

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: P927788

Luminaire Tested: DFN2DIP-HX4F0-110D080US840-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P927788  
REPORT IS A COMBINATION OF REPORTS P900905 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-110D080US840-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

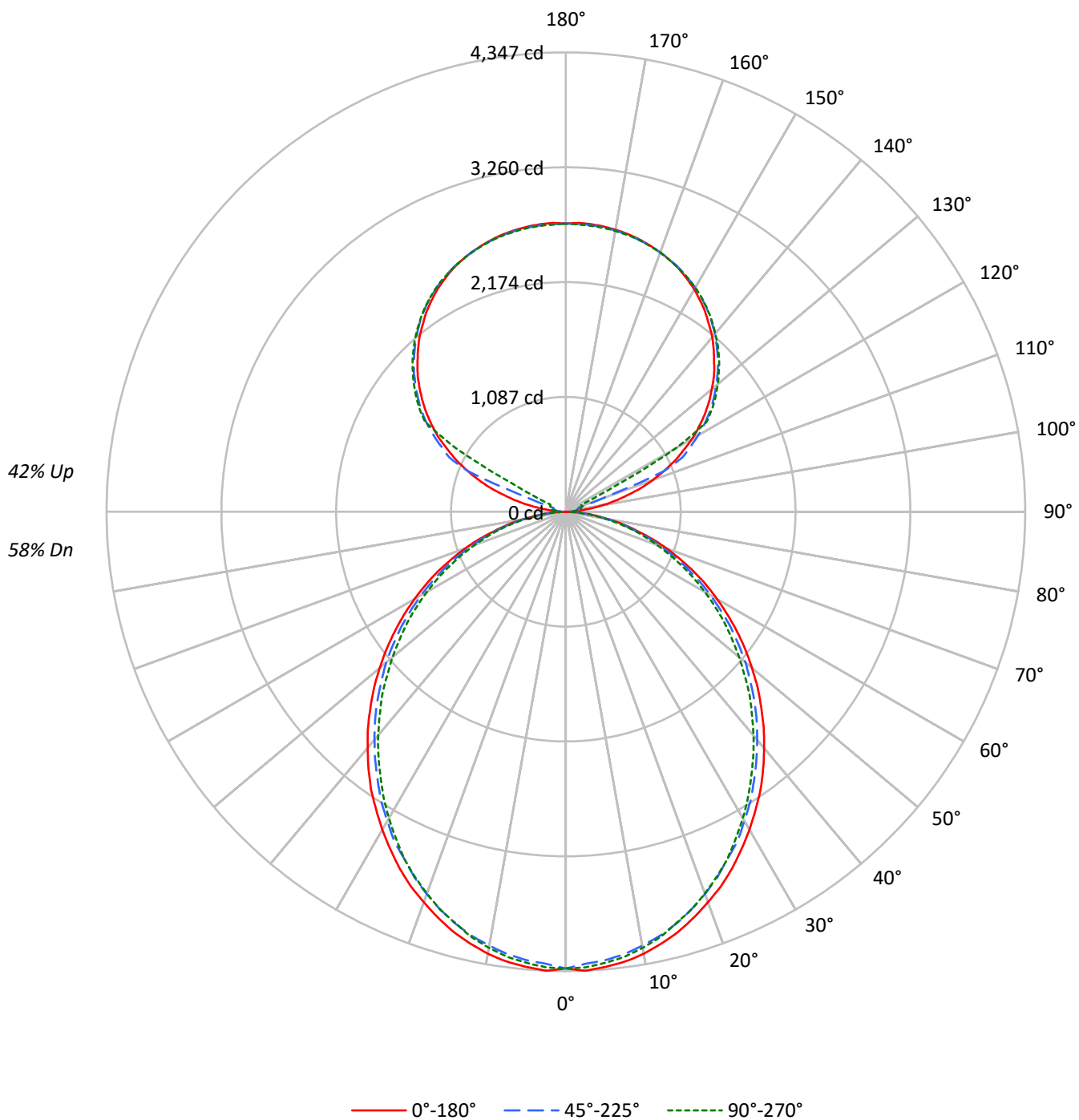
Lumens per Lamp: N/A  
Luminaire Lumens: 18994.3 lumens  
Efficiency: N/A  
Efficacy: 111.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 170.6  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9967  
Total Harmonic Distortion (THDi): 0.063  
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 | 102 | 102 | 102 | 102 | 88 | 88 | 88 | 75 | 75 | 75 | 63 | 63 | 63 |
| 1   | 100 | 95  | 91  | 88  | 93  | 89  | 85  | 82  | 77 | 74 | 72 | 66 | 64 | 63 | 56 | 55 | 54 |
| 2   | 91  | 83  | 77  | 72  | 84  | 78  | 72  | 68  | 67 | 63 | 60 | 58 | 55 | 52 | 49 | 47 | 45 |
| 3   | 83  | 73  | 66  | 60  | 77  | 68  | 62  | 57  | 60 | 54 | 50 | 51 | 47 | 44 | 44 | 41 | 38 |
| 4   | 76  | 65  | 57  | 51  | 70  | 61  | 54  | 48  | 53 | 47 | 43 | 46 | 41 | 38 | 39 | 36 | 33 |
| 5   | 70  | 58  | 50  | 43  | 65  | 54  | 47  | 41  | 47 | 42 | 37 | 41 | 37 | 33 | 35 | 32 | 29 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 41  | 36  | 43 | 37 | 32 | 37 | 32 | 29 | 32 | 28 | 25 |
| 7   | 59  | 47  | 39  | 33  | 55  | 44  | 37  | 32  | 39 | 33 | 29 | 34 | 29 | 26 | 29 | 26 | 23 |
| 8   | 55  | 43  | 35  | 29  | 51  | 40  | 33  | 28  | 35 | 30 | 25 | 31 | 26 | 23 | 27 | 23 | 20 |
| 9   | 51  | 39  | 31  | 26  | 48  | 37  | 30  | 25  | 33 | 27 | 23 | 29 | 24 | 21 | 25 | 21 | 18 |
| 10  | 48  | 36  | 28  | 24  | 45  | 34  | 27  | 23  | 30 | 24 | 21 | 26 | 22 | 19 | 23 | 19 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3214 | 3214 | 3214 |
| 5°  | 3219 | 3169 | 3191 |
| 10° | 3193 | 3127 | 3147 |
| 15° | 3147 | 3076 | 3080 |
| 20° | 3083 | 3005 | 3011 |
| 25° | 3021 | 2919 | 2931 |
| 30° | 2942 | 2840 | 2830 |
| 35° | 2867 | 2746 | 2723 |
| 40° | 2775 | 2652 | 2621 |
| 45° | 2684 | 2557 | 2516 |
| 50° | 2583 | 2458 | 2395 |
| 55° | 2478 | 2343 | 2284 |
| 60° | 2360 | 2206 | 2157 |
| 65° | 2230 | 2065 | 2006 |
| 70° | 2066 | 1893 | 1845 |
| 75° | 1838 | 1687 | 1696 |
| 80° | 1564 | 1425 | 1411 |
| 85° | 1135 | 971  | 938  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2684 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 406.8   | 2.1       |
| 10°-20°   | 1144.6  | 6.0       |
| 20°-30°   | 1682.1  | 8.9       |
| 30°-40°   | 1953.6  | 10.3      |
| 40°-50°   | 1951.2  | 10.3      |
| 50°-60°   | 1701.4  | 9.0       |
| 60°-70°   | 1257.7  | 6.6       |
| 70°-80°   | 711.6   | 3.7       |
| 80°-90°   | 192.6   | 1.0       |
| 90°-100°  | 89.9    | 0.5       |
| 100°-110° | 335.1   | 1.8       |
| 110°-120° | 888.8   | 4.7       |
| 120°-130° | 1474.2  | 7.8       |
| 130°-140° | 1565.9  | 8.2       |
| 140°-150° | 1455.3  | 7.7       |
| 150°-160° | 1170.1  | 6.2       |
| 160°-170° | 754.0   | 4.0       |
| 170°-180° | 259.5   | 1.4       |
| 0°-30°    | 3233.4  | 17.0      |
| 0°-40°    | 5187.0  | 27.3      |
| 0°-60°    | 8839.6  | 46.5      |
| 0°-90°    | 11001.5 | 57.9      |
| 90°-120°  | 1313.9  | 6.9       |
| 90°-150°  | 5809.3  | 30.6      |
| 90°-180°  | 7993.0  | 42.1      |
| 0°-180°   | 18994.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4322 | 4322  | 4322 | 4322  | 4322 |      |
| 5°   | 4322 | 4306  | 4260 | 4293  | 4285 | 410  |
| 15°  | 4114 | 4090  | 4036 | 4052  | 4032 | 1159 |
| 25°  | 3724 | 3691  | 3620 | 3628  | 3620 | 1713 |
| 35°  | 3213 | 3171  | 3105 | 3080  | 3059 | 2006 |
| 45°  | 2614 | 2585  | 2523 | 2477  | 2460 | 2018 |
| 55°  | 1978 | 1953  | 1904 | 1854  | 1833 | 1769 |
| 65°  | 1334 | 1309  | 1268 | 1230  | 1210 | 1319 |
| 75°  | 698  | 690   | 669  | 644   | 653  | 745  |
| 85°  | 170  | 166   | 162  | 150   | 146  | 190  |
| 90°  | 2    | 24    | 39   | 49    | 53   | 18   |
| 95°  | 128  | 63    | 77   | 87    | 85   | 152  |
| 105° | 600  | 659   | 120  | 142   | 150  | 641  |
| 115° | 1134 | 1168  | 1217 | 304   | 162  | 1117 |
| 125° | 1604 | 1630  | 1667 | 1681  | 1687 | 1430 |
| 135° | 1985 | 2016  | 2034 | 2054  | 2050 | 1533 |
| 145° | 2302 | 2300  | 2334 | 2348  | 2338 | 1440 |
| 155° | 2535 | 2517  | 2541 | 2553  | 2537 | 1168 |
| 165° | 2671 | 2659  | 2665 | 2679  | 2665 | 755  |
| 175° | 2732 | 2718  | 2722 | 2736  | 2717 | 260  |
| 180° | 2726 | 2726  | 2726 | 2726  | 2726 |      |



TEST NUMBER: P927788

CATALOG NUMBER: DFN2DIP-HX4F0-110D080US840-FLONL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4322.1 | 4322.1 | 4322.1 | 4322.1 | 4322.1 |
| 2.5°   | 4347.2 | 4326.5 | 4280.6 | 4322.1 | 4314.2 |
| 5°     | 4322.1 | 4305.8 | 4259.9 | 4293.0 | 4285.1 |
| 7.5°   | 4293.0 | 4268.3 | 4222.5 | 4256.0 | 4247.6 |
| 10°    | 4247.6 | 4218.4 | 4168.7 | 4201.7 | 4189.4 |
| 12.5°  | 4185.0 | 4160.3 | 4110.5 | 4131.2 | 4122.8 |
| 15°    | 4114.4 | 4089.7 | 4035.5 | 4052.2 | 4031.5 |
| 17.5°  | 4027.1 | 4002.4 | 3948.2 | 3968.9 | 3948.2 |
| 20°    | 3931.5 | 3906.7 | 3848.5 | 3860.9 | 3844.6 |
| 22.5°  | 3836.2 | 3798.7 | 3744.4 | 3744.4 | 3736.1 |
| 25°    | 3723.7 | 3690.7 | 3620.1 | 3628.1 | 3620.1 |
| 27.5°  | 3598.9 | 3569.8 | 3516.0 | 3503.7 | 3483.0 |
| 30°    | 3474.6 | 3441.1 | 3378.9 | 3366.6 | 3349.8 |
| 32.5°  | 3341.4 | 3316.8 | 3250.1 | 3225.0 | 3208.2 |
| 35°    | 3212.7 | 3171.3 | 3104.6 | 3079.5 | 3058.8 |
| 37.5°  | 3067.2 | 3029.7 | 2963.2 | 2934.0 | 2913.3 |
| 40°    | 2917.7 | 2884.2 | 2817.6 | 2780.6 | 2763.8 |
| 42.5°  | 2772.2 | 2738.7 | 2672.5 | 2630.6 | 2606.0 |
| 45°    | 2614.4 | 2585.2 | 2522.6 | 2477.2 | 2460.5 |
| 47.5°  | 2460.5 | 2431.4 | 2364.7 | 2318.9 | 2294.2 |
| 50°    | 2298.2 | 2277.5 | 2219.2 | 2161.1 | 2140.4 |
| 52.5°  | 2140.4 | 2111.2 | 2057.5 | 2011.5 | 1982.4 |
| 55°    | 1978.5 | 1953.4 | 1903.6 | 1853.7 | 1833.0 |
| 57.5°  | 1816.2 | 1795.5 | 1741.3 | 1691.4 | 1674.7 |
| 60°    | 1654.0 | 1637.7 | 1579.4 | 1533.6 | 1521.3 |
| 62.5°  | 1496.1 | 1467.0 | 1425.5 | 1384.1 | 1367.4 |
| 65°    | 1334.2 | 1309.1 | 1267.7 | 1230.2 | 1209.5 |
| 67.5°  | 1168.0 | 1146.9 | 1109.9 | 1080.8 | 1064.0 |
| 70°    | 1014.1 | 997.4  | 959.9  | 930.8  | 914.5  |
| 72.5°  | 856.3  | 839.5  | 818.8  | 789.8  | 777.3  |
| 75°    | 698.0  | 690.1  | 668.9  | 644.3  | 652.6  |
| 77.5°  | 556.9  | 540.1  | 531.8  | 519.4  | 507.1  |
| 80°    | 415.8  | 411.4  | 403.0  | 390.7  | 382.3  |
| 82.5°  | 282.6  | 282.6  | 278.7  | 261.9  | 261.9  |
| 85°    | 170.3  | 166.2  | 162.3  | 149.5  | 145.5  |
| 87.5°  | 74.9   | 66.5   | 58.2   | 45.8   | 41.4   |
| 90°    | 1.9    | 23.6   | 39.4   | 49.4   | 53.2   |
| 92.5°  | 49.4   | 41.5   | 47.4   | 51.3   | 53.2   |
| 95°    | 128.1  | 63.0   | 76.8   | 86.9   | 84.8   |
| 97.5°  | 230.7  | 69.1   | 100.5  | 106.6  | 108.5  |
| 100°   | 349.3  | 79.0   | 112.5  | 128.1  | 132.1  |
| 102.5° | 479.4  | 475.5  | 116.4  | 137.9  | 144.1  |
| 105°   | 599.7  | 659.0  | 120.4  | 142.0  | 150.0  |
| 107.5° | 739.8  | 789.0  | 124.4  | 145.9  | 153.9  |
| 110°   | 874.1  | 915.3  | 345.4  | 148.0  | 155.8  |

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CATALOG NUMBER: DFN2DIP-HX4F0-110D080US840-FLLONL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1000.3 | 1035.7 | 1002.2 | 151.8  | 157.9  |
| 115°   | 1134.3 | 1167.8 | 1217.2 | 303.8  | 161.9  |
| 117.5° | 1250.7 | 1290.1 | 1323.8 | 1041.5 | 524.8  |
| 120°   | 1381.0 | 1410.5 | 1446.1 | 1469.8 | 1203.4 |
| 122.5° | 1491.3 | 1523.0 | 1562.6 | 1574.3 | 1576.4 |
| 125°   | 1603.8 | 1629.5 | 1667.0 | 1680.8 | 1686.7 |
| 127.5° | 1706.4 | 1734.0 | 1763.8 | 1783.4 | 1785.3 |
| 130°   | 1803.1 | 1834.7 | 1856.3 | 1878.1 | 1876.2 |
| 132.5° | 1901.8 | 1927.5 | 1949.1 | 1966.9 | 1965.0 |
| 135°   | 1984.7 | 2016.3 | 2033.8 | 2053.8 | 2049.8 |
| 137.5° | 2071.4 | 2095.0 | 2114.9 | 2134.6 | 2128.8 |
| 140°   | 2156.1 | 2172.1 | 2193.7 | 2211.5 | 2201.6 |
| 142.5° | 2227.4 | 2241.2 | 2266.7 | 2282.5 | 2272.6 |
| 145°   | 2302.3 | 2300.2 | 2333.7 | 2347.6 | 2337.7 |
| 147.5° | 2367.3 | 2361.4 | 2394.8 | 2404.7 | 2397.0 |
| 150°   | 2430.5 | 2416.7 | 2448.3 | 2460.0 | 2450.2 |
| 152.5° | 2483.7 | 2468.0 | 2497.4 | 2509.5 | 2495.6 |
| 155°   | 2535.0 | 2517.4 | 2541.1 | 2552.8 | 2537.1 |
| 157.5° | 2576.4 | 2560.8 | 2578.5 | 2592.4 | 2576.4 |
| 160°   | 2612.0 | 2600.1 | 2612.0 | 2623.8 | 2609.9 |
| 162.5° | 2643.5 | 2631.7 | 2641.5 | 2655.4 | 2637.6 |
| 165°   | 2671.1 | 2659.4 | 2665.3 | 2679.0 | 2665.3 |
| 167.5° | 2692.8 | 2680.9 | 2687.0 | 2700.8 | 2683.0 |
| 170°   | 2710.7 | 2698.7 | 2702.7 | 2716.6 | 2698.7 |
| 172.5° | 2722.4 | 2710.7 | 2714.6 | 2728.5 | 2710.7 |
| 175°   | 2732.2 | 2718.4 | 2722.4 | 2736.2 | 2716.6 |
| 177.5° | 2736.2 | 2722.4 | 2724.4 | 2738.3 | 2720.5 |
| 180°   | 2726.4 | 2726.4 | 2726.4 | 2726.4 | 2726.4 |

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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 | 12.03            | 12.97 | 12.92 | 13.87 | 15.03 | 11.60          | 12.53 | 12.48 | 13.44 | 14.59 |
|                 | 3H   | 13.70            | 14.54 | 14.59 | 15.45 | 16.63 | 13.22          | 14.06 | 14.12 | 14.98 | 16.16 |
|                 | 4H   | 14.29            | 15.08 | 15.20 | 16.00 | 17.19 | 13.81          | 14.61 | 14.73 | 15.53 | 16.72 |
|                 | 6H   | 14.69            | 15.43 | 15.62 | 16.35 | 17.56 | 14.22          | 14.95 | 15.14 | 15.88 | 17.08 |
|                 | 8H   | 14.80            | 15.50 | 15.73 | 16.44 | 17.64 | 14.32          | 15.02 | 15.26 | 15.97 | 17.17 |
|                 | 12H  | 14.85            | 15.52 | 15.79 | 16.46 | 17.68 | 14.37          | 15.03 | 15.31 | 15.97 | 17.20 |
| 4H              | 2H   | 12.50            | 13.30 | 13.42 | 14.22 | 15.41 | 12.16          | 12.95 | 13.07 | 13.87 | 15.06 |
|                 | 3H   | 14.37            | 15.04 | 15.30 | 15.99 | 17.19 | 13.98          | 14.65 | 14.91 | 15.60 | 16.80 |
|                 | 4H   | 15.09            | 15.70 | 16.03 | 16.65 | 17.87 | 14.69          | 15.29 | 15.63 | 16.24 | 17.47 |
|                 | 6H   | 15.61            | 16.14 | 16.57 | 17.11 | 18.34 | 15.20          | 15.73 | 16.16 | 16.70 | 17.93 |
|                 | 8H   | 15.77            | 16.25 | 16.72 | 17.22 | 18.46 | 15.35          | 15.84 | 16.31 | 16.81 | 18.05 |
|                 | 12H  | 15.84            | 16.28 | 16.82 | 17.27 | 18.51 | 15.42          | 15.86 | 16.40 | 16.84 | 18.09 |
| 8H              | 4H   | 15.30            | 15.79 | 16.25 | 16.75 | 17.99 | 14.94          | 15.42 | 15.89 | 16.39 | 17.63 |
|                 | 6H   | 15.93            | 16.34 | 16.91 | 17.34 | 18.58 | 15.57          | 15.97 | 16.55 | 16.98 | 18.22 |
|                 | 8H   | 16.15            | 16.51 | 17.14 | 17.51 | 18.77 | 15.79          | 16.14 | 16.78 | 17.14 | 18.40 |
|                 | 12H  | 16.29            | 16.61 | 17.28 | 17.59 | 18.90 | 15.91          | 16.22 | 16.90 | 17.21 | 18.51 |
| 12H             | 4H   | 15.29            | 15.73 | 16.26 | 16.71 | 17.96 | 14.93          | 15.37 | 15.91 | 16.36 | 17.60 |
|                 | 6H   | 15.96            | 16.32 | 16.95 | 17.32 | 18.57 | 15.61          | 15.97 | 16.60 | 16.96 | 18.22 |
|                 | 8H   | 16.21            | 16.52 | 17.20 | 17.51 | 18.82 | 15.85          | 16.17 | 16.85 | 17.16 | 18.46 |