

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: P922413

Luminaire Tested: DFN2DIP-PN4F0-080D110US940-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P922413  
REPORT IS A COMBINATION OF REPORTS P901263 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-080D110US940-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

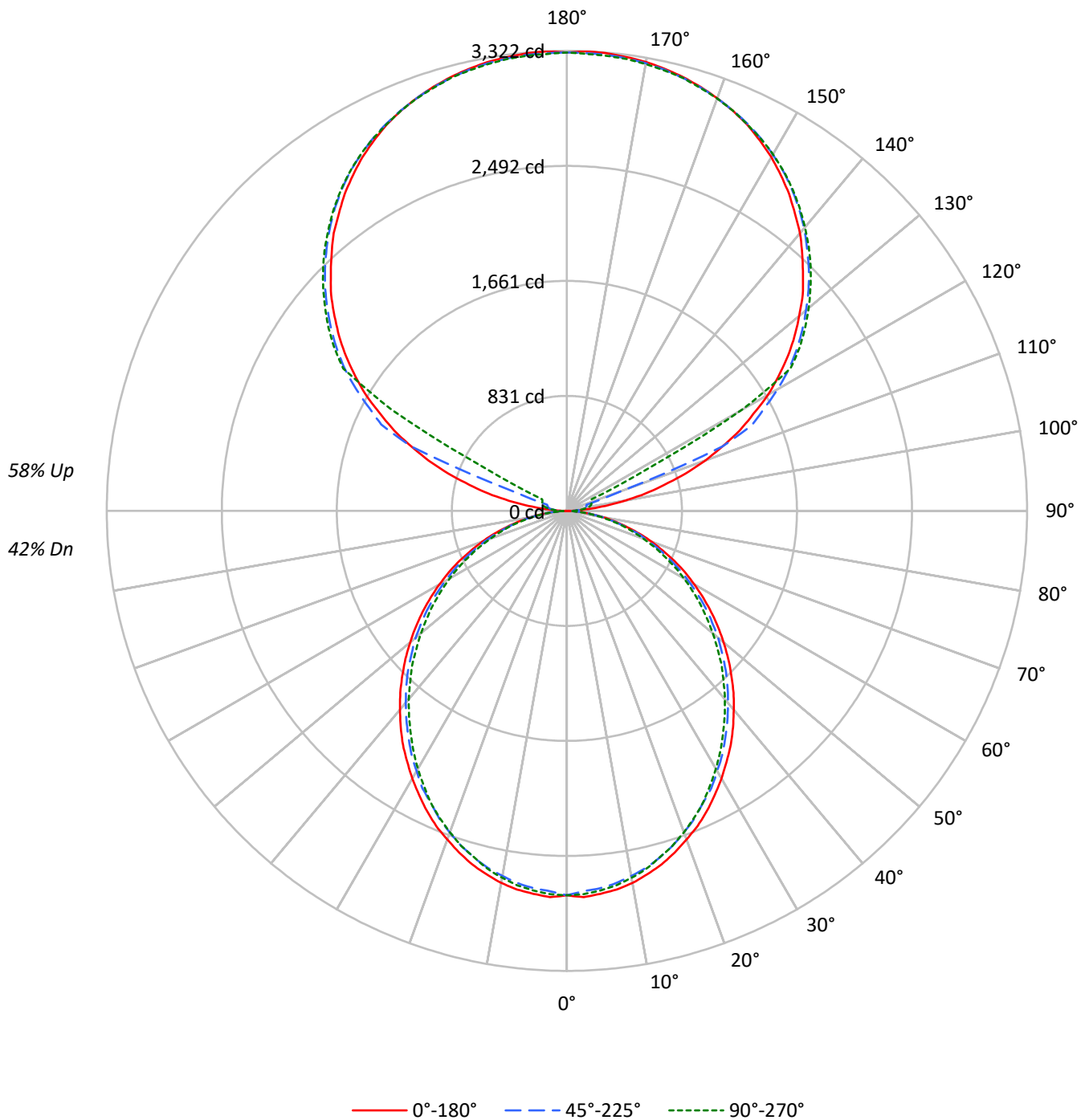
Lumens per Lamp: N/A  
Luminaire Lumens: 16773.1 lumens  
Efficiency: N/A  
Efficacy: 99.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 168.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9971  
Total Harmonic Distortion (THDi): 0.049  
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 | 63 | 63 | 63 | 49 | 49 | 49 |
| 1   | 96  | 92  | 88  | 84  | 88 | 84 | 81 | 78 | 69 | 67 | 65 | 56 | 54 | 53 | 43 | 42 | 41 |
| 2   | 87  | 80  | 74  | 69  | 80 | 73 | 68 | 64 | 61 | 57 | 54 | 49 | 46 | 44 | 38 | 36 | 35 |
| 3   | 80  | 70  | 63  | 57  | 72 | 65 | 58 | 53 | 53 | 49 | 45 | 43 | 40 | 37 | 34 | 31 | 30 |
| 4   | 73  | 62  | 54  | 49  | 66 | 57 | 50 | 45 | 47 | 42 | 38 | 38 | 35 | 32 | 30 | 28 | 25 |
| 5   | 67  | 55  | 47  | 41  | 61 | 51 | 44 | 39 | 42 | 37 | 33 | 35 | 31 | 28 | 27 | 24 | 22 |
| 6   | 62  | 50  | 42  | 36  | 56 | 46 | 39 | 34 | 38 | 33 | 29 | 31 | 27 | 24 | 25 | 22 | 20 |
| 7   | 57  | 45  | 37  | 31  | 52 | 41 | 34 | 29 | 35 | 29 | 25 | 28 | 24 | 21 | 22 | 20 | 17 |
| 8   | 53  | 41  | 33  | 28  | 48 | 37 | 31 | 26 | 32 | 26 | 22 | 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 | 15 | 18 | 15 | 13 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2026 | 2026 | 2026 |
| 5°  | 2029 | 1998 | 2012 |
| 10° | 2013 | 1972 | 1985 |
| 15° | 1983 | 1939 | 1943 |
| 20° | 1943 | 1895 | 1900 |
| 25° | 1904 | 1841 | 1850 |
| 30° | 1854 | 1791 | 1786 |
| 35° | 1806 | 1732 | 1718 |
| 40° | 1748 | 1673 | 1654 |
| 45° | 1690 | 1613 | 1589 |
| 50° | 1627 | 1550 | 1513 |
| 55° | 1560 | 1478 | 1443 |
| 60° | 1485 | 1392 | 1363 |
| 65° | 1404 | 1303 | 1269 |
| 70° | 1299 | 1195 | 1168 |
| 75° | 1155 | 1065 | 1075 |
| 80° | 981  | 900  | 896  |
| 85° | 709  | 614  | 600  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1766 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 261.3   | 1.6       |
| 10°-20°   | 735.1   | 4.4       |
| 20°-30°   | 1080.3  | 6.4       |
| 30°-40°   | 1254.7  | 7.5       |
| 40°-50°   | 1253.1  | 7.5       |
| 50°-60°   | 1092.7  | 6.5       |
| 60°-70°   | 807.7   | 4.8       |
| 70°-80°   | 457.0   | 2.7       |
| 80°-90°   | 126.5   | 0.8       |
| 90°-100°  | 109.2   | 0.7       |
| 100°-110° | 406.9   | 2.4       |
| 110°-120° | 1079.2  | 6.4       |
| 120°-130° | 1789.9  | 10.7      |
| 130°-140° | 1901.3  | 11.3      |
| 140°-150° | 1767.1  | 10.5      |
| 150°-160° | 1420.7  | 8.5       |
| 160°-170° | 915.4   | 5.5       |
| 170°-180° | 315.1   | 1.9       |
| 0°-30°    | 2076.6  | 12.4      |
| 0°-40°    | 3331.3  | 19.9      |
| 0°-60°    | 5677.0  | 33.8      |
| 0°-90°    | 7068.2  | 42.1      |
| 90°-120°  | 1595.3  | 9.5       |
| 90°-150°  | 7053.7  | 42.1      |
| 90°-180°  | 9705.0  | 57.9      |
| 0°-180°   | 16773.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2776 | 2776  | 2776 | 2776  | 2776 |      |
| 5°   | 2776 | 2765  | 2736 | 2757  | 2752 | 263  |
| 15°  | 2642 | 2626  | 2592 | 2602  | 2589 | 744  |
| 25°  | 2392 | 2370  | 2325 | 2330  | 2325 | 1100 |
| 35°  | 2063 | 2037  | 1994 | 1978  | 1964 | 1288 |
| 45°  | 1679 | 1660  | 1620 | 1591  | 1580 | 1296 |
| 55°  | 1271 | 1254  | 1222 | 1190  | 1177 | 1136 |
| 65°  | 857  | 841   | 814  | 790   | 777  | 847  |
| 75°  | 448  | 443   | 430  | 414   | 419  | 479  |
| 85°  | 109  | 107   | 104  | 96    | 94   | 122  |
| 90°  | 2    | 29    | 48   | 60    | 65   | 15   |
| 95°  | 156  | 76    | 93   | 106   | 103  | 184  |
| 105° | 728  | 800   | 146  | 172   | 182  | 778  |
| 115° | 1377 | 1418  | 1478 | 369   | 196  | 1356 |
| 125° | 1947 | 1979  | 2024 | 2041  | 2048 | 1737 |
| 135° | 2410 | 2448  | 2470 | 2494  | 2489 | 1862 |
| 145° | 2796 | 2793  | 2834 | 2850  | 2838 | 1748 |
| 155° | 3078 | 3057  | 3085 | 3100  | 3080 | 1418 |
| 165° | 3243 | 3229  | 3236 | 3253  | 3236 | 916  |
| 175° | 3317 | 3301  | 3306 | 3322  | 3298 | 316  |
| 180° | 3310 | 3310  | 3310 | 3310  | 3310 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2775.7 | 2775.7 | 2775.7 | 2775.7 | 2775.7 |
| 2.5°   | 2791.9 | 2778.6 | 2749.1 | 2775.7 | 2770.6 |
| 5°     | 2775.7 | 2765.3 | 2735.9 | 2757.1 | 2752.0 |
| 7.5°   | 2757.1 | 2741.2 | 2711.8 | 2733.3 | 2727.9 |
| 10°    | 2727.9 | 2709.2 | 2677.2 | 2698.4 | 2690.6 |
| 12.5°  | 2687.7 | 2671.8 | 2639.8 | 2653.1 | 2647.8 |
| 15°    | 2642.4 | 2626.5 | 2591.7 | 2602.5 | 2589.2 |
| 17.5°  | 2586.3 | 2570.4 | 2535.6 | 2549.0 | 2535.6 |
| 20°    | 2524.9 | 2509.0 | 2471.6 | 2479.6 | 2469.1 |
| 22.5°  | 2463.7 | 2439.6 | 2404.8 | 2404.8 | 2399.4 |
| 25°    | 2391.5 | 2370.3 | 2325.0 | 2330.0 | 2325.0 |
| 27.5°  | 2311.3 | 2292.7 | 2258.1 | 2250.1 | 2236.9 |
| 30°    | 2231.5 | 2209.9 | 2170.1 | 2162.1 | 2151.3 |
| 32.5°  | 2146.0 | 2130.1 | 2087.3 | 2071.2 | 2060.5 |
| 35°    | 2063.2 | 2036.7 | 1993.9 | 1977.7 | 1964.4 |
| 37.5°  | 1969.8 | 1945.7 | 1903.0 | 1884.3 | 1871.0 |
| 40°    | 1873.8 | 1852.3 | 1809.5 | 1785.7 | 1774.9 |
| 42.5°  | 1780.4 | 1758.8 | 1716.4 | 1689.4 | 1673.7 |
| 45°    | 1679.0 | 1660.3 | 1620.1 | 1590.9 | 1580.2 |
| 47.5°  | 1580.2 | 1561.5 | 1518.7 | 1489.2 | 1473.4 |
| 50°    | 1476.0 | 1462.7 | 1425.2 | 1387.9 | 1374.6 |
| 52.5°  | 1374.6 | 1355.8 | 1321.3 | 1291.9 | 1273.2 |
| 55°    | 1270.6 | 1254.5 | 1222.5 | 1190.5 | 1177.1 |
| 57.5°  | 1166.4 | 1153.2 | 1118.3 | 1086.3 | 1075.5 |
| 60°    | 1062.2 | 1051.8 | 1014.3 | 984.9  | 977.0  |
| 62.5°  | 960.8  | 942.2  | 915.5  | 888.9  | 878.2  |
| 65°    | 856.9  | 840.8  | 814.1  | 790.1  | 776.8  |
| 67.5°  | 750.1  | 736.6  | 712.7  | 694.1  | 683.3  |
| 70°    | 651.3  | 640.5  | 616.5  | 597.8  | 587.3  |
| 72.5°  | 549.9  | 539.2  | 525.8  | 507.2  | 499.3  |
| 75°    | 448.3  | 443.2  | 429.6  | 413.8  | 419.1  |
| 77.5°  | 357.7  | 346.9  | 341.5  | 333.6  | 325.7  |
| 80°    | 267.1  | 264.2  | 258.9  | 250.9  | 245.5  |
| 82.5°  | 181.6  | 181.6  | 179.0  | 168.2  | 168.2  |
| 85°    | 109.3  | 106.7  | 104.2  | 96.0   | 93.5   |
| 87.5°  | 48.2   | 42.8   | 37.4   | 29.4   | 26.7   |
| 90°    | 2.3    | 28.7   | 47.8   | 60.0   | 64.6   |
| 92.5°  | 60.0   | 50.4   | 57.4   | 62.3   | 64.6   |
| 95°    | 155.6  | 76.5   | 93.3   | 105.5  | 103.0  |
| 97.5°  | 280.2  | 83.9   | 122.0  | 129.4  | 131.7  |
| 100°   | 424.1  | 95.9   | 136.5  | 155.6  | 160.4  |
| 102.5° | 581.9  | 577.4  | 141.3  | 167.6  | 175.0  |
| 105°   | 728.2  | 800.1  | 146.2  | 172.4  | 182.1  |
| 107.5° | 898.3  | 958.0  | 151.1  | 177.2  | 186.9  |
| 110°   | 1061.2 | 1111.3 | 419.3  | 179.8  | 189.1  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1214.6 | 1257.5 | 1216.8 | 184.3  | 191.7  |
| 115°   | 1377.2 | 1417.9 | 1478.0 | 368.9  | 196.5  |
| 117.5° | 1518.7 | 1566.5 | 1607.4 | 1264.6 | 637.1  |
| 120°   | 1676.8 | 1712.6 | 1755.9 | 1784.6 | 1461.2 |
| 122.5° | 1810.8 | 1849.1 | 1897.2 | 1911.5 | 1914.1 |
| 125°   | 1947.3 | 1978.6 | 2024.1 | 2040.9 | 2048.0 |
| 127.5° | 2071.9 | 2105.4 | 2141.5 | 2165.4 | 2167.7 |
| 130°   | 2189.3 | 2227.8 | 2253.9 | 2280.4 | 2278.1 |
| 132.5° | 2309.1 | 2340.4 | 2366.6 | 2388.2 | 2385.9 |
| 135°   | 2409.8 | 2448.2 | 2469.5 | 2493.8 | 2488.9 |
| 137.5° | 2515.1 | 2543.8 | 2567.9 | 2591.8 | 2584.7 |
| 140°   | 2618.1 | 2637.3 | 2663.5 | 2685.1 | 2673.2 |
| 142.5° | 2704.5 | 2721.2 | 2752.3 | 2771.3 | 2759.4 |
| 145°   | 2795.5 | 2792.9 | 2833.6 | 2850.4 | 2838.5 |
| 147.5° | 2874.3 | 2867.2 | 2907.9 | 2919.8 | 2910.5 |
| 150°   | 2951.1 | 2934.4 | 2972.7 | 2987.0 | 2975.0 |
| 152.5° | 3015.7 | 2996.6 | 3032.4 | 3047.0 | 3030.2 |
| 155°   | 3078.0 | 3056.6 | 3085.3 | 3099.6 | 3080.5 |
| 157.5° | 3128.3 | 3109.2 | 3130.9 | 3147.6 | 3128.3 |
| 160°   | 3171.5 | 3157.0 | 3171.5 | 3185.7 | 3169.0 |
| 162.5° | 3209.6 | 3195.4 | 3207.4 | 3224.2 | 3202.6 |
| 165°   | 3243.2 | 3229.0 | 3236.1 | 3252.9 | 3236.1 |
| 167.5° | 3269.6 | 3255.2 | 3262.6 | 3279.4 | 3257.8 |
| 170°   | 3291.3 | 3276.8 | 3281.6 | 3298.4 | 3276.8 |
| 172.5° | 3305.5 | 3291.3 | 3296.1 | 3312.9 | 3291.3 |
| 175°   | 3317.4 | 3300.7 | 3305.5 | 3322.3 | 3298.4 |
| 177.5° | 3322.3 | 3305.5 | 3308.1 | 3324.8 | 3303.3 |
| 180°   | 3310.4 | 3310.4 | 3310.4 | 3310.4 | 3310.4 |

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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 | 8.96             | 9.75  | 9.98  | 10.78 | 12.16 | 8.52           | 9.31  | 9.54  | 10.34 | 11.72 |
|                 | 3H   | 10.62            | 11.33 | 11.65 | 12.37 | 13.77 | 10.13          | 10.85 | 11.17 | 11.88 | 13.28 |
|                 | 4H   | 11.20            | 11.88 | 12.25 | 12.92 | 14.33 | 10.72          | 11.39 | 11.76 | 12.43 | 13.84 |
|                 | 6H   | 11.60            | 12.22 | 12.66 | 13.27 | 14.69 | 11.11          | 11.73 | 12.17 | 12.78 | 14.20 |
|                 | 8H   | 11.71            | 12.30 | 12.77 | 13.36 | 14.77 | 11.21          | 11.81 | 12.27 | 12.87 | 14.28 |
|                 | 12H  | 11.75            | 12.32 | 12.82 | 13.37 | 14.81 | 11.25          | 11.82 | 12.32 | 12.87 | 14.31 |
| 4H              | 2H   | 9.41             | 10.09 | 10.46 | 11.13 | 12.54 | 9.06           | 9.74  | 10.11 | 10.78 | 12.18 |
|                 | 3H   | 11.28            | 11.84 | 12.33 | 12.91 | 14.33 | 10.87          | 11.44 | 11.93 | 12.51 | 13.93 |
|                 | 4H   | 11.99            | 12.51 | 13.05 | 13.57 | 15.01 | 11.57          | 12.09 | 12.64 | 13.15 | 14.59 |
|                 | 6H   | 12.50            | 12.95 | 13.58 | 14.03 | 15.47 | 12.08          | 12.52 | 13.15 | 13.61 | 15.04 |
|                 | 8H   | 12.65            | 13.07 | 13.73 | 14.14 | 15.60 | 12.22          | 12.64 | 13.30 | 13.72 | 15.17 |
|                 | 12H  | 12.73            | 13.10 | 13.82 | 14.19 | 15.65 | 12.28          | 12.66 | 13.38 | 13.75 | 15.21 |
| 8H              | 4H   | 12.18            | 12.60 | 13.26 | 13.67 | 15.12 | 11.81          | 12.22 | 12.88 | 13.30 | 14.75 |
|                 | 6H   | 12.81            | 13.16 | 13.91 | 14.27 | 15.72 | 12.44          | 12.78 | 13.53 | 13.90 | 15.35 |
|                 | 8H   | 13.04            | 13.34 | 14.14 | 14.44 | 15.90 | 12.65          | 12.95 | 13.75 | 14.05 | 15.52 |
|                 | 12H  | 13.17            | 13.43 | 14.27 | 14.53 | 16.03 | 12.76          | 13.03 | 13.87 | 14.12 | 15.63 |
| 12H             | 4H   | 12.16            | 12.54 | 13.26 | 13.63 | 15.09 | 11.80          | 12.18 | 12.89 | 13.27 | 14.72 |
|                 | 6H   | 12.84            | 13.14 | 13.95 | 14.24 | 15.71 | 12.48          | 12.78 | 13.58 | 13.88 | 15.35 |
|                 | 8H   | 13.08            | 13.35 | 14.19 | 14.44 | 15.95 | 12.71          | 12.98 | 13.82 | 14.07 | 15.58 |