

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: P927608

Luminaire Tested: DFN2DIP-HX4F0-060D080US840-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P927608  
REPORT IS A COMBINATION OF REPORTS P900895 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-060D080US840-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

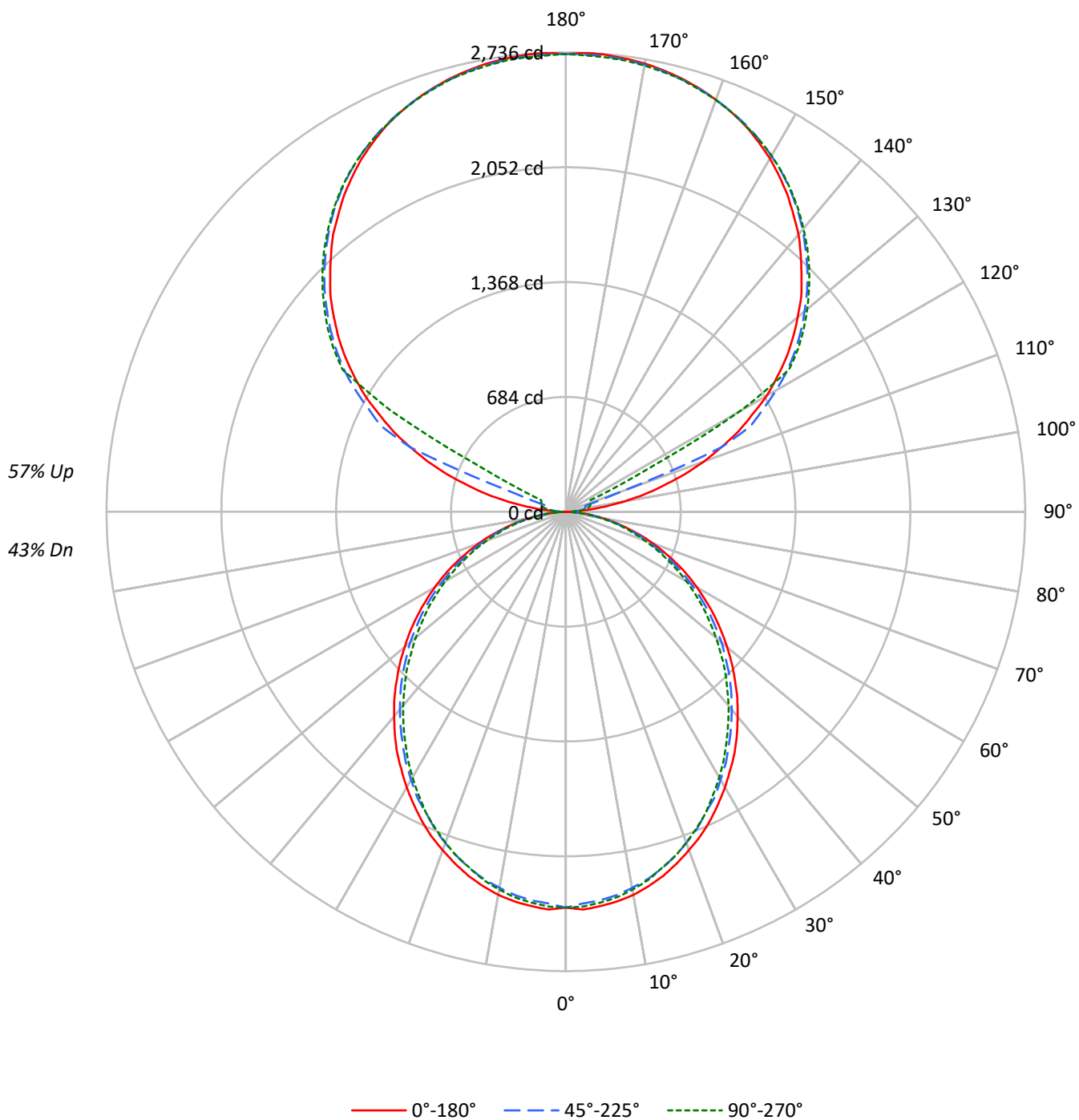
Lumens per Lamp: N/A  
Luminaire Lumens: 13995.8 lumens  
Efficiency: N/A  
Efficacy: 124.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 112.5  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.099  
Total Harmonic Distortion (THDi): 0.979  
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   | 105 | 105 | 105 | 105 | 96 | 96 | 96 | 96 | 79 | 79 | 79 | 64 | 64 | 64 | 50 | 50 | 50 |
| 1   | 96  | 92  | 88  | 85  | 88 | 84 | 81 | 78 | 70 | 67 | 65 | 56 | 55 | 53 | 44 | 43 | 42 |
| 2   | 88  | 80  | 74  | 69  | 80 | 74 | 68 | 64 | 61 | 57 | 54 | 49 | 47 | 44 | 39 | 37 | 35 |
| 3   | 80  | 71  | 63  | 58  | 73 | 65 | 58 | 53 | 54 | 49 | 45 | 44 | 40 | 38 | 34 | 32 | 30 |
| 4   | 73  | 62  | 55  | 49  | 66 | 57 | 50 | 45 | 48 | 43 | 39 | 39 | 35 | 32 | 31 | 28 | 26 |
| 5   | 67  | 56  | 48  | 42  | 61 | 51 | 44 | 39 | 43 | 37 | 33 | 35 | 31 | 28 | 28 | 25 | 23 |
| 6   | 62  | 50  | 42  | 36  | 56 | 46 | 39 | 34 | 38 | 33 | 29 | 31 | 27 | 24 | 25 | 22 | 20 |
| 7   | 57  | 45  | 37  | 32  | 52 | 41 | 34 | 29 | 35 | 29 | 25 | 29 | 25 | 22 | 23 | 20 | 18 |
| 8   | 53  | 41  | 33  | 28  | 48 | 38 | 31 | 26 | 32 | 26 | 23 | 26 | 22 | 19 | 21 | 18 | 16 |
| 9   | 49  | 37  | 30  | 25  | 45 | 34 | 28 | 23 | 29 | 24 | 20 | 24 | 20 | 17 | 19 | 16 | 14 |
| 10  | 46  | 34  | 27  | 22  | 42 | 31 | 25 | 21 | 27 | 22 | 18 | 22 | 18 | 16 | 18 | 15 | 13 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1753 | 1753 | 1753 |
| 5°  | 1756 | 1729 | 1740 |
| 10° | 1742 | 1706 | 1717 |
| 15° | 1716 | 1678 | 1680 |
| 20° | 1682 | 1639 | 1643 |
| 25° | 1648 | 1592 | 1599 |
| 30° | 1605 | 1549 | 1544 |
| 35° | 1564 | 1498 | 1485 |
| 40° | 1514 | 1447 | 1429 |
| 45° | 1464 | 1395 | 1372 |
| 50° | 1409 | 1341 | 1306 |
| 55° | 1352 | 1278 | 1246 |
| 60° | 1287 | 1204 | 1176 |
| 65° | 1217 | 1127 | 1094 |
| 70° | 1127 | 1033 | 1006 |
| 75° | 1002 | 920  | 925  |
| 80° | 853  | 777  | 770  |
| 85° | 619  | 529  | 512  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 1464 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 221.9   | 1.6       |
| 10°-20°   | 624.3   | 4.5       |
| 20°-30°   | 917.5   | 6.6       |
| 30°-40°   | 1065.6  | 7.6       |
| 40°-50°   | 1064.3  | 7.6       |
| 50°-60°   | 928.0   | 6.6       |
| 60°-70°   | 686.0   | 4.9       |
| 70°-80°   | 388.1   | 2.8       |
| 80°-90°   | 107.2   | 0.8       |
| 90°-100°  | 89.9    | 0.6       |
| 100°-110° | 335.1   | 2.4       |
| 110°-120° | 888.8   | 6.4       |
| 120°-130° | 1474.2  | 10.5      |
| 130°-140° | 1565.9  | 11.2      |
| 140°-150° | 1455.3  | 10.4      |
| 150°-160° | 1170.1  | 8.4       |
| 160°-170° | 754.0   | 5.4       |
| 170°-180° | 259.5   | 1.9       |
| 0°-30°    | 1763.7  | 12.6      |
| 0°-40°    | 2829.3  | 20.2      |
| 0°-60°    | 4821.6  | 34.5      |
| 0°-90°    | 6003.0  | 42.9      |
| 90°-120°  | 1313.9  | 9.4       |
| 90°-150°  | 5809.3  | 41.5      |
| 90°-180°  | 7993.0  | 57.1      |
| 0°-180°   | 13995.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2358 | 2358  | 2358 | 2358  | 2358 |      |
| 5°   | 2358 | 2349  | 2324 | 2342  | 2337 | 224  |
| 15°  | 2244 | 2231  | 2201 | 2210  | 2199 | 632  |
| 25°  | 2031 | 2013  | 1975 | 1979  | 1975 | 935  |
| 35°  | 1752 | 1730  | 1693 | 1680  | 1668 | 1094 |
| 45°  | 1426 | 1410  | 1376 | 1351  | 1342 | 1101 |
| 55°  | 1079 | 1065  | 1038 | 1011  | 1000 | 965  |
| 65°  | 728  | 714   | 692  | 671   | 660  | 720  |
| 75°  | 381  | 376   | 365  | 351   | 356  | 406  |
| 85°  | 93   | 91    | 88   | 82    | 79   | 104  |
| 90°  | 2    | 24    | 39   | 49    | 53   | 13   |
| 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 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2357.5 | 2357.5 | 2357.5 | 2357.5 | 2357.5 |
| 2.5°   | 2371.2 | 2359.9 | 2334.9 | 2357.5 | 2353.1 |
| 5°     | 2357.5 | 2348.6 | 2323.5 | 2341.6 | 2337.3 |
| 7.5°   | 2341.6 | 2328.2 | 2303.2 | 2321.4 | 2316.9 |
| 10°    | 2316.9 | 2301.0 | 2273.8 | 2291.8 | 2285.1 |
| 12.5°  | 2282.8 | 2269.2 | 2242.1 | 2253.4 | 2248.8 |
| 15°    | 2244.2 | 2230.7 | 2201.2 | 2210.4 | 2199.0 |
| 17.5°  | 2196.6 | 2183.2 | 2153.6 | 2164.8 | 2153.6 |
| 20°    | 2144.4 | 2131.0 | 2099.2 | 2105.9 | 2097.1 |
| 22.5°  | 2092.5 | 2072.0 | 2042.4 | 2042.4 | 2037.9 |
| 25°    | 2031.1 | 2013.1 | 1974.6 | 1978.9 | 1974.6 |
| 27.5°  | 1963.1 | 1947.2 | 1917.8 | 1911.1 | 1899.8 |
| 30°    | 1895.3 | 1876.9 | 1843.1 | 1836.3 | 1827.1 |
| 32.5°  | 1822.6 | 1809.2 | 1772.8 | 1759.1 | 1750.0 |
| 35°    | 1752.4 | 1729.8 | 1693.4 | 1679.7 | 1668.4 |
| 37.5°  | 1673.0 | 1652.5 | 1616.3 | 1600.3 | 1589.0 |
| 40°    | 1591.4 | 1573.2 | 1536.9 | 1516.7 | 1507.5 |
| 42.5°  | 1512.1 | 1493.8 | 1457.7 | 1434.9 | 1421.4 |
| 45°    | 1426.0 | 1410.1 | 1376.0 | 1351.2 | 1342.0 |
| 47.5°  | 1342.0 | 1326.2 | 1289.9 | 1264.9 | 1251.3 |
| 50°    | 1253.6 | 1242.3 | 1210.5 | 1178.7 | 1167.4 |
| 52.5°  | 1167.4 | 1151.6 | 1122.2 | 1097.2 | 1081.4 |
| 55°    | 1079.2 | 1065.4 | 1038.3 | 1011.1 | 999.8  |
| 57.5°  | 990.7  | 979.4  | 949.8  | 922.7  | 913.5  |
| 60°    | 902.2  | 893.3  | 861.6  | 836.5  | 829.8  |
| 62.5°  | 816.0  | 800.2  | 777.5  | 754.9  | 745.8  |
| 65°    | 727.8  | 714.1  | 691.5  | 671.0  | 659.7  |
| 67.5°  | 637.1  | 625.6  | 605.4  | 589.5  | 580.3  |
| 70°    | 553.2  | 544.1  | 523.6  | 507.7  | 498.8  |
| 72.5°  | 467.0  | 457.9  | 446.6  | 430.8  | 424.0  |
| 75°    | 380.7  | 376.5  | 364.8  | 351.4  | 356.0  |
| 77.5°  | 303.7  | 294.7  | 290.0  | 283.3  | 276.6  |
| 80°    | 226.8  | 224.4  | 219.8  | 213.1  | 208.5  |
| 82.5°  | 154.2  | 154.2  | 152.0  | 142.9  | 142.9  |
| 85°    | 92.8   | 90.7   | 88.5   | 81.5   | 79.4   |
| 87.5°  | 40.9   | 36.4   | 31.7   | 25.0   | 22.6   |
| 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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**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 | 8.53             | 9.33  | 9.54  | 10.35 | 11.72 | 8.10           | 8.90  | 9.11  | 9.92  | 11.29 |
|                 | 3H   | 10.19            | 10.90 | 11.21 | 11.94 | 13.33 | 9.71           | 10.43 | 10.74 | 11.46 | 12.85 |
|                 | 4H   | 10.77            | 11.45 | 11.81 | 12.49 | 13.88 | 10.30          | 10.98 | 11.34 | 12.01 | 13.41 |
|                 | 6H   | 11.17            | 11.79 | 12.22 | 12.83 | 14.24 | 10.69          | 11.32 | 11.74 | 12.36 | 13.77 |
|                 | 8H   | 11.27            | 11.87 | 12.32 | 12.92 | 14.33 | 10.80          | 11.39 | 11.85 | 12.45 | 13.85 |
|                 | 12H  | 11.32            | 11.88 | 12.38 | 12.94 | 14.36 | 10.84          | 11.40 | 11.90 | 12.45 | 13.88 |
| 4H              | 2H   | 8.98             | 9.66  | 10.03 | 10.70 | 12.10 | 8.64           | 9.32  | 9.68  | 10.36 | 11.75 |
|                 | 3H   | 10.84            | 11.41 | 11.90 | 12.48 | 13.89 | 10.45          | 11.02 | 11.50 | 12.08 | 13.49 |
|                 | 4H   | 11.56            | 12.08 | 12.62 | 13.13 | 14.57 | 11.15          | 11.67 | 12.21 | 12.73 | 14.16 |
|                 | 6H   | 12.07            | 12.52 | 13.14 | 13.60 | 15.02 | 11.66          | 12.11 | 12.73 | 13.19 | 14.61 |
|                 | 8H   | 12.22            | 12.64 | 13.29 | 13.71 | 15.15 | 11.81          | 12.22 | 12.88 | 13.30 | 14.74 |
|                 | 12H  | 12.29            | 12.67 | 13.38 | 13.75 | 15.20 | 11.87          | 12.25 | 12.95 | 13.33 | 14.78 |
| 8H              | 4H   | 11.75            | 12.17 | 12.82 | 13.24 | 14.68 | 11.39          | 11.81 | 12.46 | 12.88 | 14.32 |
|                 | 6H   | 12.38            | 12.73 | 13.47 | 13.84 | 15.28 | 12.02          | 12.36 | 13.11 | 13.48 | 14.91 |
|                 | 8H   | 12.60            | 12.90 | 13.70 | 14.00 | 15.46 | 12.23          | 12.53 | 13.33 | 13.63 | 15.09 |
|                 | 12H  | 12.73            | 13.00 | 13.83 | 14.09 | 15.59 | 12.35          | 12.61 | 13.45 | 13.70 | 15.20 |
| 12H             | 4H   | 11.73            | 12.11 | 12.82 | 13.20 | 14.64 | 11.38          | 11.76 | 12.47 | 12.84 | 14.29 |
|                 | 6H   | 12.41            | 12.71 | 13.51 | 13.81 | 15.27 | 12.06          | 12.36 | 13.16 | 13.46 | 14.92 |
|                 | 8H   | 12.65            | 12.92 | 13.75 | 14.01 | 15.51 | 12.29          | 12.56 | 13.40 | 13.65 | 15.15 |