

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: P915763

Luminaire Tested: DFN2DIP-TR4F0-120D090US927-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P915763  
REPORT IS A COMBINATION OF REPORTS P901995 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-120D090US927-FLLONL  
Description: 4 foot, Triangle Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

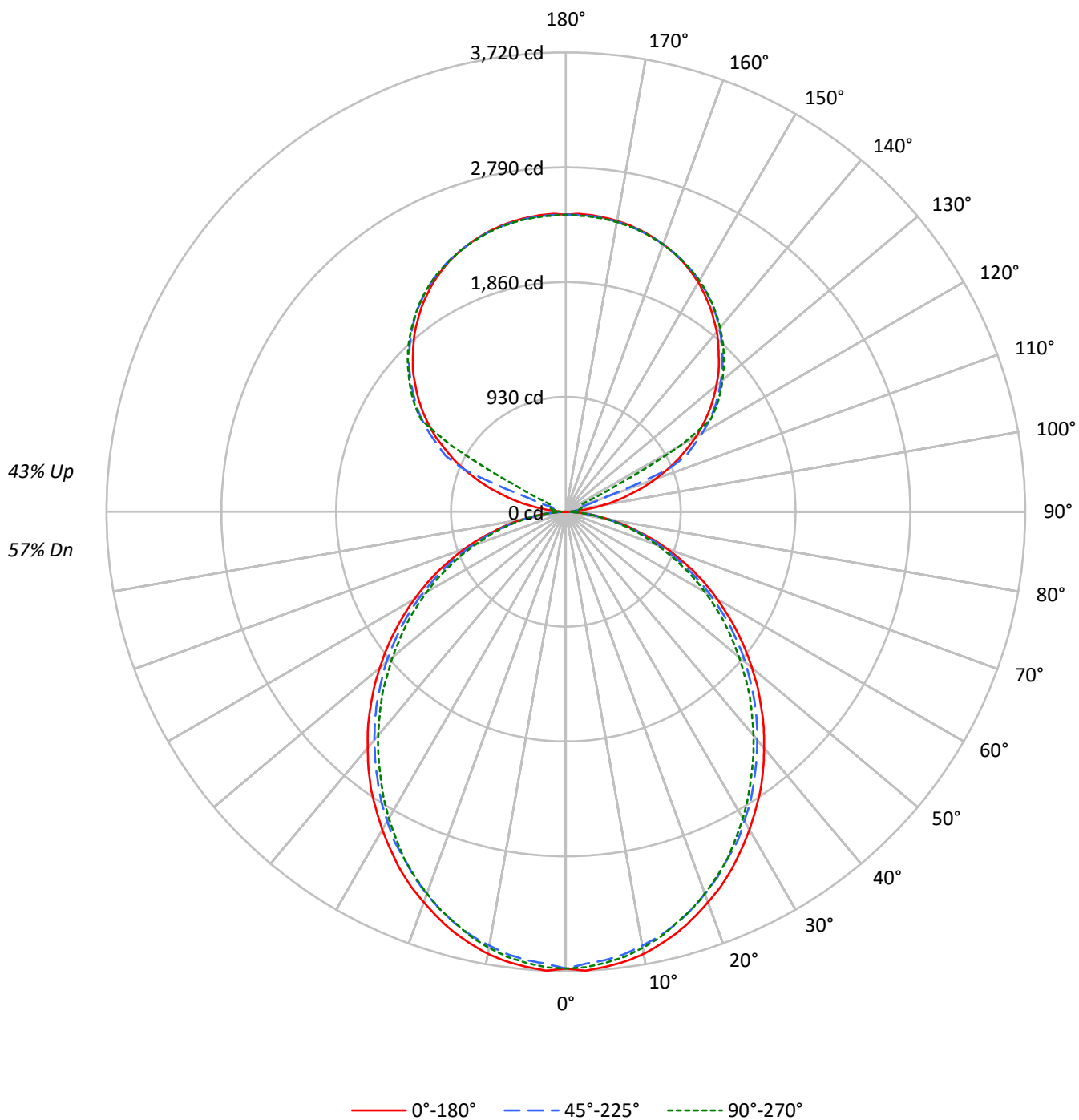
Lumens per Lamp: N/A  
Luminaire Lumens: 16469.4 lumens  
Efficiency: N/A  
Efficacy: 85.2 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 193.3  
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   | 109 | 109 | 109 | 109 | 101 | 101 | 101 | 101 | 87 | 87 | 87 | 74 | 74 | 74 | 63 | 63 | 63 |
| 1   | 99  | 95  | 91  | 88  | 92  | 89  | 85  | 82  | 77 | 74 | 72 | 66 | 64 | 62 | 55 | 54 | 53 |
| 2   | 91  | 83  | 77  | 72  | 84  | 77  | 72  | 67  | 67 | 63 | 59 | 58 | 55 | 52 | 49 | 47 | 45 |
| 3   | 83  | 73  | 66  | 60  | 77  | 68  | 62  | 56  | 59 | 54 | 50 | 51 | 47 | 44 | 43 | 40 | 38 |
| 4   | 76  | 65  | 57  | 50  | 70  | 61  | 53  | 48  | 53 | 47 | 43 | 45 | 41 | 38 | 39 | 35 | 33 |
| 5   | 69  | 58  | 49  | 43  | 64  | 54  | 47  | 41  | 47 | 41 | 37 | 41 | 36 | 33 | 35 | 31 | 29 |
| 6   | 64  | 52  | 44  | 38  | 59  | 49  | 41  | 36  | 43 | 37 | 32 | 37 | 32 | 29 | 32 | 28 | 25 |
| 7   | 59  | 47  | 39  | 33  | 55  | 44  | 37  | 32  | 39 | 33 | 28 | 34 | 29 | 25 | 29 | 25 | 22 |
| 8   | 55  | 43  | 35  | 29  | 51  | 40  | 33  | 28  | 35 | 29 | 25 | 31 | 26 | 23 | 27 | 23 | 20 |
| 9   | 51  | 39  | 31  | 26  | 48  | 37  | 30  | 25  | 32 | 27 | 23 | 28 | 24 | 20 | 25 | 21 | 18 |
| 10  | 48  | 36  | 28  | 24  | 45  | 34  | 27  | 22  | 30 | 24 | 20 | 26 | 22 | 18 | 23 | 19 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2939 | 2939 | 2939 |
| 5°  | 2943 | 2898 | 2917 |
| 10° | 2919 | 2859 | 2877 |
| 15° | 2877 | 2811 | 2816 |
| 20° | 2819 | 2746 | 2752 |
| 25° | 2761 | 2668 | 2679 |
| 30° | 2689 | 2595 | 2586 |
| 35° | 2620 | 2509 | 2488 |
| 40° | 2536 | 2422 | 2394 |
| 45° | 2452 | 2336 | 2299 |
| 50° | 2360 | 2244 | 2188 |
| 55° | 2263 | 2139 | 2086 |
| 60° | 2155 | 2013 | 1969 |
| 65° | 2036 | 1884 | 1831 |
| 70° | 1885 | 1726 | 1683 |
| 75° | 1676 | 1536 | 1546 |
| 80° | 1424 | 1295 | 1284 |
| 85° | 1030 | 879  | 851  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2452 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 348.1   | 2.1       |
| 10°-20°   | 979.5   | 5.9       |
| 20°-30°   | 1439.5  | 8.7       |
| 30°-40°   | 1671.9  | 10.2      |
| 40°-50°   | 1669.9  | 10.1      |
| 50°-60°   | 1456.0  | 8.8       |
| 60°-70°   | 1076.3  | 6.5       |
| 70°-80°   | 609.0   | 3.7       |
| 80°-90°   | 165.0   | 1.0       |
| 90°-100°  | 79.3    | 0.5       |
| 100°-110° | 295.8   | 1.8       |
| 110°-120° | 784.4   | 4.8       |
| 120°-130° | 1301.0  | 7.9       |
| 130°-140° | 1382.0  | 8.4       |
| 140°-150° | 1284.4  | 7.8       |
| 150°-160° | 1032.6  | 6.3       |
| 160°-170° | 665.4   | 4.0       |
| 170°-180° | 229.0   | 1.4       |
| <hr/>     |         |           |
| 0°-30°    | 2767.2  | 16.8      |
| 0°-40°    | 4439.1  | 27.0      |
| 0°-60°    | 7565.0  | 45.9      |
| 0°-90°    | 9415.3  | 57.2      |
| 90°-120°  | 1159.5  | 7.0       |
| 90°-150°  | 5127.0  | 31.1      |
| 90°-180°  | 7054.0  | 42.8      |
| 0°-180°   | 16469.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3699 | 3699  | 3699 | 3699  | 3699 |      |
| 5°   | 3699 | 3685  | 3646 | 3674  | 3667 | 351  |
| 15°  | 3521 | 3500  | 3454 | 3468  | 3450 | 992  |
| 25°  | 3187 | 3158  | 3098 | 3105  | 3098 | 1466 |
| 35°  | 2749 | 2714  | 2657 | 2636  | 2618 | 1717 |
| 45°  | 2237 | 2212  | 2159 | 2120  | 2106 | 1727 |
| 55°  | 1693 | 1672  | 1629 | 1586  | 1569 | 1514 |
| 65°  | 1142 | 1120  | 1085 | 1053  | 1035 | 1129 |
| 75°  | 597  | 591   | 572  | 551   | 558  | 638  |
| 85°  | 146  | 142   | 139  | 128   | 124  | 162  |
| 90°  | 2    | 21    | 35   | 44    | 47   | 15   |
| 95°  | 113  | 56    | 68   | 77    | 75   | 134  |
| 105° | 529  | 582   | 106  | 125   | 132  | 566  |
| 115° | 1001 | 1031  | 1074 | 268   | 143  | 986  |
| 125° | 1415 | 1438  | 1471 | 1483  | 1489 | 1262 |
| 135° | 1752 | 1780  | 1795 | 1813  | 1809 | 1353 |
| 145° | 2032 | 2030  | 2060 | 2072  | 2063 | 1271 |
| 155° | 2237 | 2222  | 2243 | 2253  | 2239 | 1031 |
| 165° | 2357 | 2347  | 2352 | 2364  | 2352 | 666  |
| 175° | 2411 | 2399  | 2403 | 2415  | 2398 | 229  |
| 180° | 2406 | 2406  | 2406 | 2406  | 2406 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3698.9 | 3698.9 | 3698.9 | 3698.9 | 3698.9 |
| 2.5°   | 3720.4 | 3702.7 | 3663.4 | 3698.9 | 3692.1 |
| 5°     | 3698.9 | 3684.9 | 3645.7 | 3674.0 | 3667.2 |
| 7.5°   | 3674.0 | 3652.8 | 3613.6 | 3642.3 | 3635.2 |
| 10°    | 3635.2 | 3610.2 | 3567.6 | 3595.9 | 3585.3 |
| 12.5°  | 3581.5 | 3560.4 | 3517.8 | 3535.5 | 3528.3 |
| 15°    | 3521.2 | 3500.0 | 3453.6 | 3467.9 | 3450.2 |
| 17.5°  | 3446.5 | 3425.3 | 3378.9 | 3396.6 | 3378.9 |
| 20°    | 3364.6 | 3343.4 | 3293.7 | 3304.2 | 3290.2 |
| 22.5°  | 3283.0 | 3251.0 | 3204.5 | 3204.5 | 3197.4 |
| 25°    | 3186.8 | 3158.5 | 3098.1 | 3105.0 | 3098.1 |
| 27.5°  | 3080.0 | 3055.1 | 3009.1 | 2998.5 | 2980.8 |
| 30°    | 2973.6 | 2944.9 | 2891.7 | 2881.2 | 2866.8 |
| 32.5°  | 2859.6 | 2838.5 | 2781.5 | 2760.0 | 2745.7 |
| 35°    | 2749.4 | 2714.0 | 2657.0 | 2635.5 | 2617.8 |
| 37.5°  | 2624.9 | 2592.9 | 2535.9 | 2511.0 | 2493.2 |
| 40°    | 2497.0 | 2468.4 | 2411.3 | 2379.6 | 2365.3 |
| 42.5°  | 2372.5 | 2343.8 | 2287.2 | 2251.4 | 2230.2 |
| 45°    | 2237.4 | 2212.5 | 2158.9 | 2120.0 | 2105.7 |
| 47.5°  | 2105.7 | 2080.7 | 2023.8 | 1984.6 | 1963.4 |
| 50°    | 1966.8 | 1949.1 | 1899.3 | 1849.4 | 1831.7 |
| 52.5°  | 1831.7 | 1806.8 | 1760.8 | 1721.5 | 1696.6 |
| 55°    | 1693.2 | 1671.7 | 1629.0 | 1586.4 | 1568.7 |
| 57.5°  | 1554.3 | 1536.6 | 1490.2 | 1447.6 | 1433.2 |
| 60°    | 1415.5 | 1401.5 | 1351.7 | 1312.5 | 1301.9 |
| 62.5°  | 1280.4 | 1255.4 | 1220.0 | 1184.5 | 1170.2 |
| 65°    | 1141.9 | 1120.4 | 1084.9 | 1052.8 | 1035.1 |
| 67.5°  | 999.7  | 981.5  | 949.8  | 925.0  | 910.6  |
| 70°    | 867.9  | 853.6  | 821.5  | 796.6  | 782.7  |
| 72.5°  | 732.8  | 718.5  | 700.8  | 675.9  | 665.3  |
| 75°    | 597.4  | 590.6  | 572.4  | 551.4  | 558.5  |
| 77.5°  | 476.6  | 462.2  | 455.1  | 444.5  | 434.0  |
| 80°    | 355.8  | 352.0  | 344.9  | 334.4  | 327.2  |
| 82.5°  | 241.9  | 241.9  | 238.5  | 224.2  | 224.2  |
| 85°    | 145.7  | 142.3  | 138.9  | 127.9  | 124.5  |
| 87.5°  | 64.2   | 57.0   | 49.8   | 39.2   | 35.5   |
| 90°    | 1.7    | 20.9   | 34.7   | 43.6   | 46.9   |
| 92.5°  | 43.6   | 36.6   | 41.7   | 45.3   | 46.9   |
| 95°    | 113.1  | 55.6   | 67.8   | 76.7   | 74.9   |
| 97.5°  | 203.7  | 61.0   | 88.7   | 94.0   | 95.7   |
| 100°   | 308.2  | 69.7   | 99.3   | 113.1  | 116.6  |
| 102.5° | 423.0  | 419.7  | 102.7  | 121.8  | 127.1  |
| 105°   | 529.3  | 581.6  | 106.2  | 125.3  | 132.3  |
| 107.5° | 652.9  | 696.3  | 109.8  | 128.8  | 135.9  |
| 110°   | 771.3  | 807.8  | 304.8  | 130.6  | 137.5  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 882.8  | 914.0  | 884.5  | 134.0  | 139.3  |
| 115°   | 1001.1 | 1030.6 | 1074.3 | 268.2  | 142.8  |
| 117.5° | 1103.8 | 1138.6 | 1168.3 | 919.2  | 463.1  |
| 120°   | 1218.8 | 1244.8 | 1276.3 | 1297.1 | 1062.1 |
| 122.5° | 1316.2 | 1344.1 | 1379.0 | 1389.3 | 1391.2 |
| 125°   | 1415.4 | 1438.1 | 1471.2 | 1483.4 | 1488.6 |
| 127.5° | 1505.9 | 1530.3 | 1556.6 | 1574.0 | 1575.6 |
| 130°   | 1591.3 | 1619.3 | 1638.3 | 1657.5 | 1655.9 |
| 132.5° | 1678.4 | 1701.1 | 1720.1 | 1735.9 | 1734.2 |
| 135°   | 1751.6 | 1779.5 | 1795.0 | 1812.6 | 1809.1 |
| 137.5° | 1828.1 | 1849.0 | 1866.5 | 1883.9 | 1878.7 |
| 140°   | 1902.9 | 1917.0 | 1936.0 | 1951.7 | 1943.1 |
| 142.5° | 1965.8 | 1978.0 | 2000.5 | 2014.4 | 2005.7 |
| 145°   | 2031.9 | 2030.0 | 2059.7 | 2071.9 | 2063.2 |
| 147.5° | 2089.2 | 2084.1 | 2113.6 | 2122.3 | 2115.4 |
| 150°   | 2145.1 | 2132.9 | 2160.8 | 2171.1 | 2162.4 |
| 152.5° | 2192.0 | 2178.1 | 2204.2 | 2214.7 | 2202.5 |
| 155°   | 2237.3 | 2221.8 | 2242.6 | 2253.0 | 2239.1 |
| 157.5° | 2273.9 | 2260.0 | 2275.7 | 2287.9 | 2273.9 |
| 160°   | 2305.2 | 2294.7 | 2305.2 | 2315.6 | 2303.4 |
| 162.5° | 2333.0 | 2322.6 | 2331.3 | 2343.5 | 2327.8 |
| 165°   | 2357.4 | 2347.0 | 2352.2 | 2364.4 | 2352.2 |
| 167.5° | 2376.6 | 2366.1 | 2371.4 | 2383.6 | 2367.9 |
| 170°   | 2392.3 | 2381.8 | 2385.3 | 2397.5 | 2381.8 |
| 172.5° | 2402.7 | 2392.3 | 2395.8 | 2408.0 | 2392.3 |
| 175°   | 2411.3 | 2399.1 | 2402.7 | 2414.8 | 2397.5 |
| 177.5° | 2414.8 | 2402.7 | 2404.5 | 2416.7 | 2401.0 |
| 180°   | 2406.2 | 2406.2 | 2406.2 | 2406.2 | 2406.2 |

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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 | 11.65            | 12.58 | 12.54 | 13.49 | 14.66 | 11.22          | 12.15 | 12.11 | 13.06 | 14.23 |
|                 | 3H   | 13.31            | 14.15 | 14.22 | 15.07 | 16.26 | 12.84          | 13.68 | 13.75 | 14.60 | 15.79 |
|                 | 4H   | 13.90            | 14.69 | 14.82 | 15.62 | 16.82 | 13.43          | 14.22 | 14.35 | 15.15 | 16.35 |
|                 | 6H   | 14.31            | 15.03 | 15.24 | 15.97 | 17.18 | 13.83          | 14.56 | 14.76 | 15.49 | 16.71 |
|                 | 8H   | 14.41            | 15.11 | 15.35 | 16.06 | 17.27 | 13.94          | 14.63 | 14.88 | 15.58 | 16.79 |
|                 | 12H  | 14.46            | 15.12 | 15.41 | 16.07 | 17.31 | 13.98          | 14.64 | 14.93 | 15.59 | 16.83 |
| 4H              | 2H   | 12.12            | 12.91 | 13.04 | 13.84 | 15.03 | 11.77          | 12.56 | 12.70 | 13.49 | 14.69 |
|                 | 3H   | 13.99            | 14.65 | 14.93 | 15.61 | 16.82 | 13.60          | 14.26 | 14.53 | 15.22 | 16.43 |
|                 | 4H   | 14.71            | 15.31 | 15.65 | 16.26 | 17.50 | 14.30          | 14.90 | 15.25 | 15.86 | 17.10 |
|                 | 6H   | 15.23            | 15.75 | 16.19 | 16.72 | 17.96 | 14.82          | 15.34 | 15.78 | 16.31 | 17.55 |
|                 | 8H   | 15.38            | 15.86 | 16.34 | 16.83 | 18.09 | 14.97          | 15.45 | 15.93 | 16.42 | 17.67 |
|                 | 12H  | 15.45            | 15.89 | 16.43 | 16.88 | 18.14 | 15.03          | 15.47 | 16.01 | 16.46 | 17.72 |
| 8H              | 4H   | 14.91            | 15.39 | 15.87 | 16.37 | 17.62 | 14.55          | 15.03 | 15.51 | 16.01 | 17.26 |
|                 | 6H   | 15.54            | 15.94 | 16.53 | 16.96 | 18.21 | 15.18          | 15.58 | 16.17 | 16.60 | 17.85 |
|                 | 8H   | 15.77            | 16.12 | 16.76 | 17.12 | 18.39 | 15.40          | 15.75 | 16.39 | 16.75 | 18.02 |
|                 | 12H  | 15.90            | 16.21 | 16.90 | 17.21 | 18.52 | 15.52          | 15.83 | 16.52 | 16.82 | 18.14 |
| 12H             | 4H   | 14.90            | 15.34 | 15.88 | 16.32 | 17.58 | 14.55          | 14.98 | 15.53 | 15.97 | 17.23 |
|                 | 6H   | 15.57            | 15.93 | 16.57 | 16.93 | 18.20 | 15.22          | 15.58 | 16.22 | 16.58 | 17.85 |
|                 | 8H   | 15.82            | 16.13 | 16.82 | 17.13 | 18.44 | 15.46          | 15.77 | 16.46 | 16.77 | 18.09 |