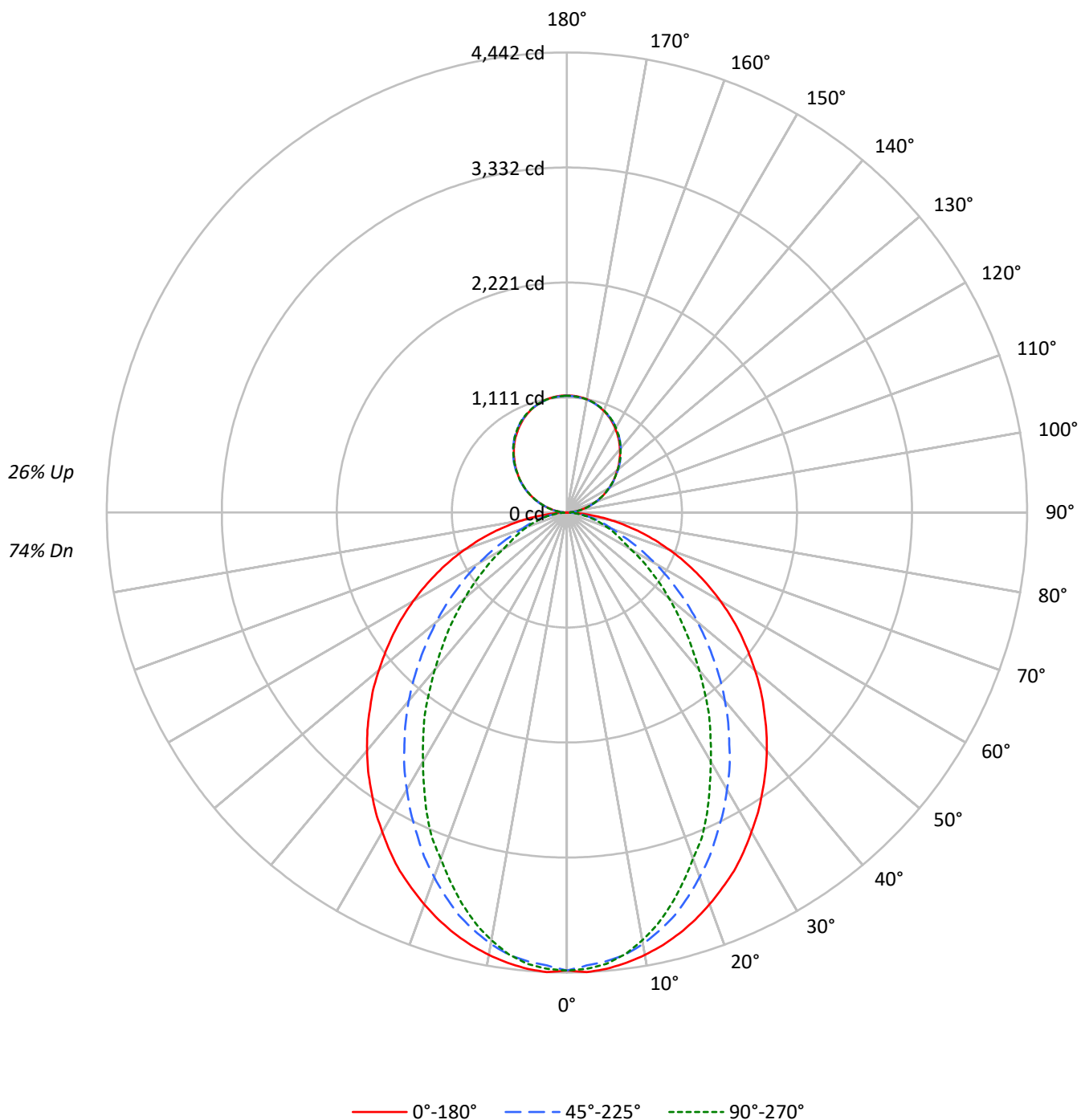
Lumens per Lamp: N/A  
Luminaire Lumens: 12252.1 lumens  
Efficiency: N/A  
Efficacy: 81.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 149.9  
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



TEST NUMBER: P921927

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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   | 113 | 113 | 113 | 113 | 107 | 107 | 107 | 107 | 97 | 97 | 97 | 87 | 87 | 87 | 78 | 78 | 78 |
| 1   | 104 | 100 | 96  | 93  | 99  | 95  | 92  | 89  | 86 | 84 | 81 | 78 | 76 | 74 | 70 | 69 | 68 |
| 2   | 95  | 88  | 82  | 77  | 90  | 84  | 79  | 74  | 76 | 72 | 68 | 69 | 66 | 63 | 63 | 60 | 58 |
| 3   | 87  | 78  | 71  | 65  | 83  | 75  | 68  | 63  | 68 | 63 | 58 | 62 | 58 | 54 | 56 | 53 | 50 |
| 4   | 80  | 70  | 62  | 56  | 76  | 67  | 60  | 54  | 61 | 55 | 51 | 56 | 51 | 47 | 51 | 47 | 44 |
| 5   | 74  | 63  | 54  | 48  | 70  | 60  | 53  | 47  | 55 | 49 | 44 | 51 | 45 | 42 | 46 | 42 | 39 |
| 6   | 69  | 57  | 48  | 43  | 65  | 54  | 47  | 41  | 50 | 44 | 39 | 46 | 41 | 37 | 42 | 38 | 35 |
| 7   | 64  | 51  | 43  | 38  | 61  | 49  | 42  | 37  | 46 | 39 | 35 | 42 | 37 | 33 | 39 | 34 | 31 |
| 8   | 59  | 47  | 39  | 34  | 57  | 45  | 38  | 33  | 42 | 36 | 31 | 39 | 34 | 30 | 36 | 31 | 28 |
| 9   | 56  | 43  | 36  | 31  | 53  | 42  | 35  | 30  | 39 | 33 | 28 | 36 | 31 | 27 | 33 | 29 | 26 |
| 10  | 52  | 40  | 33  | 28  | 50  | 39  | 32  | 27  | 36 | 30 | 26 | 33 | 28 | 25 | 31 | 27 | 23 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3288 | 3288 | 3288 |
| 5°  | 3294 | 3237 | 3257 |
| 10° | 3262 | 3173 | 3151 |
| 15° | 3217 | 3069 | 2988 |
| 20° | 3158 | 2925 | 2787 |
| 25° | 3097 | 2763 | 2593 |
| 30° | 3016 | 2597 | 2346 |
| 35° | 2936 | 2418 | 2130 |
| 40° | 2855 | 2234 | 1882 |
| 45° | 2761 | 2029 | 1658 |
| 50° | 2663 | 1822 | 1438 |
| 55° | 2562 | 1601 | 1227 |
| 60° | 2444 | 1370 | 1010 |
| 65° | 2308 | 1135 | 909  |
| 70° | 2144 | 915  | 823  |
| 75° | 1938 | 808  | 749  |
| 80° | 1640 | 678  | 650  |
| 85° | 1147 | 455  | 490  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2761 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 414.5   | 3.4       |
| 10°-20°   | 1137.8  | 9.3       |
| 20°-30°   | 1597.5  | 13.0      |
| 30°-40°   | 1741.4  | 14.2      |
| 40°-50°   | 1600.5  | 13.1      |
| 50°-60°   | 1256.9  | 10.3      |
| 60°-70°   | 818.2   | 6.7       |
| 70°-80°   | 421.2   | 3.4       |
| 80°-90°   | 110.7   | 0.9       |
| 90°-100°  | 69.8    | 0.6       |
| 100°-110° | 221.8   | 1.8       |
| 110°-120° | 379.5   | 3.1       |
| 120°-130° | 499.2   | 4.1       |
| 130°-140° | 560.3   | 4.6       |
| 140°-150° | 549.4   | 4.5       |
| 150°-160° | 460.9   | 3.8       |
| 160°-170° | 305.7   | 2.5       |
| 170°-180° | 106.8   | 0.9       |
| 0°-30°    | 3149.8  | 25.7      |
| 0°-40°    | 4891.2  | 39.9      |
| 0°-60°    | 7748.6  | 63.2      |
| 0°-90°    | 9098.6  | 74.3      |
| 90°-120°  | 671.2   | 5.5       |
| 90°-150°  | 2280.1  | 18.6      |
| 90°-180°  | 3153.0  | 25.7      |
| 0°-180°   | 12252.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4422 | 4422  | 4422 | 4422  | 4422 |      |
| 5°   | 4422 | 4403  | 4350 | 4386  | 4375 | 419  |
| 15°  | 4206 | 4162  | 4026 | 3950  | 3910 | 1185 |
| 25°  | 3818 | 3690  | 3426 | 3262  | 3202 | 1756 |
| 35°  | 3290 | 3086  | 2734 | 2482  | 2393 | 2059 |
| 45°  | 2690 | 2421  | 2001 | 1717  | 1621 | 2077 |
| 55°  | 2045 | 1733  | 1301 | 1061  | 985  | 1827 |
| 65°  | 1381 | 1056  | 696  | 560   | 548  | 1369 |
| 75°  | 736  | 456   | 320  | 292   | 288  | 779  |
| 85°  | 172  | 88    | 76   | 76    | 76   | 197  |
| 90°  | 1    | 12    | 33   | 31    | 32   | 12   |
| 95°  | 50   | 59    | 61   | 61    | 59   | 55   |
| 105° | 205  | 207   | 210  | 211   | 211  | 216  |
| 115° | 381  | 386   | 385  | 384   | 381  | 377  |
| 125° | 554  | 562   | 560  | 557   | 556  | 495  |
| 135° | 717  | 727   | 729  | 728   | 725  | 554  |
| 145° | 870  | 877   | 882  | 883   | 880  | 544  |
| 155° | 995  | 998   | 1000 | 1005  | 1002 | 458  |
| 165° | 1082 | 1081  | 1081 | 1088  | 1083 | 305  |
| 175° | 1126 | 1123  | 1121 | 1128  | 1122 | 107  |
| 180° | 1128 | 1128  | 1128 | 1128  | 1128 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4422.5 | 4422.5 | 4422.5 | 4422.5 | 4422.5 |
| 2.5°   | 4442.5 | 4422.5 | 4378.4 | 4418.7 | 4410.6 |
| 5°     | 4422.5 | 4402.6 | 4350.3 | 4386.4 | 4374.6 |
| 7.5°   | 4386.4 | 4362.6 | 4306.6 | 4322.3 | 4302.3 |
| 10°    | 4338.4 | 4310.4 | 4230.5 | 4218.2 | 4194.5 |
| 12.5°  | 4278.5 | 4242.5 | 4134.1 | 4110.4 | 4066.3 |
| 15°    | 4206.4 | 4162.2 | 4026.3 | 3950.3 | 3910.4 |
| 17.5°  | 4122.3 | 4058.2 | 3890.0 | 3802.2 | 3738.0 |
| 20°    | 4026.3 | 3946.1 | 3746.1 | 3646.3 | 3557.9 |
| 22.5°  | 3922.3 | 3830.2 | 3597.9 | 3462.0 | 3402.1 |
| 25°    | 3818.3 | 3690.0 | 3425.9 | 3262.0 | 3201.7 |
| 27.5°  | 3694.3 | 3557.9 | 3265.8 | 3077.7 | 2985.5 |
| 30°    | 3562.2 | 3409.8 | 3089.6 | 2885.8 | 2777.5 |
| 32.5°  | 3434.0 | 3249.7 | 2921.9 | 2681.6 | 2581.3 |
| 35°    | 3290.1 | 3085.8 | 2733.7 | 2481.5 | 2393.2 |
| 37.5°  | 3149.9 | 2929.5 | 2557.5 | 2281.1 | 2181.3 |
| 40°    | 3001.7 | 2761.8 | 2373.3 | 2089.2 | 1985.1 |
| 42.5°  | 2849.6 | 2593.6 | 2189.4 | 1893.0 | 1793.2 |
| 45°    | 2689.6 | 2421.3 | 2001.3 | 1716.8 | 1620.8 |
| 47.5°  | 2537.5 | 2253.5 | 1821.2 | 1536.8 | 1448.9 |
| 50°    | 2369.5 | 2085.4 | 1645.0 | 1368.6 | 1285.0 |
| 52.5°  | 2205.1 | 1904.9 | 1476.9 | 1212.7 | 1136.8 |
| 55°    | 2045.0 | 1732.9 | 1300.6 | 1060.7 | 984.7  |
| 57.5°  | 1881.1 | 1560.9 | 1144.8 | 920.6  | 856.5  |
| 60°    | 1713.0 | 1392.8 | 980.4  | 776.7  | 712.6  |
| 62.5°  | 1549.1 | 1228.9 | 840.3  | 648.5  | 616.5  |
| 65°    | 1380.9 | 1056.5 | 696.4  | 560.5  | 548.2  |
| 67.5°  | 1220.8 | 896.3  | 560.5  | 492.1  | 480.3  |
| 70°    | 1052.7 | 740.6  | 464.1  | 424.2  | 408.0  |
| 72.5°  | 892.6  | 596.2  | 388.1  | 356.2  | 348.2  |
| 75°    | 736.3  | 456.0  | 320.2  | 292.1  | 288.3  |
| 77.5°  | 580.5  | 324.0  | 252.3  | 236.1  | 228.0  |
| 80°    | 436.1  | 232.3  | 191.9  | 176.2  | 176.2  |
| 82.5°  | 304.1  | 156.2  | 132.1  | 123.9  | 123.9  |
| 85°    | 172.0  | 87.9   | 76.0   | 76.0   | 76.0   |
| 87.5°  | 64.1   | 31.8   | 31.8   | 28.0   | 28.0   |
| 90°    | 1.0    | 12.2   | 33.3   | 31.3   | 32.3   |
| 92.5°  | 21.0   | 28.5   | 29.6   | 30.6   | 30.6   |
| 95°    | 49.7   | 59.2   | 60.9   | 60.9   | 59.2   |
| 97.5°  | 82.7   | 91.5   | 95.2   | 95.2   | 95.2   |
| 100°   | 120.7  | 128.6  | 131.3  | 131.3  | 130.3  |
| 102.5° | 160.9  | 166.7  | 170.4  | 171.4  | 170.4  |
| 105°   | 204.7  | 207.4  | 209.5  | 211.2  | 211.2  |
| 107.5° | 248.3  | 252.4  | 252.4  | 253.0  | 248.3  |
| 110°   | 290.4  | 295.9  | 295.9  | 295.9  | 293.2  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 336.0  | 341.8  | 340.7  | 338.0  | 336.0  |
| 115°   | 380.8  | 386.4  | 384.6  | 383.6  | 380.8  |
| 117.5° | 425.4  | 432.9  | 428.2  | 425.4  | 422.8  |
| 120°   | 470.4  | 477.8  | 470.4  | 470.4  | 467.3  |
| 122.5° | 511.1  | 520.7  | 515.9  | 513.2  | 511.1  |
| 125°   | 554.0  | 562.5  | 559.8  | 556.7  | 555.7  |
| 127.5° | 595.8  | 606.4  | 602.6  | 598.5  | 595.8  |
| 130°   | 634.9  | 647.2  | 645.5  | 643.5  | 639.7  |
| 132.5° | 678.8  | 688.3  | 689.0  | 684.2  | 681.5  |
| 135°   | 716.6  | 727.1  | 729.2  | 728.1  | 725.4  |
| 137.5° | 758.8  | 767.2  | 768.9  | 768.2  | 764.2  |
| 140°   | 795.8  | 804.3  | 809.0  | 809.0  | 805.3  |
| 142.5° | 833.9  | 842.4  | 845.1  | 846.1  | 842.4  |
| 145°   | 870.0  | 876.7  | 882.2  | 883.2  | 879.5  |
| 147.5° | 902.2  | 910.7  | 914.8  | 916.5  | 912.8  |
| 150°   | 935.6  | 941.4  | 945.1  | 948.2  | 945.1  |
| 152.5° | 965.2  | 970.9  | 975.7  | 979.5  | 975.7  |
| 155°   | 994.7  | 997.5  | 1000.5 | 1005.3 | 1002.2 |
| 157.5° | 1020.3 | 1022.3 | 1024.0 | 1030.8 | 1026.0 |
| 160°   | 1043.0 | 1045.1 | 1046.1 | 1051.9 | 1047.8 |
| 162.5° | 1064.1 | 1064.1 | 1065.1 | 1071.6 | 1066.8 |
| 165°   | 1082.2 | 1081.1 | 1081.1 | 1087.9 | 1083.2 |
| 167.5° | 1098.5 | 1095.4 | 1095.4 | 1102.2 | 1097.4 |
| 170°   | 1110.7 | 1108.0 | 1107.0 | 1113.7 | 1108.0 |
| 172.5° | 1119.2 | 1116.5 | 1115.4 | 1122.3 | 1116.5 |
| 175°   | 1126.1 | 1123.3 | 1121.2 | 1128.0 | 1122.3 |
| 177.5° | 1129.8 | 1127.0 | 1125.0 | 1130.8 | 1125.0 |
| 180°   | 1128.0 | 1128.0 | 1128.0 | 1128.0 | 1128.0 |

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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 | 13.30            | 14.38 | 14.03 | 15.12 | 16.00 | 9.28           | 10.35 | 10.00 | 11.09 | 11.97 |
|                 | 3H   | 15.00            | 15.96 | 15.74 | 16.71 | 17.63 | 10.49          | 11.45 | 11.22 | 12.20 | 13.11 |
|                 | 4H   | 15.62            | 16.53 | 16.38 | 17.29 | 18.21 | 10.95          | 11.86 | 11.70 | 12.62 | 13.54 |
|                 | 6H   | 16.06            | 16.89 | 16.82 | 17.66 | 18.60 | 11.28          | 12.12 | 12.05 | 12.89 | 13.83 |
|                 | 8H   | 16.19            | 16.99 | 16.97 | 17.77 | 18.71 | 11.38          | 12.18 | 12.16 | 12.96 | 13.90 |
|                 | 12H  | 16.26            | 17.02 | 17.04 | 17.80 | 18.76 | 11.43          | 12.19 | 12.22 | 12.97 | 13.94 |
| 4H              | 2H   | 13.35            | 14.26 | 14.11 | 15.02 | 15.94 | 9.90           | 10.81 | 10.66 | 11.57 | 12.49 |
|                 | 3H   | 15.20            | 15.96 | 15.98 | 16.75 | 17.69 | 11.28          | 12.03 | 12.05 | 12.82 | 13.77 |
|                 | 4H   | 15.91            | 16.59 | 16.69 | 17.39 | 18.35 | 11.84          | 12.52 | 12.62 | 13.31 | 14.28 |
|                 | 6H   | 16.44            | 17.03 | 17.24 | 17.85 | 18.82 | 12.27          | 12.86 | 13.07 | 13.68 | 14.66 |
|                 | 8H   | 16.62            | 17.17 | 17.42 | 17.98 | 18.97 | 12.40          | 12.96 | 13.21 | 13.77 | 14.76 |
|                 | 12H  | 16.72            | 17.22 | 17.55 | 18.06 | 19.05 | 12.48          | 12.98 | 13.31 | 13.81 | 14.81 |
| 8H              | 4H   | 15.89            | 16.44 | 16.70 | 17.26 | 18.25 | 12.13          | 12.69 | 12.94 | 13.50 | 14.49 |
|                 | 6H   | 16.47            | 16.92 | 17.31 | 17.78 | 18.77 | 12.66          | 13.12 | 13.50 | 13.98 | 14.97 |
|                 | 8H   | 16.69            | 17.09 | 17.54 | 17.95 | 18.95 | 12.86          | 13.26 | 13.71 | 14.12 | 15.12 |
|                 | 12H  | 16.84            | 17.19 | 17.69 | 18.04 | 19.10 | 12.99          | 13.35 | 13.84 | 14.19 | 15.25 |
| 12H             | 4H   | 15.86            | 16.35 | 16.68 | 17.19 | 18.18 | 12.15          | 12.65 | 12.98 | 13.48 | 14.48 |
|                 | 6H   | 16.45            | 16.85 | 17.29 | 17.71 | 18.71 | 12.71          | 13.12 | 13.56 | 13.97 | 14.98 |
|                 | 8H   | 16.68            | 17.04 | 17.53 | 17.88 | 18.94 | 12.94          | 13.29 | 13.79 | 14.14 | 15.20 |