

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: P903241

Luminaire Tested: DFN2DIP-PN4F0-060D100US830-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P903241  
REPORT IS A COMBINATION OF REPORTS P901241 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-060D100US830-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

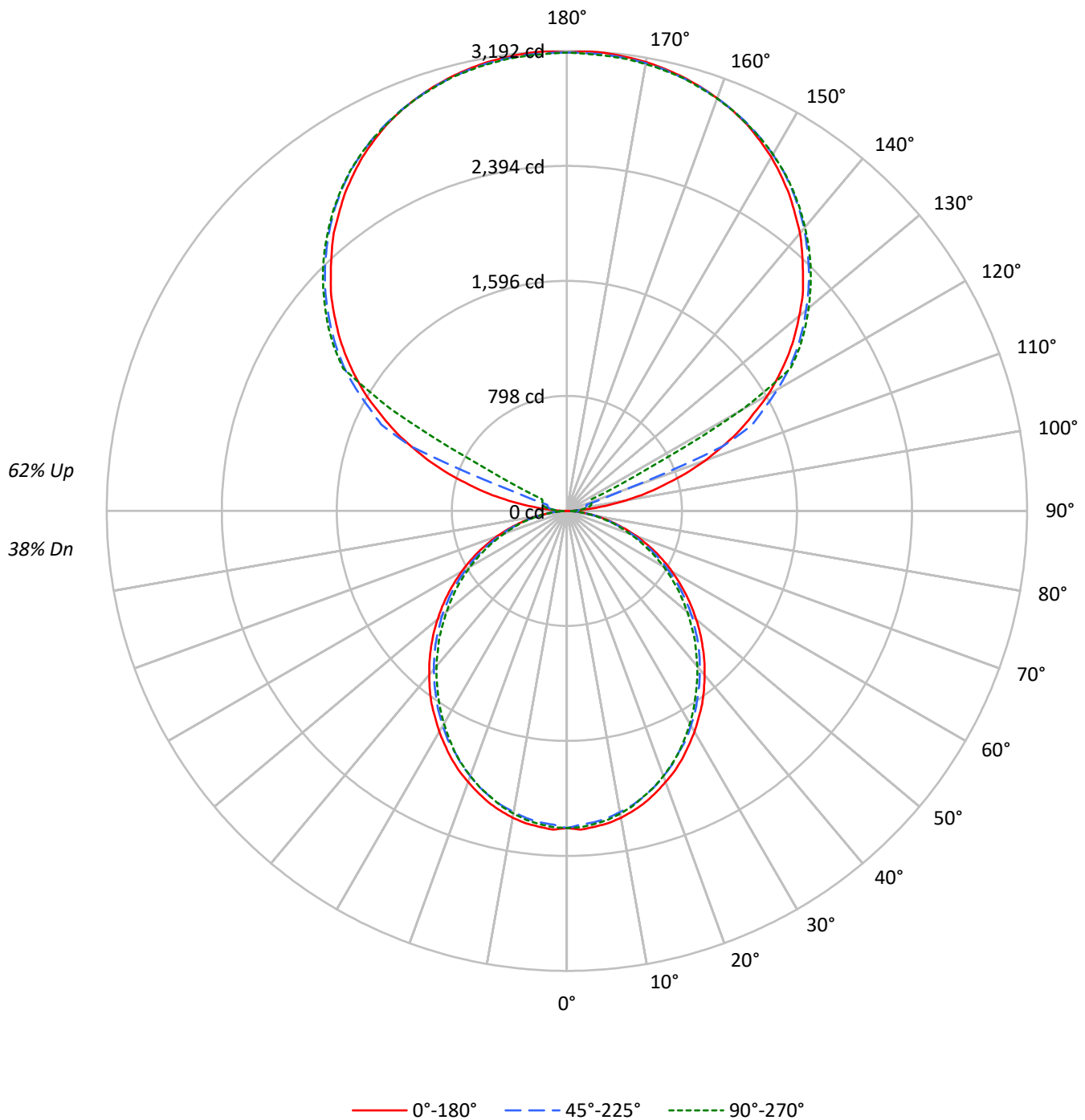
Lumens per Lamp: N/A  
Luminaire Lumens: 14929.9 lumens  
Efficiency: N/A  
Efficacy: 115.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 129.5  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9933  
Total Harmonic Distortion (THDi): 0.066  
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   | 104 | 104 | 104 | 104 | 94 | 94 | 94 | 94 | 76 | 76 | 76 | 60 | 60 | 60 | 45 | 45 | 45 |
| 1   | 95  | 91  | 87  | 83  | 86 | 82 | 79 | 76 | 67 | 65 | 63 | 53 | 51 | 50 | 39 | 39 | 38 |
| 2   | 86  | 79  | 73  | 68  | 78 | 72 | 67 | 63 | 59 | 55 | 52 | 46 | 44 | 42 | 35 | 33 | 32 |
| 3   | 79  | 70  | 62  | 57  | 71 | 63 | 57 | 52 | 52 | 47 | 44 | 41 | 38 | 35 | 31 | 29 | 27 |
| 4   | 72  | 62  | 54  | 48  | 65 | 56 | 49 | 44 | 46 | 41 | 37 | 36 | 33 | 30 | 27 | 25 | 23 |
| 5   | 66  | 55  | 47  | 41  | 60 | 50 | 43 | 38 | 41 | 36 | 32 | 33 | 29 | 26 | 25 | 22 | 20 |
| 6   | 61  | 49  | 41  | 35  | 55 | 45 | 38 | 33 | 37 | 32 | 28 | 29 | 26 | 23 | 22 | 20 | 18 |
| 7   | 56  | 44  | 36  | 31  | 51 | 40 | 34 | 29 | 33 | 28 | 24 | 27 | 23 | 20 | 20 | 18 | 16 |
| 8   | 52  | 40  | 32  | 27  | 47 | 37 | 30 | 25 | 30 | 25 | 22 | 24 | 21 | 18 | 19 | 16 | 14 |
| 9   | 48  | 36  | 29  | 24  | 44 | 33 | 27 | 23 | 28 | 23 | 19 | 22 | 19 | 16 | 17 | 15 | 13 |
| 10  | 45  | 33  | 26  | 22  | 41 | 31 | 24 | 20 | 26 | 21 | 17 | 21 | 17 | 14 | 16 | 13 | 12 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1606 | 1606 | 1606 |
| 5°  | 1609 | 1584 | 1595 |
| 10° | 1596 | 1563 | 1574 |
| 15° | 1572 | 1538 | 1540 |
| 20° | 1541 | 1502 | 1506 |
| 25° | 1509 | 1459 | 1466 |
| 30° | 1470 | 1420 | 1416 |
| 35° | 1432 | 1373 | 1362 |
| 40° | 1386 | 1326 | 1311 |
| 45° | 1340 | 1279 | 1259 |
| 50° | 1290 | 1229 | 1199 |
| 55° | 1237 | 1172 | 1144 |
| 60° | 1178 | 1104 | 1081 |
| 65° | 1113 | 1033 | 1006 |
| 70° | 1030 | 947  | 926  |
| 75° | 915  | 844  | 852  |
| 80° | 778  | 714  | 710  |
| 85° | 562  | 487  | 475  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1695 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 207.1   | 1.4       |
| 10°-20°   | 582.7   | 3.9       |
| 20°-30°   | 856.4   | 5.7       |
| 30°-40°   | 994.6   | 6.7       |
| 40°-50°   | 993.4   | 6.7       |
| 50°-60°   | 866.2   | 5.8       |
| 60°-70°   | 640.3   | 4.3       |
| 70°-80°   | 362.3   | 2.4       |
| 80°-90°   | 101.2   | 0.7       |
| 90°-100°  | 104.9   | 0.7       |
| 100°-110° | 391.0   | 2.6       |
| 110°-120° | 1037.0  | 6.9       |
| 120°-130° | 1720.0  | 11.5      |
| 130°-140° | 1827.0  | 12.2      |
| 140°-150° | 1698.0  | 11.4      |
| 150°-160° | 1365.2  | 9.1       |
| 160°-170° | 879.7   | 5.9       |
| 170°-180° | 302.8   | 2.0       |
| 0°-30°    | 1646.2  | 11.0      |
| 0°-40°    | 2640.9  | 17.7      |
| 0°-60°    | 4500.5  | 30.1      |
| 0°-90°    | 5604.3  | 37.5      |
| 90°-120°  | 1532.9  | 10.3      |
| 90°-150°  | 6778.0  | 45.4      |
| 90°-180°  | 9326.0  | 62.5      |
| 0°-180°   | 14929.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2200 | 2200  | 2200 | 2200  | 2200 |      |
| 5°   | 2200 | 2192  | 2169 | 2186  | 2182 | 209  |
| 15°  | 2095 | 2082  | 2055 | 2063  | 2053 | 590  |
| 25°  | 1896 | 1879  | 1843 | 1847  | 1843 | 872  |
| 35°  | 1636 | 1615  | 1581 | 1568  | 1557 | 1021 |
| 45°  | 1331 | 1316  | 1284 | 1261  | 1253 | 1027 |
| 55°  | 1007 | 994   | 969  | 944   | 933  | 901  |
| 65°  | 679  | 667   | 646  | 626   | 616  | 672  |
| 75°  | 355  | 351   | 340  | 328   | 332  | 379  |
| 85°  | 87   | 85    | 83   | 76    | 74   | 97   |
| 90°  | 2    | 28    | 46   | 58    | 62   | 14   |
| 95°  | 150  | 74    | 90   | 101   | 99   | 177  |
| 105° | 700  | 769   | 140  | 166   | 175  | 748  |
| 115° | 1323 | 1362  | 1420 | 354   | 189  | 1303 |
| 125° | 1871 | 1901  | 1945 | 1961  | 1968 | 1669 |
| 135° | 2316 | 2352  | 2373 | 2396  | 2392 | 1789 |
| 145° | 2686 | 2684  | 2723 | 2739  | 2728 | 1680 |
| 155° | 2958 | 2937  | 2965 | 2978  | 2960 | 1363 |
| 165° | 3116 | 3103  | 3110 | 3126  | 3110 | 880  |
| 175° | 3188 | 3172  | 3176 | 3192  | 3170 | 303  |
| 180° | 3181 | 3181  | 3181 | 3181  | 3181 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2200.5 | 2200.5 | 2200.5 | 2200.5 | 2200.5 |
| 2.5°   | 2213.3 | 2202.7 | 2179.3 | 2200.5 | 2196.4 |
| 5°     | 2200.5 | 2192.2 | 2168.8 | 2185.7 | 2181.6 |
| 7.5°   | 2185.7 | 2173.1 | 2149.8 | 2166.8 | 2162.6 |
| 10°    | 2162.6 | 2147.8 | 2122.3 | 2139.2 | 2132.9 |
| 12.5°  | 2130.7 | 2118.1 | 2092.7 | 2103.3 | 2099.0 |
| 15°    | 2094.7 | 2082.2 | 2054.6 | 2063.1 | 2052.6 |
| 17.5°  | 2050.3 | 2037.8 | 2010.2 | 2020.6 | 2010.2 |
| 20°    | 2001.6 | 1989.0 | 1959.4 | 1965.7 | 1957.4 |
| 22.5°  | 1953.1 | 1934.0 | 1906.4 | 1906.4 | 1902.1 |
| 25°    | 1895.8 | 1879.1 | 1843.0 | 1847.1 | 1843.0 |
| 27.5°  | 1832.3 | 1817.5 | 1790.1 | 1783.9 | 1773.3 |
| 30°    | 1769.1 | 1751.9 | 1720.3 | 1714.0 | 1705.4 |
| 32.5°  | 1701.2 | 1688.7 | 1654.7 | 1641.9 | 1633.4 |
| 35°    | 1635.7 | 1614.6 | 1580.6 | 1567.8 | 1557.3 |
| 37.5°  | 1561.6 | 1542.5 | 1508.6 | 1493.7 | 1483.2 |
| 40°    | 1485.4 | 1468.4 | 1434.5 | 1415.7 | 1407.1 |
| 42.5°  | 1411.4 | 1394.3 | 1360.7 | 1339.4 | 1326.7 |
| 45°    | 1331.1 | 1316.2 | 1284.3 | 1261.2 | 1252.6 |
| 47.5°  | 1252.6 | 1237.8 | 1204.0 | 1180.6 | 1168.0 |
| 50°    | 1170.1 | 1159.5 | 1129.9 | 1100.2 | 1089.7 |
| 52.5°  | 1089.7 | 1074.9 | 1047.4 | 1024.2 | 1009.4 |
| 55°    | 1007.3 | 994.5  | 969.1  | 943.8  | 933.2  |
| 57.5°  | 924.7  | 914.2  | 886.6  | 861.2  | 852.6  |
| 60°    | 842.1  | 833.8  | 804.2  | 780.8  | 774.5  |
| 62.5°  | 761.7  | 746.9  | 725.8  | 704.6  | 696.2  |
| 65°    | 679.3  | 666.6  | 645.5  | 626.3  | 615.8  |
| 67.5°  | 594.6  | 583.9  | 565.1  | 550.3  | 541.7  |
| 70°    | 516.3  | 507.8  | 488.7  | 473.9  | 465.6  |
| 72.5°  | 435.9  | 427.4  | 416.9  | 402.1  | 395.8  |
| 75°    | 355.3  | 351.4  | 340.5  | 328.0  | 332.2  |
| 77.5°  | 283.5  | 275.0  | 270.7  | 264.5  | 258.2  |
| 80°    | 211.7  | 209.4  | 205.2  | 198.9  | 194.6  |
| 82.5°  | 143.9  | 143.9  | 141.9  | 133.4  | 133.4  |
| 85°    | 86.6   | 84.6   | 82.6   | 76.1   | 74.1   |
| 87.5°  | 38.2   | 33.9   | 29.6   | 23.4   | 21.1   |
| 90°    | 2.2    | 27.6   | 45.9   | 57.7   | 62.0   |
| 92.5°  | 57.7   | 48.4   | 55.2   | 59.9   | 62.0   |
| 95°    | 149.5  | 73.5   | 89.6   | 101.4  | 99.0   |
| 97.5°  | 269.2  | 80.6   | 117.3  | 124.3  | 126.6  |
| 100°   | 407.6  | 92.1   | 131.2  | 149.5  | 154.2  |
| 102.5° | 559.2  | 554.9  | 135.8  | 161.0  | 168.1  |
| 105°   | 699.7  | 768.8  | 140.5  | 165.6  | 174.9  |
| 107.5° | 863.2  | 920.6  | 145.2  | 170.3  | 179.6  |
| 110°   | 1019.7 | 1067.9 | 402.8  | 172.8  | 181.7  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1167.1 | 1208.3 | 1169.3 | 177.1  | 184.3  |
| 115°   | 1323.4 | 1362.5 | 1420.2 | 354.5  | 188.9  |
| 117.5° | 1459.2 | 1505.2 | 1544.5 | 1215.2 | 612.3  |
| 120°   | 1611.3 | 1645.7 | 1687.2 | 1714.9 | 1404.1 |
| 122.5° | 1740.0 | 1776.9 | 1823.1 | 1836.7 | 1839.2 |
| 125°   | 1871.2 | 1901.3 | 1945.0 | 1961.1 | 1967.9 |
| 127.5° | 1990.9 | 2023.2 | 2057.9 | 2080.9 | 2083.0 |
| 130°   | 2103.8 | 2140.7 | 2165.9 | 2191.2 | 2189.1 |
| 132.5° | 2218.8 | 2248.9 | 2274.1 | 2294.8 | 2292.6 |
| 135°   | 2315.6 | 2352.5 | 2373.0 | 2396.2 | 2391.6 |
| 137.5° | 2416.8 | 2444.4 | 2467.6 | 2490.6 | 2483.7 |
| 140°   | 2515.6 | 2534.3 | 2559.4 | 2580.2 | 2568.7 |
| 142.5° | 2598.8 | 2614.9 | 2644.7 | 2663.0 | 2651.6 |
| 145°   | 2686.2 | 2683.8 | 2722.9 | 2739.0 | 2727.5 |
| 147.5° | 2761.9 | 2755.1 | 2794.2 | 2805.7 | 2796.7 |
| 150°   | 2835.7 | 2819.6 | 2856.6 | 2870.2 | 2858.7 |
| 152.5° | 2897.8 | 2879.5 | 2914.0 | 2927.8 | 2911.7 |
| 155°   | 2957.7 | 2937.2 | 2964.8 | 2978.4 | 2960.1 |
| 157.5° | 3006.1 | 2987.8 | 3008.5 | 3024.6 | 3006.1 |
| 160°   | 3047.6 | 3033.7 | 3047.6 | 3061.3 | 3045.2 |
| 162.5° | 3084.2 | 3070.5 | 3082.0 | 3098.1 | 3077.4 |
| 165°   | 3116.4 | 3102.8 | 3109.6 | 3125.8 | 3109.6 |
| 167.5° | 3141.9 | 3127.9 | 3135.1 | 3151.2 | 3130.4 |
| 170°   | 3162.6 | 3148.8 | 3153.4 | 3169.5 | 3148.8 |
| 172.5° | 3176.3 | 3162.6 | 3167.3 | 3183.4 | 3162.6 |
| 175°   | 3187.8 | 3171.7 | 3176.3 | 3192.5 | 3169.5 |
| 177.5° | 3192.5 | 3176.3 | 3178.8 | 3194.9 | 3174.1 |
| 180°   | 3181.0 | 3181.0 | 3181.0 | 3181.0 | 3181.0 |

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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 | 7.65             | 8.41  | 8.71  | 9.47  | 10.91 | 7.21           | 7.97  | 8.27  | 9.03  | 10.47 |
|                 | 3H   | 9.31             | 9.99  | 10.37 | 11.06 | 12.51 | 8.82           | 9.50  | 9.89  | 10.57 | 12.03 |
|                 | 4H   | 9.89             | 10.54 | 10.97 | 11.61 | 13.07 | 9.40           | 10.05 | 10.48 | 11.12 | 12.58 |
|                 | 6H   | 10.29            | 10.88 | 11.37 | 11.96 | 13.43 | 9.80           | 10.39 | 10.88 | 11.46 | 12.94 |
|                 | 8H   | 10.39            | 10.96 | 11.48 | 12.05 | 13.52 | 9.90           | 10.46 | 10.99 | 11.55 | 13.02 |
|                 | 12H  | 10.44            | 10.97 | 11.53 | 12.06 | 13.55 | 9.94           | 10.47 | 11.03 | 11.56 | 13.05 |
| 4H              | 2H   | 8.10             | 8.75  | 9.18  | 9.82  | 11.28 | 7.75           | 8.39  | 8.83  | 9.46  | 10.93 |
|                 | 3H   | 9.96             | 10.50 | 11.05 | 11.60 | 13.07 | 9.56           | 10.10 | 10.65 | 11.19 | 12.67 |
|                 | 4H   | 10.67            | 11.17 | 11.77 | 12.25 | 13.75 | 10.25          | 10.75 | 11.35 | 11.84 | 13.33 |
|                 | 6H   | 11.18            | 11.61 | 12.29 | 12.72 | 14.21 | 10.76          | 11.18 | 11.86 | 12.30 | 13.79 |
|                 | 8H   | 11.33            | 11.73 | 12.44 | 12.83 | 14.34 | 10.90          | 11.30 | 12.01 | 12.40 | 13.91 |
|                 | 12H  | 11.40            | 11.76 | 12.52 | 12.88 | 14.39 | 10.96          | 11.32 | 12.08 | 12.44 | 13.95 |
| 8H              | 4H   | 10.86            | 11.26 | 11.96 | 12.36 | 13.87 | 10.49          | 10.89 | 11.59 | 11.99 | 13.50 |
|                 | 6H   | 11.49            | 11.82 | 12.62 | 12.96 | 14.47 | 11.11          | 11.44 | 12.24 | 12.59 | 14.09 |
|                 | 8H   | 11.71            | 12.00 | 12.85 | 13.13 | 14.65 | 11.33          | 11.61 | 12.46 | 12.74 | 14.26 |
|                 | 12H  | 11.84            | 12.09 | 12.98 | 13.22 | 14.78 | 11.44          | 11.69 | 12.58 | 12.81 | 14.37 |
| 12H             | 4H   | 10.84            | 11.20 | 11.96 | 12.32 | 13.83 | 10.48          | 10.84 | 11.60 | 11.95 | 13.47 |
|                 | 6H   | 11.52            | 11.81 | 12.65 | 12.93 | 14.46 | 11.15          | 11.44 | 12.29 | 12.57 | 14.09 |
|                 | 8H   | 11.76            | 12.01 | 12.90 | 13.13 | 14.69 | 11.39          | 11.64 | 12.52 | 12.76 | 14.32 |