

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: P928736

Luminaire Tested: DFN2DIP-HX4F0-100D110US930-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928736  
REPORT IS A COMBINATION OF REPORTS P900957 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-100D110US930-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

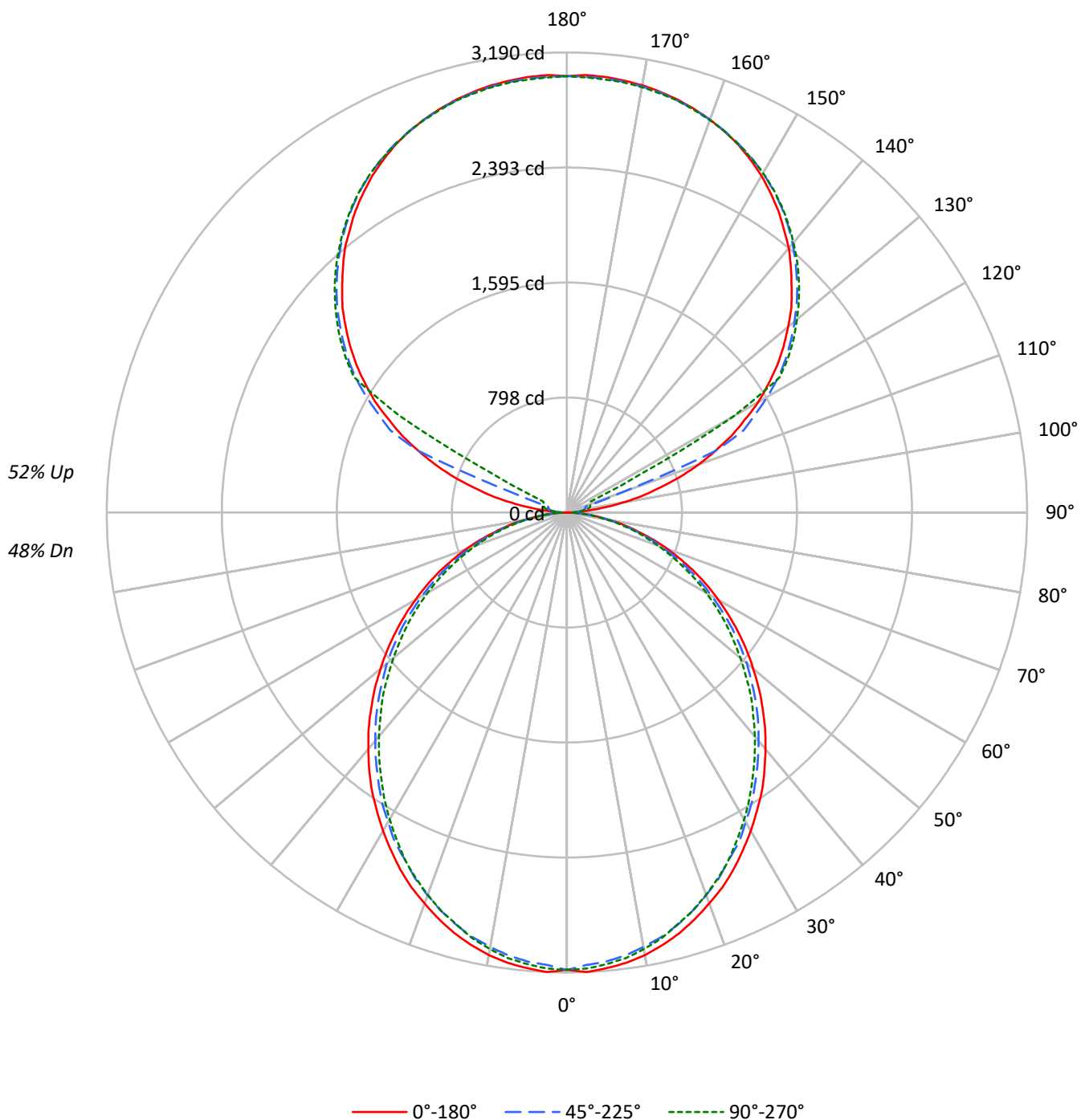
Lumens per Lamp: N/A  
Luminaire Lumens: 16943.8 lumens  
Efficiency: N/A  
Efficacy: 90.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 186.6  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.946  
Total Harmonic Distortion (THDi): 0.132  
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 | 98 | 98 | 98 | 98 | 82 | 82 | 82 | 67 | 67 | 67 | 54 | 54 | 54 |
| 1   | 97  | 93  | 89  | 86  | 89 | 86 | 82 | 79 | 72 | 70 | 67 | 59 | 58 | 56 | 48 | 47 | 46 |
| 2   | 89  | 81  | 75  | 70  | 81 | 75 | 70 | 65 | 63 | 59 | 56 | 52 | 49 | 47 | 42 | 40 | 38 |
| 3   | 81  | 71  | 64  | 58  | 74 | 66 | 60 | 54 | 56 | 51 | 47 | 46 | 43 | 40 | 37 | 35 | 33 |
| 4   | 74  | 63  | 55  | 49  | 68 | 58 | 51 | 46 | 49 | 44 | 40 | 41 | 37 | 34 | 33 | 30 | 28 |
| 5   | 68  | 56  | 48  | 42  | 62 | 52 | 45 | 40 | 44 | 39 | 34 | 37 | 33 | 29 | 30 | 27 | 25 |
| 6   | 62  | 50  | 42  | 37  | 57 | 47 | 40 | 34 | 40 | 34 | 30 | 33 | 29 | 26 | 27 | 24 | 22 |
| 7   | 58  | 46  | 38  | 32  | 53 | 42 | 35 | 30 | 36 | 30 | 26 | 30 | 26 | 23 | 25 | 22 | 19 |
| 8   | 54  | 41  | 34  | 28  | 49 | 38 | 31 | 27 | 33 | 27 | 23 | 28 | 23 | 20 | 23 | 20 | 17 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 28 | 24 | 30 | 25 | 21 | 25 | 21 | 18 | 21 | 18 | 16 |
| 10  | 47  | 35  | 27  | 23  | 43 | 32 | 26 | 21 | 28 | 23 | 19 | 24 | 19 | 17 | 20 | 16 | 14 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2358 | 2358 | 2358 |
| 5°  | 2362 | 2325 | 2341 |
| 10° | 2343 | 2294 | 2309 |
| 15° | 2309 | 2257 | 2260 |
| 20° | 2262 | 2204 | 2209 |
| 25° | 2216 | 2142 | 2151 |
| 30° | 2158 | 2084 | 2076 |
| 35° | 2104 | 2015 | 1998 |
| 40° | 2036 | 1946 | 1923 |
| 45° | 1969 | 1876 | 1846 |
| 50° | 1895 | 1803 | 1757 |
| 55° | 1818 | 1719 | 1676 |
| 60° | 1731 | 1619 | 1582 |
| 65° | 1637 | 1516 | 1472 |
| 70° | 1516 | 1389 | 1354 |
| 75° | 1348 | 1238 | 1244 |
| 80° | 1147 | 1045 | 1035 |
| 85° | 833  | 713  | 689  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1969 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 298.5   | 1.8       |
| 10°-20°   | 839.8   | 5.0       |
| 20°-30°   | 1234.2  | 7.3       |
| 30°-40°   | 1433.4  | 8.5       |
| 40°-50°   | 1431.6  | 8.4       |
| 50°-60°   | 1248.3  | 7.4       |
| 60°-70°   | 922.8   | 5.4       |
| 70°-80°   | 522.1   | 3.1       |
| 80°-90°   | 143.1   | 0.8       |
| 90°-100°  | 99.8    | 0.6       |
| 100°-110° | 371.9   | 2.2       |
| 110°-120° | 986.4   | 5.8       |
| 120°-130° | 1636.0  | 9.7       |
| 130°-140° | 1737.8  | 10.3      |
| 140°-150° | 1615.1  | 9.5       |
| 150°-160° | 1298.5  | 7.7       |
| 160°-170° | 836.7   | 4.9       |
| 170°-180° | 288.0   | 1.7       |
| 0°-30°    | 2372.4  | 14.0      |
| 0°-40°    | 3805.8  | 22.5      |
| 0°-60°    | 6485.8  | 38.3      |
| 0°-90°    | 8073.9  | 47.7      |
| 90°-120°  | 1458.0  | 8.6       |
| 90°-150°  | 6446.8  | 38.0      |
| 90°-180°  | 8870.0  | 52.3      |
| 0°-180°   | 16943.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3171 | 3171  | 3171 | 3171  | 3171 |      |
| 5°   | 3171 | 3159  | 3126 | 3150  | 3144 | 301  |
| 15°  | 3019 | 3001  | 2961 | 2973  | 2958 | 850  |
| 25°  | 2732 | 2708  | 2656 | 2662  | 2656 | 1257 |
| 35°  | 2357 | 2327  | 2278 | 2260  | 2244 | 1472 |
| 45°  | 1918 | 1897  | 1851 | 1818  | 1805 | 1480 |
| 55°  | 1452 | 1433  | 1397 | 1360  | 1345 | 1298 |
| 65°  | 979  | 961   | 930  | 903   | 888  | 968  |
| 75°  | 512  | 506   | 491  | 473   | 479  | 547  |
| 85°  | 125  | 122   | 119  | 110   | 107  | 139  |
| 90°  | 2    | 26    | 44   | 55    | 59   | 16   |
| 95°  | 142  | 70    | 85   | 96    | 94   | 168  |
| 105° | 666  | 731   | 134  | 158   | 166  | 711  |
| 115° | 1259 | 1296  | 1351 | 337   | 180  | 1239 |
| 125° | 1780 | 1808  | 1850 | 1865  | 1872 | 1587 |
| 135° | 2202 | 2238  | 2257 | 2279  | 2275 | 1701 |
| 145° | 2555 | 2553  | 2590 | 2605  | 2594 | 1598 |
| 155° | 2813 | 2794  | 2820 | 2833  | 2816 | 1296 |
| 165° | 2964 | 2951  | 2958 | 2973  | 2958 | 837  |
| 175° | 3032 | 3017  | 3021 | 3036  | 3015 | 289  |
| 180° | 3026 | 3026  | 3026 | 3026  | 3026 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3171.2 | 3171.2 | 3171.2 | 3171.2 | 3171.2 |
| 2.5°   | 3189.7 | 3174.4 | 3140.8 | 3171.2 | 3165.4 |
| 5°     | 3171.2 | 3159.3 | 3125.6 | 3149.9 | 3144.0 |
| 7.5°   | 3149.9 | 3131.7 | 3098.1 | 3122.7 | 3116.6 |
| 10°    | 3116.6 | 3095.2 | 3058.6 | 3082.9 | 3073.9 |
| 12.5°  | 3070.6 | 3052.5 | 3015.9 | 3031.1 | 3025.0 |
| 15°    | 3018.8 | 3000.7 | 2960.9 | 2973.2 | 2958.0 |
| 17.5°  | 2954.8 | 2936.7 | 2896.8 | 2912.1 | 2896.8 |
| 20°    | 2884.5 | 2866.4 | 2823.7 | 2832.8 | 2820.8 |
| 22.5°  | 2814.7 | 2787.2 | 2747.4 | 2747.4 | 2741.3 |
| 25°    | 2732.2 | 2707.9 | 2656.2 | 2662.0 | 2656.2 |
| 27.5°  | 2640.6 | 2619.2 | 2579.8 | 2570.8 | 2555.5 |
| 30°    | 2549.4 | 2524.8 | 2479.1 | 2470.1 | 2457.8 |
| 32.5°  | 2451.7 | 2433.6 | 2384.7 | 2366.3 | 2354.0 |
| 35°    | 2357.2 | 2326.8 | 2277.9 | 2259.5 | 2244.3 |
| 37.5°  | 2250.5 | 2222.9 | 2174.1 | 2152.7 | 2137.5 |
| 40°    | 2140.8 | 2116.1 | 2067.3 | 2040.2 | 2027.9 |
| 42.5°  | 2034.0 | 2009.4 | 1960.9 | 1930.2 | 1912.1 |
| 45°    | 1918.2 | 1896.8 | 1850.9 | 1817.5 | 1805.3 |
| 47.5°  | 1805.3 | 1784.0 | 1735.1 | 1701.4 | 1683.3 |
| 50°    | 1686.2 | 1671.0 | 1628.3 | 1585.6 | 1570.4 |
| 52.5°  | 1570.4 | 1549.1 | 1509.5 | 1476.0 | 1454.6 |
| 55°    | 1451.7 | 1433.3 | 1396.7 | 1360.1 | 1344.9 |
| 57.5°  | 1332.6 | 1317.4 | 1277.6 | 1241.1 | 1228.8 |
| 60°    | 1213.5 | 1201.6 | 1158.8 | 1125.2 | 1116.1 |
| 62.5°  | 1097.7 | 1076.4 | 1046.0 | 1015.6 | 1003.3 |
| 65°    | 979.0  | 960.6  | 930.2  | 902.6  | 887.5  |
| 67.5°  | 857.1  | 841.5  | 814.3  | 793.0  | 780.7  |
| 70°    | 744.1  | 731.8  | 704.3  | 683.0  | 671.0  |
| 72.5°  | 628.3  | 616.0  | 600.8  | 579.5  | 570.3  |
| 75°    | 512.1  | 506.4  | 490.8  | 472.7  | 478.8  |
| 77.5°  | 408.6  | 396.3  | 390.1  | 381.1  | 372.0  |
| 80°    | 305.1  | 301.9  | 295.7  | 286.6  | 280.5  |
| 82.5°  | 207.4  | 207.4  | 204.5  | 192.2  | 192.2  |
| 85°    | 124.9  | 122.0  | 119.1  | 109.7  | 106.8  |
| 87.5°  | 55.0   | 48.8   | 42.7   | 33.7   | 30.4   |
| 90°    | 2.1    | 26.2   | 43.7   | 54.8   | 59.0   |
| 92.5°  | 54.8   | 46.0   | 52.5   | 57.0   | 59.0   |
| 95°    | 142.2  | 69.9   | 85.2   | 96.4   | 94.1   |
| 97.5°  | 256.1  | 76.7   | 111.5  | 118.3  | 120.4  |
| 100°   | 387.6  | 87.6   | 124.8  | 142.2  | 146.6  |
| 102.5° | 531.9  | 527.7  | 129.2  | 153.1  | 159.9  |
| 105°   | 665.5  | 731.3  | 133.7  | 157.5  | 166.4  |
| 107.5° | 821.0  | 875.6  | 138.1  | 161.9  | 170.8  |
| 110°   | 969.9  | 1015.7 | 383.2  | 164.3  | 172.9  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1110.1 | 1149.3 | 1112.1 | 168.5  | 175.2  |
| 115°   | 1258.8 | 1295.9 | 1350.9 | 337.2  | 179.6  |
| 117.5° | 1388.0 | 1431.7 | 1469.1 | 1155.8 | 582.3  |
| 120°   | 1532.5 | 1565.3 | 1604.8 | 1631.1 | 1335.5 |
| 122.5° | 1655.0 | 1690.1 | 1734.0 | 1747.0 | 1749.4 |
| 125°   | 1779.8 | 1808.4 | 1850.0 | 1865.3 | 1871.8 |
| 127.5° | 1893.7 | 1924.3 | 1957.3 | 1979.1 | 1981.3 |
| 130°   | 2001.0 | 2036.1 | 2060.0 | 2084.2 | 2082.2 |
| 132.5° | 2110.4 | 2139.0 | 2163.0 | 2182.7 | 2180.7 |
| 135°   | 2202.5 | 2237.6 | 2257.1 | 2279.2 | 2274.7 |
| 137.5° | 2298.7 | 2325.0 | 2347.0 | 2368.9 | 2362.4 |
| 140°   | 2392.8 | 2410.4 | 2434.4 | 2454.1 | 2443.2 |
| 142.5° | 2471.8 | 2487.1 | 2515.5 | 2532.9 | 2522.0 |
| 145°   | 2555.0 | 2552.7 | 2589.8 | 2605.2 | 2594.3 |
| 147.5° | 2627.1 | 2620.6 | 2657.7 | 2668.6 | 2660.1 |
| 150°   | 2697.2 | 2681.9 | 2717.0 | 2730.0 | 2719.1 |
| 152.5° | 2756.2 | 2738.8 | 2771.6 | 2784.9 | 2769.5 |
| 155°   | 2813.2 | 2793.7 | 2819.9 | 2832.9 | 2815.5 |
| 157.5° | 2859.2 | 2841.7 | 2861.5 | 2876.9 | 2859.2 |
| 160°   | 2898.7 | 2885.4 | 2898.7 | 2911.7 | 2896.3 |
| 162.5° | 2933.5 | 2920.6 | 2931.5 | 2946.8 | 2927.1 |
| 165°   | 2964.2 | 2951.2 | 2957.7 | 2973.0 | 2957.7 |
| 167.5° | 2988.4 | 2975.2 | 2981.9 | 2997.2 | 2977.5 |
| 170°   | 3008.2 | 2994.9 | 2999.3 | 3014.7 | 2994.9 |
| 172.5° | 3021.1 | 3008.2 | 3012.6 | 3027.9 | 3008.2 |
| 175°   | 3032.0 | 3016.7 | 3021.1 | 3036.5 | 3014.7 |
| 177.5° | 3036.5 | 3021.1 | 3023.5 | 3038.8 | 3019.1 |
| 180°   | 3025.6 | 3025.6 | 3025.6 | 3025.6 | 3025.6 |

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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 | 10.03            | 10.87 | 11.01 | 11.86 | 13.17 | 9.60           | 10.44 | 10.58 | 11.43 | 12.74 |
|                 | 3H   | 11.69            | 12.45 | 12.68 | 13.44 | 14.77 | 11.22          | 11.97 | 12.21 | 12.97 | 14.30 |
|                 | 4H   | 12.28            | 12.99 | 13.28 | 14.00 | 15.33 | 11.81          | 12.52 | 12.81 | 13.52 | 14.86 |
|                 | 6H   | 12.68            | 13.34 | 13.69 | 14.34 | 15.69 | 12.20          | 12.86 | 13.21 | 13.87 | 15.21 |
|                 | 8H   | 12.78            | 13.41 | 13.80 | 14.43 | 15.78 | 12.31          | 12.93 | 13.33 | 13.96 | 15.30 |
|                 | 12H  | 12.83            | 13.43 | 13.85 | 14.44 | 15.81 | 12.35          | 12.94 | 13.37 | 13.96 | 15.33 |
| 4H              | 2H   | 10.49            | 11.21 | 11.50 | 12.21 | 13.54 | 10.15          | 10.86 | 11.15 | 11.86 | 13.20 |
|                 | 3H   | 12.36            | 12.95 | 13.37 | 13.98 | 15.33 | 11.96          | 12.56 | 12.98 | 13.59 | 14.94 |
|                 | 4H   | 13.07            | 13.62 | 14.10 | 14.64 | 16.01 | 12.67          | 13.21 | 13.69 | 14.23 | 15.61 |
|                 | 6H   | 13.59            | 14.06 | 14.62 | 15.10 | 16.47 | 13.18          | 13.65 | 14.21 | 14.69 | 16.06 |
|                 | 8H   | 13.74            | 14.17 | 14.77 | 15.21 | 16.60 | 13.32          | 13.76 | 14.36 | 14.80 | 16.18 |
|                 | 12H  | 13.81            | 14.20 | 14.86 | 15.26 | 16.65 | 13.39          | 13.78 | 14.44 | 14.84 | 16.22 |
| 8H              | 4H   | 13.27            | 13.70 | 14.30 | 14.75 | 16.13 | 12.91          | 13.34 | 13.94 | 14.38 | 15.77 |
|                 | 6H   | 13.90            | 14.26 | 14.96 | 15.34 | 16.72 | 13.54          | 13.90 | 14.59 | 14.98 | 16.36 |
|                 | 8H   | 14.12            | 14.44 | 15.19 | 15.51 | 16.90 | 13.75          | 14.07 | 14.82 | 15.14 | 16.53 |
|                 | 12H  | 14.25            | 14.53 | 15.32 | 15.59 | 17.03 | 13.87          | 14.15 | 14.94 | 15.21 | 16.65 |
| 12H             | 4H   | 13.25            | 13.65 | 14.31 | 14.70 | 16.09 | 12.90          | 13.30 | 13.95 | 14.35 | 15.74 |
|                 | 6H   | 13.93            | 14.25 | 15.00 | 15.31 | 16.71 | 13.58          | 13.90 | 14.64 | 14.96 | 16.36 |
|                 | 8H   | 14.17            | 14.45 | 15.24 | 15.51 | 16.95 | 13.81          | 14.09 | 14.88 | 15.15 | 16.60 |