

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: P927191

Luminaire Tested: DFN2DIP-HX4F0-120D120US830-FLLFLL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P927191  
REPORT IS A COMBINATION OF REPORTS P899459 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-120D120US830-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

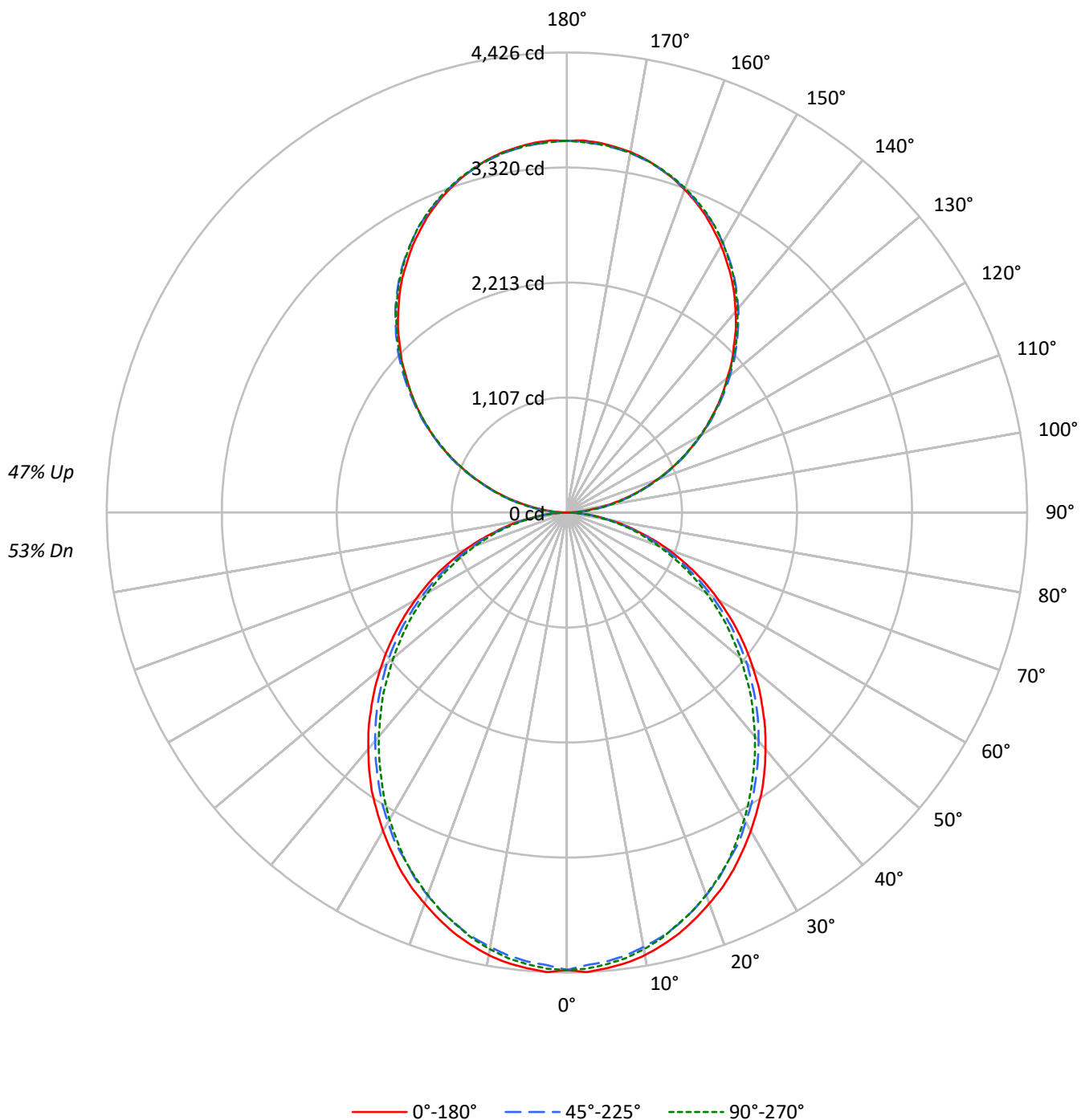
Lumens per Lamp: N/A  
Luminaire Lumens: 21206.2 lumens  
Efficiency: N/A  
Efficacy: 95.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 222.1  
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

TEST NUMBER: P927191

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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   | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 71 | 71 | 71 | 59 | 59 | 59 |
| 1   | 98  | 94  | 90  | 87  | 91  | 87  | 84  | 81  | 74 | 72 | 70 | 63 | 61 | 59 | 52 | 51 | 50 |
| 2   | 90  | 82  | 76  | 71  | 83  | 76  | 71  | 66  | 65 | 61 | 58 | 55 | 52 | 50 | 46 | 44 | 42 |
| 3   | 82  | 72  | 65  | 59  | 75  | 67  | 61  | 55  | 58 | 53 | 49 | 49 | 45 | 42 | 41 | 38 | 36 |
| 4   | 75  | 64  | 56  | 50  | 69  | 60  | 52  | 47  | 51 | 46 | 41 | 43 | 39 | 36 | 36 | 33 | 31 |
| 5   | 69  | 57  | 49  | 43  | 63  | 53  | 46  | 40  | 46 | 40 | 36 | 39 | 35 | 31 | 33 | 29 | 27 |
| 6   | 63  | 51  | 43  | 37  | 58  | 48  | 40  | 35  | 41 | 36 | 31 | 35 | 31 | 27 | 30 | 26 | 24 |
| 7   | 59  | 46  | 38  | 33  | 54  | 43  | 36  | 31  | 37 | 32 | 28 | 32 | 28 | 24 | 27 | 24 | 21 |
| 8   | 54  | 42  | 34  | 29  | 50  | 39  | 32  | 27  | 34 | 29 | 24 | 29 | 25 | 22 | 25 | 21 | 19 |
| 9   | 51  | 38  | 31  | 26  | 47  | 36  | 29  | 24  | 31 | 26 | 22 | 27 | 23 | 19 | 23 | 20 | 17 |
| 10  | 47  | 35  | 28  | 23  | 44  | 33  | 26  | 22  | 29 | 23 | 20 | 25 | 21 | 18 | 21 | 18 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3272 | 3272 | 3272 |
| 5°  | 3278 | 3227 | 3249 |
| 10° | 3251 | 3184 | 3205 |
| 15° | 3204 | 3132 | 3136 |
| 20° | 3140 | 3059 | 3066 |
| 25° | 3076 | 2972 | 2985 |
| 30° | 2995 | 2892 | 2882 |
| 35° | 2919 | 2796 | 2772 |
| 40° | 2826 | 2700 | 2668 |
| 45° | 2732 | 2604 | 2562 |
| 50° | 2630 | 2503 | 2439 |
| 55° | 2523 | 2386 | 2326 |
| 60° | 2403 | 2247 | 2196 |
| 65° | 2271 | 2103 | 2043 |
| 70° | 2104 | 1928 | 1879 |
| 75° | 1871 | 1718 | 1727 |
| 80° | 1592 | 1451 | 1437 |
| 85° | 1155 | 988  | 956  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2732 cd/sqm

TEST NUMBER: P927191

CATALOG NUMBER: DFN2DIP-HX4F0-120D120US830-FLLFLL

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 414.2   | 2.0       |
| 10°-20°   | 1165.4  | 5.5       |
| 20°-30°   | 1712.7  | 8.1       |
| 30°-40°   | 1989.2  | 9.4       |
| 40°-50°   | 1986.7  | 9.4       |
| 50°-60°   | 1732.3  | 8.2       |
| 60°-70°   | 1280.6  | 6.0       |
| 70°-80°   | 724.5   | 3.4       |
| 80°-90°   | 201.4   | 0.9       |
| 90°-100°  | 221.3   | 1.0       |
| 100°-110° | 703.3   | 3.3       |
| 110°-120° | 1203.5  | 5.7       |
| 120°-130° | 1582.8  | 7.5       |
| 130°-140° | 1776.6  | 8.4       |
| 140°-150° | 1742.2  | 8.2       |
| 150°-160° | 1461.5  | 6.9       |
| 160°-170° | 969.2   | 4.6       |
| 170°-180° | 338.8   | 1.6       |
| 0°-30°    | 3292.3  | 15.5      |
| 0°-40°    | 5281.5  | 24.9      |
| 0°-60°    | 9000.5  | 42.4      |
| 0°-90°    | 11207.1 | 52.8      |
| 90°-120°  | 2128.1  | 10.0      |
| 90°-150°  | 7229.8  | 34.1      |
| 90°-180°  | 9999.0  | 47.2      |
| 0°-180°   | 21206.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4401 | 4401  | 4401 | 4401  | 4401 |      |
| 5°   | 4401 | 4384  | 4338 | 4371  | 4363 | 418  |
| 15°  | 4189 | 4164  | 4109 | 4126  | 4105 | 1180 |
| 25°  | 3792 | 3758  | 3686 | 3694  | 3686 | 1745 |
| 35°  | 3271 | 3229  | 3161 | 3136  | 3114 | 2043 |
| 45°  | 2662 | 2632  | 2568 | 2522  | 2505 | 2054 |
| 55°  | 2014 | 1989  | 1938 | 1888  | 1866 | 1801 |
| 65°  | 1359 | 1333  | 1291 | 1253  | 1232 | 1343 |
| 75°  | 711  | 703   | 681  | 656   | 664  | 759  |
| 85°  | 173  | 169   | 165  | 152   | 148  | 193  |
| 90°  | 3    | 39    | 106  | 99    | 102  | 20   |
| 95°  | 157  | 188   | 193  | 193   | 188  | 175  |
| 105° | 649  | 658   | 664  | 670   | 670  | 685  |
| 115° | 1208 | 1225  | 1220 | 1216  | 1208 | 1195 |
| 125° | 1757 | 1784  | 1775 | 1765  | 1762 | 1570 |
| 135° | 2272 | 2306  | 2312 | 2309  | 2300 | 1756 |
| 145° | 2758 | 2780  | 2797 | 2800  | 2789 | 1724 |
| 155° | 3154 | 3163  | 3172 | 3188  | 3178 | 1452 |
| 165° | 3431 | 3428  | 3428 | 3450  | 3435 | 968  |
| 175° | 3570 | 3562  | 3555 | 3577  | 3559 | 339  |
| 180° | 3577 | 3577  | 3577 | 3577  | 3577 |      |

TEST NUMBER: P927191

CATALOG NUMBER: DFN2DIP-HX4F0-120D120US830-FLLFLL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4400.8 | 4400.8 | 4400.8 | 4400.8 | 4400.8 |
| 2.5°   | 4426.4 | 4405.2 | 4358.6 | 4400.8 | 4392.7 |
| 5°     | 4400.8 | 4384.1 | 4337.5 | 4371.1 | 4363.0 |
| 7.5°   | 4371.1 | 4346.0 | 4299.3 | 4333.4 | 4324.9 |
| 10°    | 4324.9 | 4295.3 | 4244.5 | 4278.2 | 4265.7 |
| 12.5°  | 4261.1 | 4236.0 | 4185.3 | 4206.4 | 4197.8 |
| 15°    | 4189.3 | 4164.2 | 4108.9 | 4126.0 | 4104.9 |
| 17.5°  | 4100.4 | 4075.3 | 4020.0 | 4041.2 | 4020.0 |
| 20°    | 4003.0 | 3977.8 | 3918.6 | 3931.2 | 3914.6 |
| 22.5°  | 3906.0 | 3867.8 | 3812.6 | 3812.6 | 3804.1 |
| 25°    | 3791.5 | 3757.8 | 3686.0 | 3694.1 | 3686.0 |
| 27.5°  | 3664.4 | 3634.8 | 3580.1 | 3567.5 | 3546.4 |
| 30°    | 3537.9 | 3503.7 | 3440.4 | 3427.9 | 3410.8 |
| 32.5°  | 3402.2 | 3377.2 | 3309.3 | 3283.8 | 3266.7 |
| 35°    | 3271.1 | 3229.0 | 3161.1 | 3135.6 | 3114.5 |
| 37.5°  | 3123.0 | 3084.9 | 3017.0 | 2987.4 | 2966.3 |
| 40°    | 2970.9 | 2936.7 | 2868.9 | 2831.2 | 2814.1 |
| 42.5°  | 2822.7 | 2788.6 | 2721.2 | 2678.6 | 2653.4 |
| 45°    | 2661.9 | 2632.3 | 2568.5 | 2522.3 | 2505.3 |
| 47.5°  | 2505.3 | 2475.6 | 2407.8 | 2361.2 | 2336.0 |
| 50°    | 2340.0 | 2318.9 | 2259.6 | 2200.4 | 2179.2 |
| 52.5°  | 2179.2 | 2149.7 | 2094.9 | 2048.1 | 2018.6 |
| 55°    | 2014.5 | 1989.0 | 1938.2 | 1887.5 | 1866.3 |
| 57.5°  | 1849.3 | 1828.2 | 1772.9 | 1722.2 | 1705.2 |
| 60°    | 1684.1 | 1667.5 | 1608.2 | 1561.5 | 1548.9 |
| 62.5°  | 1523.4 | 1493.7 | 1451.5 | 1409.3 | 1392.3 |
| 65°    | 1358.6 | 1333.0 | 1290.8 | 1252.6 | 1231.6 |
| 67.5°  | 1189.3 | 1167.8 | 1130.1 | 1100.5 | 1083.4 |
| 70°    | 1032.6 | 1015.5 | 977.4  | 947.8  | 931.2  |
| 72.5°  | 871.9  | 854.8  | 833.7  | 804.1  | 791.5  |
| 75°    | 710.7  | 702.6  | 681.1  | 656.0  | 664.5  |
| 77.5°  | 567.0  | 549.9  | 541.5  | 528.8  | 516.3  |
| 80°    | 423.4  | 418.8  | 410.4  | 397.8  | 389.3  |
| 82.5°  | 287.7  | 287.7  | 283.8  | 266.7  | 266.7  |
| 85°    | 173.3  | 169.3  | 165.2  | 152.2  | 148.2  |
| 87.5°  | 76.3   | 67.8   | 59.3   | 46.7   | 42.2   |
| 90°    | 3.2    | 38.8   | 105.7  | 99.2   | 102.4  |
| 92.5°  | 66.8   | 90.6   | 93.8   | 97.1   | 97.1   |
| 95°    | 157.4  | 187.7  | 193.0  | 193.0  | 187.7  |
| 97.5°  | 262.0  | 290.1  | 302.0  | 302.0  | 302.0  |
| 100°   | 382.8  | 407.6  | 416.2  | 416.2  | 413.0  |
| 102.5° | 510.1  | 528.4  | 540.2  | 543.5  | 540.2  |
| 105°   | 649.2  | 657.8  | 664.3  | 669.6  | 669.6  |
| 107.5° | 787.2  | 800.2  | 800.2  | 802.3  | 787.2  |
| 110°   | 920.9  | 938.2  | 938.2  | 938.2  | 929.6  |

TEST NUMBER: P927191

CATALOG NUMBER: DFN2DIP-HX4F0-120D120US830-FLLFLL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1065.4 | 1083.8 | 1080.5 | 1071.9 | 1065.4 |
| 115°   | 1207.7 | 1225.1 | 1219.6 | 1216.4 | 1207.7 |
| 117.5° | 1349.0 | 1372.8 | 1357.7 | 1349.0 | 1340.4 |
| 120°   | 1491.4 | 1515.1 | 1491.4 | 1491.4 | 1481.7 |
| 122.5° | 1620.8 | 1651.0 | 1635.9 | 1627.2 | 1620.8 |
| 125°   | 1756.6 | 1783.6 | 1775.0 | 1765.3 | 1762.0 |
| 127.5° | 1889.3 | 1922.7 | 1910.8 | 1897.9 | 1889.3 |
| 130°   | 2013.3 | 2052.1 | 2046.7 | 2040.2 | 2028.4 |
| 132.5° | 2152.4 | 2182.6 | 2184.7 | 2169.6 | 2161.1 |
| 135°   | 2272.1 | 2305.5 | 2312.0 | 2308.7 | 2300.2 |
| 137.5° | 2405.8 | 2432.8 | 2438.2 | 2436.0 | 2423.1 |
| 140°   | 2523.4 | 2550.3 | 2565.4 | 2565.4 | 2553.5 |
| 142.5° | 2644.2 | 2671.1 | 2679.7 | 2682.9 | 2671.1 |
| 145°   | 2758.4 | 2780.0 | 2797.2 | 2800.5 | 2788.7 |
| 147.5° | 2860.9 | 2887.8 | 2900.8 | 2906.2 | 2894.3 |
| 150°   | 2966.6 | 2984.9 | 2996.8 | 3006.5 | 2996.8 |
| 152.5° | 3060.4 | 3078.7 | 3093.9 | 3105.7 | 3093.9 |
| 155°   | 3154.2 | 3162.8 | 3172.5 | 3187.6 | 3177.9 |
| 157.5° | 3235.1 | 3241.5 | 3246.9 | 3268.5 | 3253.4 |
| 160°   | 3307.3 | 3313.8 | 3317.0 | 3335.4 | 3322.4 |
| 162.5° | 3374.2 | 3374.2 | 3377.4 | 3397.9 | 3382.8 |
| 165°   | 3431.4 | 3428.2 | 3428.2 | 3449.6 | 3434.6 |
| 167.5° | 3483.1 | 3473.4 | 3473.4 | 3495.0 | 3479.9 |
| 170°   | 3521.9 | 3513.3 | 3510.1 | 3531.6 | 3513.3 |
| 172.5° | 3548.9 | 3540.2 | 3537.0 | 3558.6 | 3540.2 |
| 175°   | 3570.5 | 3561.8 | 3555.4 | 3576.9 | 3558.6 |
| 177.5° | 3582.3 | 3573.7 | 3567.2 | 3585.6 | 3567.2 |
| 180°   | 3576.9 | 3576.9 | 3576.9 | 3576.9 | 3576.9 |

TEST NUMBER: P927191

CATALOG NUMBER: DFN2DIP-HX4F0-120D120US830-FLLFLL

**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            | 12.54 | 12.58 | 13.49 | 14.72 | 11.22          | 12.11 | 12.15 | 13.06 | 14.29 |
|                 | 3H   | 13.31            | 14.11 | 14.26 | 15.07 | 16.32 | 12.84          | 13.64 | 13.78 | 14.60 | 15.85 |
|                 | 4H   | 13.90            | 14.66 | 14.86 | 15.62 | 16.88 | 13.43          | 14.18 | 14.39 | 15.15 | 16.41 |
|                 | 6H   | 14.30            | 15.00 | 15.27 | 15.97 | 17.24 | 13.83          | 14.52 | 14.80 | 15.49 | 16.77 |
|                 | 8H   | 14.41            | 15.07 | 15.39 | 16.06 | 17.33 | 13.94          | 14.60 | 14.91 | 15.58 | 16.85 |
|                 | 12H  | 14.46            | 15.09 | 15.44 | 16.07 | 17.37 | 13.98          | 14.61 | 14.96 | 15.59 | 16.89 |
| 4H              | 2H   | 12.12            | 12.87 | 13.08 | 13.83 | 15.09 | 11.77          | 12.52 | 12.73 | 13.49 | 14.75 |
|                 | 3H   | 13.98            | 14.61 | 14.96 | 15.61 | 16.88 | 13.59          | 14.22 | 14.57 | 15.21 | 16.49 |
|                 | 4H   | 14.70            | 15.28 | 15.68 | 16.26 | 17.56 | 14.30          | 14.87 | 15.28 | 15.86 | 17.16 |
|                 | 6H   | 15.22            | 15.71 | 16.21 | 16.72 | 18.02 | 14.81          | 15.30 | 15.80 | 16.31 | 17.61 |
|                 | 8H   | 15.37            | 15.83 | 16.37 | 16.84 | 18.15 | 14.96          | 15.42 | 15.95 | 16.42 | 17.74 |
|                 | 12H  | 15.44            | 15.86 | 16.46 | 16.88 | 18.20 | 15.02          | 15.44 | 16.04 | 16.46 | 17.78 |
| 8H              | 4H   | 14.90            | 15.36 | 15.90 | 16.37 | 17.68 | 14.54          | 15.00 | 15.54 | 16.01 | 17.32 |
|                 | 6H   | 15.53            | 15.92 | 16.56 | 16.96 | 18.27 | 15.17          | 15.55 | 16.19 | 16.60 | 17.91 |
|                 | 8H   | 15.76            | 16.09 | 16.79 | 17.13 | 18.45 | 15.39          | 15.72 | 16.42 | 16.76 | 18.09 |
|                 | 12H  | 15.89            | 16.19 | 16.92 | 17.21 | 18.59 | 15.50          | 15.80 | 16.54 | 16.83 | 18.20 |
| 12H             | 4H   | 14.89            | 15.31 | 15.90 | 16.32 | 17.64 | 14.54          | 14.95 | 15.55 | 15.97 | 17.29 |
|                 | 6H   | 15.56            | 15.90 | 16.59 | 16.93 | 18.26 | 15.21          | 15.55 | 16.24 | 16.58 | 17.91 |
|                 | 8H   | 15.81            | 16.11 | 16.84 | 17.13 | 18.51 | 15.45          | 15.75 | 16.48 | 16.77 | 18.15 |