

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: P906153

Luminaire Tested: DFN2DIP-PN4F0-110D110US835-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P906153  
REPORT IS A COMBINATION OF REPORTS P901269 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-110D110US835-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

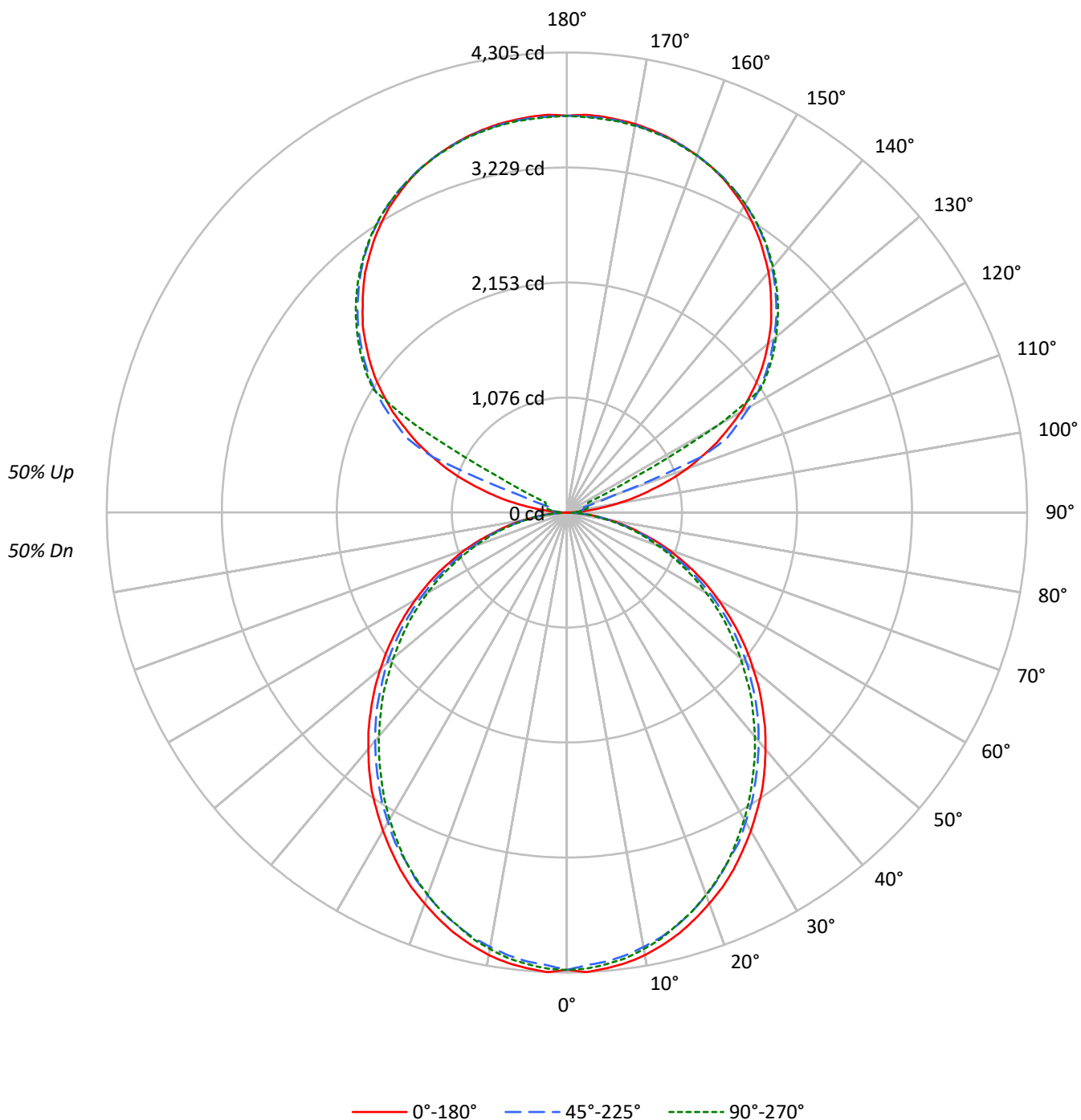
Lumens per Lamp: N/A  
Luminaire Lumens: 21780.0 lumens  
Efficiency: N/A  
Efficacy: 105.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 205.9  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.996  
Total Harmonic Distortion (THDi): 0.064  
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   | 107 | 107 | 107 | 107 | 99 | 99 | 99 | 99 | 83 | 83 | 83 | 69 | 69 | 69 | 56 | 56 | 56 |
| 1   | 98  | 93  | 90  | 86  | 90 | 86 | 83 | 80 | 73 | 71 | 68 | 61 | 59 | 58 | 50 | 48 | 47 |
| 2   | 89  | 82  | 75  | 70  | 82 | 76 | 70 | 66 | 64 | 60 | 57 | 53 | 51 | 48 | 44 | 42 | 40 |
| 3   | 81  | 72  | 64  | 59  | 75 | 66 | 60 | 55 | 56 | 52 | 48 | 47 | 44 | 41 | 39 | 36 | 34 |
| 4   | 74  | 64  | 56  | 50  | 68 | 59 | 52 | 47 | 50 | 45 | 41 | 42 | 38 | 35 | 35 | 32 | 29 |
| 5   | 68  | 57  | 48  | 42  | 63 | 53 | 45 | 40 | 45 | 39 | 35 | 38 | 34 | 30 | 31 | 28 | 26 |
| 6   | 63  | 51  | 43  | 37  | 58 | 47 | 40 | 35 | 40 | 35 | 31 | 34 | 30 | 27 | 28 | 25 | 23 |
| 7   | 58  | 46  | 38  | 32  | 53 | 43 | 36 | 30 | 37 | 31 | 27 | 31 | 27 | 23 | 26 | 23 | 20 |
| 8   | 54  | 42  | 34  | 29  | 50 | 39 | 32 | 27 | 33 | 28 | 24 | 28 | 24 | 21 | 24 | 20 | 18 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 29 | 24 | 31 | 25 | 21 | 26 | 22 | 19 | 22 | 19 | 16 |
| 10  | 47  | 35  | 28  | 23  | 43 | 33 | 26 | 22 | 28 | 23 | 19 | 24 | 20 | 17 | 20 | 17 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3124 | 3124 | 3124 |
| 5°  | 3129 | 3081 | 3102 |
| 10° | 3104 | 3040 | 3061 |
| 15° | 3058 | 2991 | 2996 |
| 20° | 2997 | 2921 | 2929 |
| 25° | 2935 | 2839 | 2852 |
| 30° | 2858 | 2762 | 2754 |
| 35° | 2786 | 2671 | 2650 |
| 40° | 2696 | 2579 | 2551 |
| 45° | 2606 | 2487 | 2450 |
| 50° | 2509 | 2391 | 2333 |
| 55° | 2406 | 2279 | 2225 |
| 60° | 2290 | 2146 | 2102 |
| 65° | 2164 | 2010 | 1957 |
| 70° | 2004 | 1842 | 1801 |
| 75° | 1781 | 1642 | 1658 |
| 80° | 1513 | 1388 | 1382 |
| 85° | 1094 | 947  | 925  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2606 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 402.8   | 1.8       |
| 10°-20°   | 1133.5  | 5.2       |
| 20°-30°   | 1665.7  | 7.6       |
| 30°-40°   | 1934.7  | 8.9       |
| 40°-50°   | 1932.3  | 8.9       |
| 50°-60°   | 1684.9  | 7.7       |
| 60°-70°   | 1245.5  | 5.7       |
| 70°-80°   | 704.7   | 3.2       |
| 80°-90°   | 192.5   | 0.9       |
| 90°-100°  | 122.4   | 0.6       |
| 100°-110° | 456.3   | 2.1       |
| 110°-120° | 1210.3  | 5.6       |
| 120°-130° | 2007.3  | 9.2       |
| 130°-140° | 2132.2  | 9.8       |
| 140°-150° | 1981.7  | 9.1       |
| 150°-160° | 1593.2  | 7.3       |
| 160°-170° | 1026.6  | 4.7       |
| 170°-180° | 353.3   | 1.6       |
| 0°-30°    | 3202.1  | 14.7      |
| 0°-40°    | 5136.7  | 23.6      |
| 0°-60°    | 8753.8  | 40.2      |
| 0°-90°    | 10896.5 | 50.0      |
| 90°-120°  | 1789.0  | 8.2       |
| 90°-150°  | 7910.3  | 36.3      |
| 90°-180°  | 10883.0 | 50.0      |
| 0°-180°   | 21780.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4280 | 4280  | 4280 | 4280  | 4280 |      |
| 5°   | 4280 | 4264  | 4219 | 4251  | 4244 | 406  |
| 15°  | 4074 | 4050  | 3996 | 4013  | 3992 | 1148 |
| 25°  | 3688 | 3655  | 3585 | 3593  | 3585 | 1697 |
| 35°  | 3182 | 3140  | 3074 | 3050  | 3029 | 1987 |
| 45°  | 2589 | 2560  | 2498 | 2453  | 2437 | 1998 |
| 55°  | 1959 | 1934  | 1885 | 1836  | 1815 | 1752 |
| 65°  | 1321 | 1296  | 1255 | 1218  | 1198 | 1306 |
| 75°  | 691  | 683   | 662  | 638   | 646  | 738  |
| 85°  | 169  | 165   | 161  | 148   | 144  | 188  |
| 90°  | 3    | 32    | 54   | 67    | 72   | 20   |
| 95°  | 174  | 86    | 105  | 118   | 116  | 207  |
| 105° | 817  | 897   | 164  | 193   | 204  | 873  |
| 115° | 1544 | 1590  | 1658 | 414   | 220  | 1521 |
| 125° | 2184 | 2219  | 2270 | 2289  | 2297 | 1948 |
| 135° | 2702 | 2746  | 2769 | 2797  | 2791 | 2088 |
| 145° | 3135 | 3132  | 3178 | 3197  | 3183 | 1961 |
| 155° | 3452 | 3428  | 3460 | 3476  | 3455 | 1591 |
| 165° | 3637 | 3621  | 3629 | 3648  | 3629 | 1028 |
| 175° | 3720 | 3702  | 3707 | 3726  | 3699 | 354  |
| 180° | 3712 | 3712  | 3712 | 3712  | 3712 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4280.2 | 4280.2 | 4280.2 | 4280.2 | 4280.2 |
| 2.5°   | 4305.0 | 4284.5 | 4239.1 | 4280.2 | 4272.3 |
| 5°     | 4280.2 | 4264.0 | 4218.6 | 4251.3 | 4243.5 |
| 7.5°   | 4251.3 | 4226.9 | 4181.5 | 4214.7 | 4206.4 |
| 10°    | 4206.4 | 4177.5 | 4128.2 | 4160.9 | 4148.7 |
| 12.5°  | 4144.4 | 4119.9 | 4070.6 | 4091.1 | 4082.8 |
| 15°    | 4074.5 | 4050.0 | 3996.3 | 4012.9 | 3992.4 |
| 17.5°  | 3988.0 | 3963.6 | 3909.9 | 3930.4 | 3909.9 |
| 20°    | 3893.3 | 3868.8 | 3811.2 | 3823.4 | 3807.3 |
| 22.5°  | 3799.0 | 3761.8 | 3708.1 | 3708.1 | 3699.8 |
| 25°    | 3687.6 | 3654.9 | 3585.0 | 3592.9 | 3585.0 |
| 27.5°  | 3564.0 | 3535.2 | 3481.9 | 3469.7 | 3449.2 |
| 30°    | 3440.9 | 3407.7 | 3346.1 | 3333.9 | 3317.3 |
| 32.5°  | 3309.0 | 3284.6 | 3218.6 | 3193.7 | 3177.1 |
| 35°    | 3181.5 | 3140.5 | 3074.5 | 3049.6 | 3029.1 |
| 37.5°  | 3037.4 | 3000.3 | 2934.4 | 2905.5 | 2885.0 |
| 40°    | 2889.4 | 2856.2 | 2790.3 | 2753.6 | 2737.0 |
| 42.5°  | 2745.3 | 2712.1 | 2646.6 | 2605.1 | 2580.7 |
| 45°    | 2589.0 | 2560.1 | 2498.1 | 2453.2 | 2436.6 |
| 47.5°  | 2436.6 | 2407.8 | 2341.8 | 2296.4 | 2271.9 |
| 50°    | 2275.9 | 2255.4 | 2197.7 | 2140.1 | 2119.6 |
| 52.5°  | 2119.6 | 2090.7 | 2037.5 | 1992.0 | 1963.2 |
| 55°    | 1959.3 | 1934.4 | 1885.1 | 1835.7 | 1815.2 |
| 57.5°  | 1798.6 | 1778.1 | 1724.4 | 1675.0 | 1658.4 |
| 60°    | 1637.9 | 1621.8 | 1564.1 | 1518.7 | 1506.5 |
| 62.5°  | 1481.6 | 1452.8 | 1411.7 | 1370.7 | 1354.1 |
| 65°    | 1321.3 | 1296.4 | 1255.4 | 1218.3 | 1197.8 |
| 67.5°  | 1156.7 | 1135.8 | 1099.1 | 1070.3 | 1053.7 |
| 70°    | 1004.3 | 987.7  | 950.6  | 921.8  | 905.6  |
| 72.5°  | 848.0  | 831.4  | 810.9  | 782.1  | 769.8  |
| 75°    | 691.2  | 683.4  | 662.4  | 638.0  | 646.3  |
| 77.5°  | 551.5  | 534.9  | 526.6  | 514.4  | 502.2  |
| 80°    | 411.8  | 407.4  | 399.1  | 386.9  | 378.6  |
| 82.5°  | 279.9  | 279.9  | 276.0  | 259.4  | 259.4  |
| 85°    | 168.6  | 164.6  | 160.7  | 148.0  | 144.1  |
| 87.5°  | 74.2   | 65.9   | 57.6   | 45.4   | 41.0   |
| 90°    | 2.6    | 32.2   | 53.6   | 67.3   | 72.4   |
| 92.5°  | 67.3   | 56.5   | 64.4   | 69.9   | 72.4   |
| 95°    | 174.5  | 85.8   | 104.6  | 118.3  | 115.5  |
| 97.5°  | 314.2  | 94.1   | 136.8  | 145.1  | 147.7  |
| 100°   | 475.6  | 107.5  | 153.1  | 174.5  | 179.9  |
| 102.5° | 652.6  | 647.5  | 158.5  | 187.9  | 196.2  |
| 105°   | 816.6  | 897.3  | 164.0  | 193.3  | 204.2  |
| 107.5° | 1007.4 | 1074.3 | 169.4  | 198.7  | 209.6  |
| 110°   | 1190.1 | 1246.3 | 470.2  | 201.6  | 212.1  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1362.1 | 1410.2 | 1364.6 | 206.7  | 215.0  |
| 115°   | 1544.5 | 1590.1 | 1657.5 | 413.7  | 220.4  |
| 117.5° | 1703.1 | 1756.7 | 1802.6 | 1418.2 | 714.5  |
| 120°   | 1880.4 | 1920.6 | 1969.1 | 2001.3 | 1638.6 |
| 122.5° | 2030.7 | 2073.7 | 2127.6 | 2143.6 | 2146.5 |
| 125°   | 2183.8 | 2218.9 | 2269.9 | 2288.7 | 2296.7 |
| 127.5° | 2323.5 | 2361.1 | 2401.6 | 2428.4 | 2431.0 |
| 130°   | 2455.2 | 2498.3 | 2527.6 | 2557.3 | 2554.8 |
| 132.5° | 2589.5 | 2624.6 | 2654.0 | 2678.2 | 2675.7 |
| 135°   | 2702.5 | 2745.5 | 2769.4 | 2796.6 | 2791.1 |
| 137.5° | 2820.5 | 2852.7 | 2879.8 | 2906.6 | 2898.6 |
| 140°   | 2936.0 | 2957.6 | 2987.0 | 3011.2 | 2997.8 |
| 142.5° | 3032.9 | 3051.7 | 3086.5 | 3107.9 | 3094.5 |
| 145°   | 3135.0 | 3132.1 | 3177.7 | 3196.6 | 3183.2 |
| 147.5° | 3223.4 | 3215.4 | 3261.0 | 3274.4 | 3263.9 |
| 150°   | 3309.5 | 3290.7 | 3333.7 | 3349.7 | 3336.3 |
| 152.5° | 3381.9 | 3360.5 | 3400.7 | 3417.0 | 3398.2 |
| 155°   | 3451.8 | 3427.8 | 3460.0 | 3476.0 | 3454.6 |
| 157.5° | 3508.2 | 3486.8 | 3511.1 | 3529.9 | 3508.2 |
| 160°   | 3556.7 | 3540.4 | 3556.7 | 3572.6 | 3553.8 |
| 162.5° | 3599.4 | 3583.5 | 3596.9 | 3615.7 | 3591.5 |
| 165°   | 3637.1 | 3621.1 | 3629.1 | 3647.9 | 3629.1 |
| 167.5° | 3666.7 | 3650.5 | 3658.8 | 3677.6 | 3653.4 |
| 170°   | 3691.0 | 3674.7 | 3680.1 | 3699.0 | 3674.7 |
| 172.5° | 3706.9 | 3691.0 | 3696.4 | 3715.2 | 3691.0 |
| 175°   | 3720.3 | 3701.5 | 3706.9 | 3725.8 | 3699.0 |
| 177.5° | 3725.8 | 3706.9 | 3709.8 | 3728.6 | 3704.4 |
| 180°   | 3712.4 | 3712.4 | 3712.4 | 3712.4 | 3712.4 |

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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 | 11.24            | 12.10 | 12.20 | 13.07 | 14.34 | 10.80          | 11.66 | 11.76 | 12.63 | 13.90 |
|                 | 3H   | 12.90            | 13.68 | 13.87 | 14.66 | 15.95 | 12.42          | 13.19 | 13.39 | 14.17 | 15.47 |
|                 | 4H   | 13.49            | 14.22 | 14.47 | 15.21 | 16.51 | 13.01          | 13.74 | 13.99 | 14.72 | 16.02 |
|                 | 6H   | 13.89            | 14.57 | 14.89 | 15.56 | 16.87 | 13.40          | 14.08 | 14.40 | 15.07 | 16.38 |
|                 | 8H   | 14.00            | 14.64 | 15.00 | 15.65 | 16.96 | 13.51          | 14.15 | 14.51 | 15.16 | 16.47 |
|                 | 12H  | 14.05            | 14.66 | 15.05 | 15.66 | 17.00 | 13.55          | 14.16 | 14.55 | 15.16 | 16.50 |
| 4H              | 2H   | 11.70            | 12.43 | 12.69 | 13.42 | 14.72 | 11.35          | 12.08 | 12.34 | 13.07 | 14.37 |
|                 | 3H   | 13.57            | 14.18 | 14.57 | 15.20 | 16.51 | 13.17          | 13.78 | 14.17 | 14.79 | 16.11 |
|                 | 4H   | 14.29            | 14.85 | 15.29 | 15.85 | 17.19 | 13.87          | 14.43 | 14.88 | 15.44 | 16.77 |
|                 | 6H   | 14.81            | 15.29 | 15.82 | 16.32 | 17.65 | 14.38          | 14.86 | 15.40 | 15.89 | 17.23 |
|                 | 8H   | 14.96            | 15.41 | 15.97 | 16.43 | 17.78 | 14.53          | 14.98 | 15.55 | 16.00 | 17.35 |
|                 | 12H  | 15.03            | 15.44 | 16.07 | 16.48 | 17.83 | 14.59          | 15.00 | 15.63 | 16.04 | 17.39 |
| 8H              | 4H   | 14.48            | 14.93 | 15.50 | 15.96 | 17.31 | 14.11          | 14.56 | 15.13 | 15.59 | 16.94 |
|                 | 6H   | 15.12            | 15.49 | 16.16 | 16.56 | 17.90 | 14.74          | 15.11 | 15.78 | 16.18 | 17.53 |
|                 | 8H   | 15.34            | 15.67 | 16.39 | 16.72 | 18.09 | 14.96          | 15.28 | 16.01 | 16.34 | 17.70 |
|                 | 12H  | 15.48            | 15.76 | 16.53 | 16.81 | 18.22 | 15.07          | 15.36 | 16.13 | 16.41 | 17.82 |
| 12H             | 4H   | 14.47            | 14.88 | 15.51 | 15.91 | 17.27 | 14.11          | 14.51 | 15.14 | 15.55 | 16.91 |
|                 | 6H   | 15.15            | 15.48 | 16.20 | 16.53 | 17.89 | 14.78          | 15.11 | 15.83 | 16.16 | 17.53 |
|                 | 8H   | 15.39            | 15.68 | 16.45 | 16.73 | 18.14 | 15.02          | 15.31 | 16.07 | 16.35 | 17.76 |