

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: P919199

Luminaire Tested: DFN2DIP-HX4F0-120D040US935-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P919199  
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-HX4F0-120D040US935-RLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

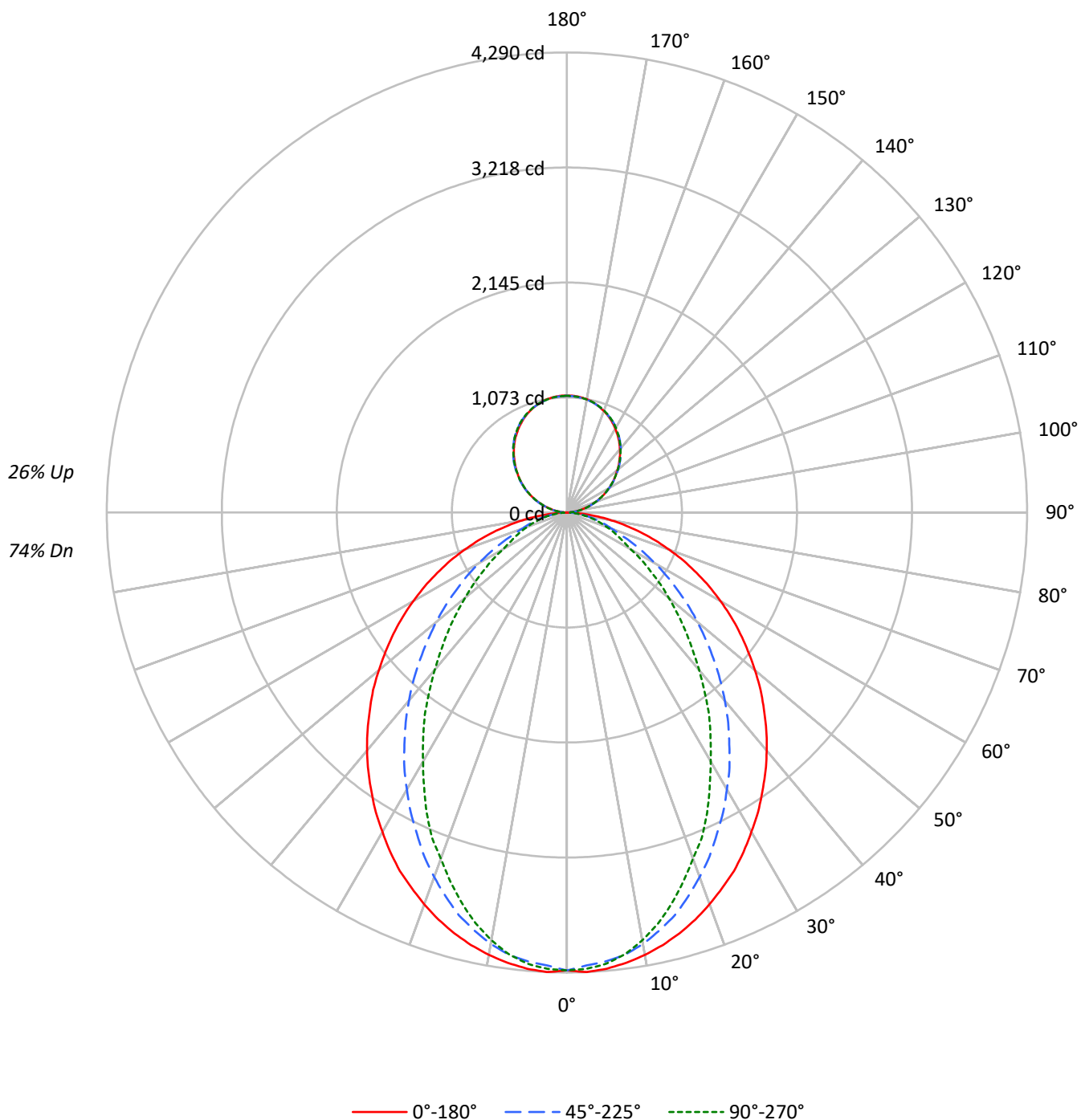
Lumens per Lamp: N/A  
Luminaire Lumens: 11830.1 lumens  
Efficiency: N/A  
Efficacy: 78.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Direct

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



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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°  | 3175 | 3175 | 3175 |
| 5°  | 3180 | 3125 | 3145 |
| 10° | 3149 | 3064 | 3043 |
| 15° | 3106 | 2963 | 2885 |
| 20° | 3049 | 2824 | 2691 |
| 25° | 2991 | 2668 | 2503 |
| 30° | 2912 | 2507 | 2266 |
| 35° | 2835 | 2335 | 2057 |
| 40° | 2757 | 2157 | 1817 |
| 45° | 2666 | 1959 | 1600 |
| 50° | 2572 | 1759 | 1388 |
| 55° | 2473 | 1546 | 1185 |
| 60° | 2360 | 1323 | 975  |
| 65° | 2229 | 1095 | 878  |
| 70° | 2071 | 884  | 795  |
| 75° | 1872 | 780  | 724  |
| 80° | 1583 | 655  | 628  |
| 85° | 1107 | 439  | 473  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2666 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 400.2   | 3.4       |
| 10°-20°   | 1098.7  | 9.3       |
| 20°-30°   | 1542.5  | 13.0      |
| 30°-40°   | 1681.4  | 14.2      |
| 40°-50°   | 1545.4  | 13.1      |
| 50°-60°   | 1213.7  | 10.3      |
| 60°-70°   | 790.0   | 6.7       |
| 70°-80°   | 406.7   | 3.4       |
| 80°-90°   | 106.9   | 0.9       |
| 90°-100°  | 67.4    | 0.6       |
| 100°-110° | 214.2   | 1.8       |
| 110°-120° | 366.5   | 3.1       |
| 120°-130° | 482.0   | 4.1       |
| 130°-140° | 541.0   | 4.6       |
| 140°-150° | 530.5   | 4.5       |
| 150°-160° | 445.0   | 3.8       |
| 160°-170° | 295.1   | 2.5       |
| 170°-180° | 103.2   | 0.9       |
| 0°-30°    | 3041.3  | 25.7      |
| 0°-40°    | 4722.7  | 39.9      |
| 0°-60°    | 7481.7  | 63.2      |
| 0°-90°    | 8785.3  | 74.3      |
| 90°-120°  | 648.0   | 5.5       |
| 90°-150°  | 2201.5  | 18.6      |
| 90°-180°  | 3045.0  | 25.7      |
| 0°-180°   | 11830.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4270 | 4270  | 4270 | 4270  | 4270 |      |
| 5°   | 4270 | 4251  | 4200 | 4235  | 4224 | 405  |
| 15°  | 4062 | 4019  | 3888 | 3814  | 3776 | 1144 |
| 25°  | 3687 | 3563  | 3308 | 3150  | 3091 | 1696 |
| 35°  | 3177 | 2980  | 2640 | 2396  | 2311 | 1988 |
| 45°  | 2597 | 2338  | 1932 | 1658  | 1565 | 2006 |
| 55°  | 1975 | 1673  | 1256 | 1024  | 951  | 1764 |
| 65°  | 1333 | 1020  | 672  | 541   | 529  | 1322 |
| 75°  | 711  | 440   | 309  | 282   | 278  | 752  |
| 85°  | 166  | 85    | 73   | 73    | 73   | 191  |
| 90°  | 1    | 12    | 32   | 30    | 31   | 12   |
| 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 |      |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4270.2 | 4270.2 | 4270.2 | 4270.2 | 4270.2 |
| 2.5°   | 4289.5 | 4270.2 | 4227.6 | 4266.5 | 4258.7 |
| 5°     | 4270.2 | 4250.9 | 4200.5 | 4235.3 | 4223.9 |
| 7.5°   | 4235.3 | 4212.3 | 4158.3 | 4173.4 | 4154.1 |
| 10°    | 4189.0 | 4162.0 | 4084.8 | 4073.0 | 4050.0 |
| 12.5°  | 4131.2 | 4096.4 | 3991.8 | 3968.9 | 3926.2 |
| 15°    | 4061.5 | 4018.9 | 3887.7 | 3814.2 | 3775.7 |
| 17.5°  | 3980.3 | 3918.4 | 3756.0 | 3671.2 | 3609.3 |
| 20°    | 3887.7 | 3810.2 | 3617.1 | 3520.7 | 3435.4 |
| 22.5°  | 3787.2 | 3698.2 | 3474.0 | 3342.7 | 3285.0 |
| 25°    | 3686.8 | 3562.9 | 3307.9 | 3149.6 | 3091.4 |
| 27.5°  | 3567.0 | 3435.4 | 3153.3 | 2971.7 | 2882.7 |
| 30°    | 3439.5 | 3292.4 | 2983.2 | 2786.4 | 2681.8 |
| 32.5°  | 3315.7 | 3137.7 | 2821.2 | 2589.2 | 2492.4 |
| 35°    | 3176.7 | 2979.5 | 2639.6 | 2396.1 | 2310.7 |
| 37.5°  | 3041.4 | 2828.6 | 2469.4 | 2202.5 | 2106.2 |
| 40°    | 2898.3 | 2666.7 | 2291.5 | 2017.2 | 1916.8 |
| 42.5°  | 2751.5 | 2504.3 | 2114.0 | 1827.8 | 1731.5 |
| 45°    | 2596.9 | 2337.9 | 1932.3 | 1657.7 | 1564.9 |
| 47.5°  | 2450.1 | 2175.9 | 1758.5 | 1483.8 | 1398.9 |
| 50°    | 2287.8 | 2013.5 | 1588.4 | 1321.5 | 1240.7 |
| 52.5°  | 2129.2 | 1839.3 | 1426.0 | 1171.0 | 1097.6 |
| 55°    | 1974.6 | 1673.3 | 1255.9 | 1024.2 | 950.8  |
| 57.5°  | 1816.3 | 1507.2 | 1105.3 | 888.9  | 827.0  |
| 60°    | 1654.0 | 1344.8 | 946.7  | 749.9  | 688.0  |
| 62.5°  | 1495.7 | 1186.5 | 811.4  | 626.1  | 595.3  |
| 65°    | 1333.3 | 1020.1 | 672.4  | 541.2  | 529.3  |
| 67.5°  | 1178.8 | 865.5  | 541.2  | 475.2  | 463.7  |
| 70°    | 1016.4 | 715.1  | 448.1  | 409.6  | 394.0  |
| 72.5°  | 861.9  | 575.7  | 374.7  | 344.0  | 336.2  |
| 75°    | 710.9  | 440.3  | 309.2  | 282.1  | 278.4  |
| 77.5°  | 560.5  | 312.8  | 243.6  | 228.0  | 220.2  |
| 80°    | 421.1  | 224.3  | 185.3  | 170.1  | 170.1  |
| 82.5°  | 293.6  | 150.8  | 127.5  | 119.7  | 119.7  |
| 85°    | 166.1  | 84.9   | 73.4   | 73.4   | 73.4   |
| 87.5°  | 61.9   | 30.7   | 30.7   | 27.0   | 27.0   |
| 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  |

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**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 |

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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 | 13.18            | 14.26 | 13.91 | 15.00 | 15.88 | 9.16           | 10.23 | 9.88  | 10.97 | 11.85 |
|                 | 3H   | 14.88            | 15.84 | 15.62 | 16.59 | 17.50 | 10.36          | 11.33 | 11.10 | 12.08 | 12.99 |
|                 | 4H   | 15.50            | 16.41 | 16.26 | 17.17 | 18.09 | 10.83          | 11.73 | 11.58 | 12.49 | 13.42 |
|                 | 6H   | 15.93            | 16.77 | 16.70 | 17.54 | 18.48 | 11.16          | 12.00 | 11.93 | 12.77 | 13.70 |
|                 | 8H   | 16.07            | 16.86 | 16.85 | 17.65 | 18.59 | 11.26          | 12.06 | 12.04 | 12.84 | 13.78 |
|                 | 12H  | 16.14            | 16.90 | 16.92 | 17.68 | 18.64 | 11.31          | 12.07 | 12.10 | 12.85 | 13.82 |
| 4H              | 2H   | 13.23            | 14.14 | 13.99 | 14.90 | 15.82 | 9.78           | 10.69 | 10.54 | 11.45 | 12.37 |
|                 | 3H   | 15.08            | 15.84 | 15.85 | 16.63 | 17.57 | 11.15          | 11.91 | 11.93 | 12.70 | 13.64 |
|                 | 4H   | 15.79            | 16.47 | 16.57 | 17.26 | 18.23 | 11.71          | 12.40 | 12.50 | 13.19 | 14.16 |
|                 | 6H   | 16.31            | 16.90 | 17.12 | 17.72 | 18.70 | 12.15          | 12.74 | 12.95 | 13.56 | 14.53 |
|                 | 8H   | 16.50            | 17.05 | 17.30 | 17.86 | 18.85 | 12.28          | 12.83 | 13.09 | 13.65 | 14.64 |
|                 | 12H  | 16.60            | 17.10 | 17.43 | 17.93 | 18.93 | 12.36          | 12.86 | 13.19 | 13.69 | 14.69 |
| 8H              | 4H   | 15.77            | 16.32 | 16.58 | 17.14 | 18.13 | 12.01          | 12.56 | 12.82 | 13.38 | 14.37 |
|                 | 6H   | 16.35            | 16.80 | 17.18 | 17.66 | 18.65 | 12.54          | 13.00 | 13.38 | 13.86 | 14.84 |
|                 | 8H   | 16.57            | 16.97 | 17.41 | 17.83 | 18.83 | 12.74          | 13.14 | 13.58 | 14.00 | 15.00 |
|                 | 12H  | 16.72            | 17.07 | 17.57 | 17.92 | 18.98 | 12.87          | 13.22 | 13.72 | 14.07 | 15.13 |
| 12H             | 4H   | 15.73            | 16.23 | 16.56 | 17.07 | 18.06 | 12.03          | 12.52 | 12.86 | 13.36 | 14.35 |
|                 | 6H   | 16.32            | 16.73 | 17.17 | 17.58 | 18.59 | 12.59          | 13.00 | 13.44 | 13.85 | 14.86 |
|                 | 8H   | 16.56            | 16.91 | 17.41 | 17.76 | 18.82 | 12.82          | 13.17 | 13.66 | 14.02 | 15.08 |