

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: P921077

Luminaire Tested: DFN2DIP-TR4F0-080D090US935-RLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P921077  
REPORT IS A COMBINATION OF REPORTS P901988 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-080D090US935-RLLONL  
Description: 4 foot, Triangle Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

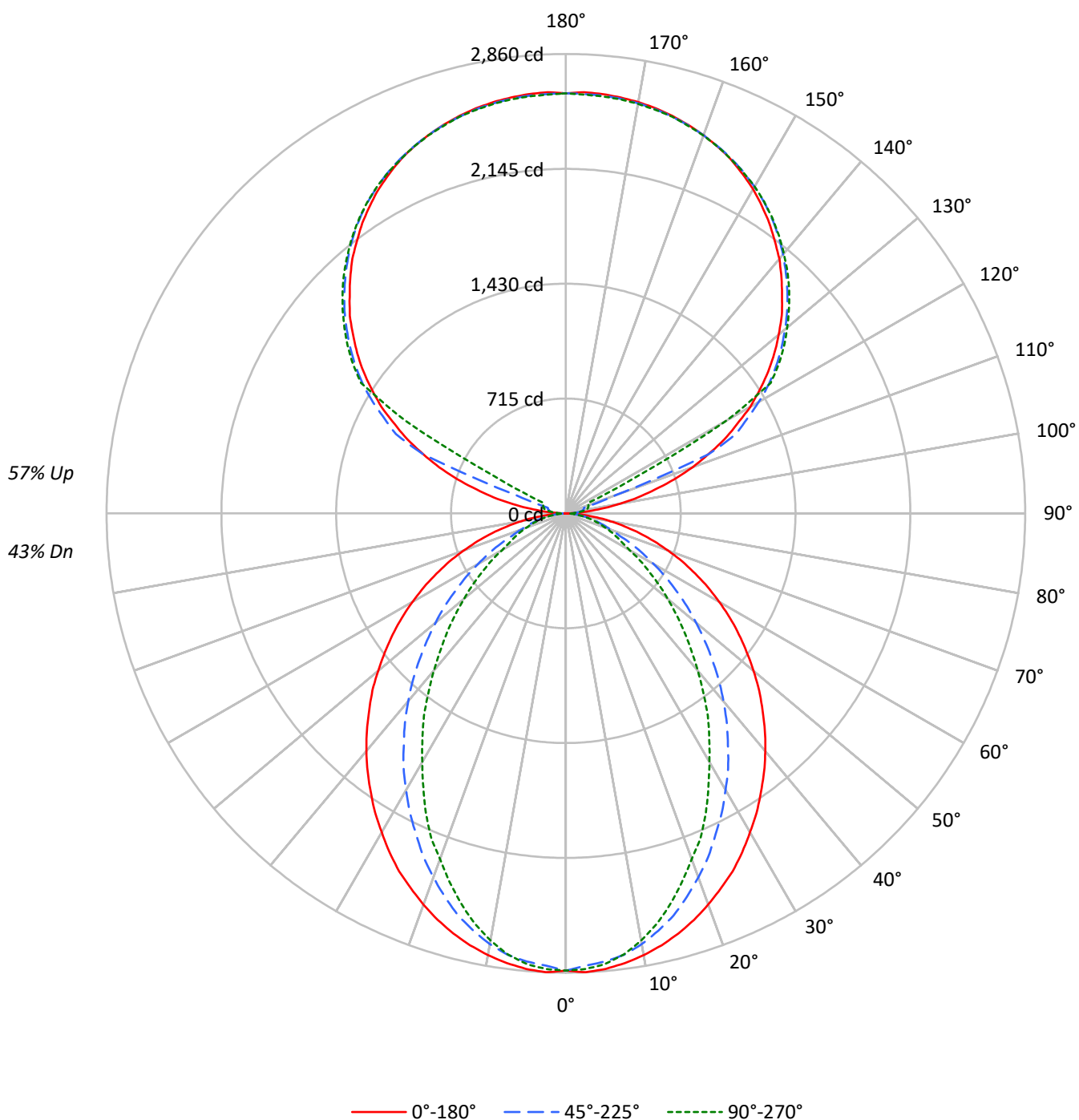
Lumens per Lamp: N/A  
Luminaire Lumens: 13526.3 lumens  
Efficiency: N/A  
Efficacy: 94.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 142.7  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9957  
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   | 106 | 106 | 106 | 106 | 97 | 97 | 97 | 97 | 80 | 80 | 80 | 64 | 64 | 64 | 50 | 50 | 50 |
| 1   | 97  | 93  | 89  | 86  | 88 | 85 | 82 | 79 | 70 | 68 | 66 | 57 | 56 | 54 | 45 | 44 | 43 |
| 2   | 88  | 81  | 75  | 71  | 81 | 75 | 70 | 65 | 62 | 59 | 55 | 51 | 48 | 46 | 40 | 38 | 37 |
| 3   | 81  | 72  | 65  | 59  | 74 | 66 | 60 | 55 | 55 | 51 | 47 | 45 | 42 | 39 | 36 | 34 | 32 |
| 4   | 74  | 64  | 56  | 50  | 68 | 59 | 52 | 47 | 49 | 44 | 40 | 40 | 37 | 34 | 32 | 30 | 28 |
| 5   | 68  | 57  | 49  | 43  | 62 | 53 | 46 | 41 | 44 | 39 | 35 | 36 | 33 | 30 | 29 | 27 | 24 |
| 6   | 63  | 51  | 43  | 38  | 57 | 47 | 40 | 35 | 40 | 35 | 31 | 33 | 29 | 26 | 27 | 24 | 22 |
| 7   | 58  | 46  | 39  | 33  | 53 | 43 | 36 | 31 | 36 | 31 | 27 | 30 | 26 | 23 | 24 | 22 | 19 |
| 8   | 54  | 42  | 35  | 30  | 49 | 39 | 32 | 28 | 33 | 28 | 24 | 28 | 24 | 21 | 23 | 20 | 18 |
| 9   | 50  | 39  | 31  | 26  | 46 | 36 | 29 | 25 | 31 | 25 | 22 | 26 | 22 | 19 | 21 | 18 | 16 |
| 10  | 47  | 35  | 28  | 24  | 43 | 33 | 27 | 22 | 28 | 23 | 20 | 24 | 20 | 17 | 19 | 17 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2262 | 2262 | 2262 |
| 5°  | 2265 | 2226 | 2240 |
| 10° | 2243 | 2182 | 2167 |
| 15° | 2212 | 2110 | 2054 |
| 20° | 2171 | 2010 | 1916 |
| 25° | 2129 | 1899 | 1782 |
| 30° | 2073 | 1785 | 1613 |
| 35° | 2018 | 1662 | 1464 |
| 40° | 1962 | 1535 | 1293 |
| 45° | 1897 | 1394 | 1139 |
| 50° | 1830 | 1251 | 988  |
| 55° | 1760 | 1099 | 843  |
| 60° | 1678 | 940  | 694  |
| 65° | 1585 | 778  | 624  |
| 70° | 1472 | 628  | 565  |
| 75° | 1329 | 553  | 514  |
| 80° | 1123 | 464  | 445  |
| 85° | 783  | 309  | 334  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1897 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 266.8   | 2.0       |
| 10°-20°   | 732.4   | 5.4       |
| 20°-30°   | 1028.3  | 7.6       |
| 30°-40°   | 1120.9  | 8.3       |
| 40°-50°   | 1030.3  | 7.6       |
| 50°-60°   | 809.1   | 6.0       |
| 60°-70°   | 526.6   | 3.9       |
| 70°-80°   | 271.1   | 2.0       |
| 80°-90°   | 73.8    | 0.5       |
| 90°-100°  | 86.2    | 0.6       |
| 100°-110° | 321.5   | 2.4       |
| 110°-120° | 852.6   | 6.3       |
| 120°-130° | 1414.1  | 10.5      |
| 130°-140° | 1502.1  | 11.1      |
| 140°-150° | 1396.0  | 10.3      |
| 150°-160° | 1122.4  | 8.3       |
| 160°-170° | 723.2   | 5.3       |
| 170°-180° | 248.9   | 1.8       |
| 0°-30°    | 2027.6  | 15.0      |
| 0°-40°    | 3148.5  | 23.3      |
| 0°-60°    | 4987.8  | 36.9      |
| 0°-90°    | 5859.4  | 43.3      |
| 90°-120°  | 1260.3  | 9.3       |
| 90°-150°  | 5572.4  | 41.2      |
| 90°-180°  | 7667.0  | 56.7      |
| 0°-180°   | 13526.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2847 | 2847  | 2847 | 2847  | 2847 |      |
| 5°   | 2847 | 2834  | 2800 | 2824  | 2816 | 270  |
| 15°  | 2708 | 2679  | 2592 | 2543  | 2517 | 763  |
| 25°  | 2458 | 2375  | 2205 | 2100  | 2061 | 1130 |
| 35°  | 2118 | 1986  | 1760 | 1597  | 1540 | 1326 |
| 45°  | 1731 | 1559  | 1288 | 1105  | 1043 | 1337 |
| 55°  | 1316 | 1116  | 837  | 683   | 634  | 1176 |
| 65°  | 889  | 680   | 448  | 361   | 353  | 881  |
| 75°  | 474  | 294   | 206  | 188   | 186  | 501  |
| 85°  | 111  | 57    | 49   | 49    | 49   | 127  |
| 90°  | 2    | 23    | 38   | 47    | 51   | 13   |
| 95°  | 123  | 60    | 74   | 83    | 81   | 146  |
| 105° | 575  | 632   | 116  | 136   | 144  | 615  |
| 115° | 1088 | 1120  | 1168 | 291   | 155  | 1071 |
| 125° | 1538 | 1563  | 1599 | 1612  | 1618 | 1372 |
| 135° | 1904 | 1934  | 1951 | 1970  | 1966 | 1471 |
| 145° | 2208 | 2206  | 2239 | 2252  | 2242 | 1381 |
| 155° | 2432 | 2415  | 2437 | 2449  | 2434 | 1121 |
| 165° | 2562 | 2551  | 2557 | 2570  | 2557 | 724  |
| 175° | 2621 | 2608  | 2611 | 2625  | 2606 | 249  |
| 180° | 2615 | 2615  | 2615 | 2615  | 2615 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2846.8 | 2846.8 | 2846.8 | 2846.8 | 2846.8 |
| 2.5°   | 2859.6 | 2846.8 | 2818.4 | 2844.3 | 2839.1 |
| 5°     | 2846.8 | 2834.0 | 2800.3 | 2823.6 | 2815.9 |
| 7.5°   | 2823.6 | 2808.2 | 2772.2 | 2782.3 | 2769.4 |
| 10°    | 2792.6 | 2774.7 | 2723.3 | 2715.3 | 2700.0 |
| 12.5°  | 2754.2 | 2730.9 | 2661.2 | 2645.8 | 2617.4 |
| 15°    | 2707.7 | 2679.3 | 2591.8 | 2542.9 | 2517.1 |
| 17.5°  | 2653.5 | 2612.3 | 2504.0 | 2447.5 | 2406.1 |
| 20°    | 2591.8 | 2540.1 | 2411.4 | 2347.2 | 2290.3 |
| 22.5°  | 2524.8 | 2465.5 | 2316.0 | 2228.5 | 2189.9 |
| 25°    | 2457.8 | 2375.3 | 2205.3 | 2099.8 | 2061.0 |
| 27.5°  | 2378.0 | 2290.3 | 2102.2 | 1981.2 | 1921.8 |
| 30°    | 2293.0 | 2194.9 | 1988.8 | 1857.6 | 1787.9 |
| 32.5°  | 2210.4 | 2091.9 | 1880.8 | 1726.1 | 1661.6 |
| 35°    | 2117.8 | 1986.3 | 1759.7 | 1597.4 | 1540.5 |
| 37.5°  | 2027.6 | 1885.8 | 1646.3 | 1468.3 | 1404.1 |
| 40°    | 1932.3 | 1777.8 | 1527.7 | 1344.8 | 1277.8 |
| 42.5°  | 1834.4 | 1669.6 | 1409.3 | 1218.6 | 1154.3 |
| 45°    | 1731.3 | 1558.6 | 1288.2 | 1105.1 | 1043.4 |
| 47.5°  | 1633.5 | 1450.6 | 1172.3 | 989.2  | 932.6  |
| 50°    | 1525.2 | 1342.4 | 1058.9 | 881.0  | 827.1  |
| 52.5°  | 1419.4 | 1226.1 | 950.6  | 780.7  | 731.8  |
| 55°    | 1316.4 | 1115.5 | 837.2  | 682.8  | 633.9  |
| 57.5°  | 1210.9 | 1004.8 | 736.9  | 592.6  | 551.3  |
| 60°    | 1102.6 | 896.6  | 631.1  | 499.9  | 458.7  |
| 62.5°  | 997.1  | 791.0  | 541.0  | 417.4  | 396.9  |
| 65°    | 888.9  | 680.0  | 448.2  | 360.8  | 352.8  |
| 67.5°  | 785.8  | 577.0  | 360.8  | 316.8  | 309.2  |
| 70°    | 677.6  | 476.7  | 298.8  | 273.0  | 262.7  |
| 72.5°  | 574.5  | 383.7  | 249.9  | 229.4  | 224.1  |
| 75°    | 474.0  | 293.6  | 206.1  | 188.0  | 185.6  |
| 77.5°  | 373.7  | 208.5  | 162.4  | 152.0  | 146.8  |
| 80°    | 280.7  | 149.6  | 123.6  | 113.4  | 113.4  |
| 82.5°  | 195.7  | 100.6  | 85.0   | 79.8   | 79.8   |
| 85°    | 110.7  | 56.6   | 48.9   | 48.9   | 48.9   |
| 87.5°  | 41.2   | 20.5   | 20.5   | 18.1   | 18.1   |
| 90°    | 1.8    | 22.7   | 37.7   | 47.4   | 51.0   |
| 92.5°  | 47.4   | 39.8   | 45.4   | 49.2   | 51.0   |
| 95°    | 123.0  | 60.4   | 73.7   | 83.3   | 81.4   |
| 97.5°  | 221.4  | 66.3   | 96.4   | 102.2  | 104.0  |
| 100°   | 335.0  | 75.8   | 107.9  | 123.0  | 126.7  |
| 102.5° | 459.8  | 456.2  | 111.7  | 132.3  | 138.2  |
| 105°   | 575.2  | 632.1  | 115.5  | 136.2  | 143.8  |
| 107.5° | 709.6  | 756.8  | 119.3  | 140.0  | 147.7  |
| 110°   | 838.4  | 878.0  | 331.2  | 142.0  | 149.5  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 959.5  | 993.4  | 961.3  | 145.6  | 151.4  |
| 115°   | 1088.0 | 1120.2 | 1167.6 | 291.4  | 155.2  |
| 117.5° | 1199.7 | 1237.5 | 1269.8 | 999.1  | 503.3  |
| 120°   | 1324.6 | 1353.0 | 1387.2 | 1409.8 | 1154.3 |
| 122.5° | 1430.5 | 1460.9 | 1498.8 | 1510.0 | 1512.1 |
| 125°   | 1538.3 | 1563.1 | 1599.0 | 1612.3 | 1617.9 |
| 127.5° | 1636.8 | 1663.3 | 1691.9 | 1710.7 | 1712.5 |
| 130°   | 1729.6 | 1760.0 | 1780.6 | 1801.5 | 1799.7 |
| 132.5° | 1824.2 | 1848.9 | 1869.6 | 1886.7 | 1884.9 |
| 135°   | 1903.8 | 1934.1 | 1950.9 | 1970.0 | 1966.3 |
| 137.5° | 1986.9 | 2009.6 | 2028.7 | 2047.5 | 2041.9 |
| 140°   | 2068.2 | 2083.5 | 2104.2 | 2121.2 | 2111.9 |
| 142.5° | 2136.6 | 2149.8 | 2174.3 | 2189.3 | 2180.0 |
| 145°   | 2208.5 | 2206.4 | 2238.6 | 2251.9 | 2242.4 |
| 147.5° | 2270.7 | 2265.1 | 2297.2 | 2306.7 | 2299.2 |
| 150°   | 2331.4 | 2318.2 | 2348.5 | 2359.7 | 2350.3 |
| 152.5° | 2382.4 | 2367.3 | 2395.6 | 2407.1 | 2393.8 |
| 155°   | 2431.6 | 2414.8 | 2437.4 | 2448.7 | 2433.6 |
| 157.5° | 2471.4 | 2456.3 | 2473.4 | 2486.6 | 2471.4 |
| 160°   | 2505.5 | 2494.1 | 2505.5 | 2516.8 | 2503.5 |
| 162.5° | 2535.6 | 2524.4 | 2533.8 | 2547.1 | 2530.0 |
| 165°   | 2562.2 | 2550.9 | 2556.6 | 2569.8 | 2556.6 |
| 167.5° | 2583.1 | 2571.6 | 2577.4 | 2590.7 | 2573.6 |
| 170°   | 2600.1 | 2588.7 | 2592.5 | 2605.7 | 2588.7 |
| 172.5° | 2611.4 | 2600.1 | 2603.9 | 2617.2 | 2600.1 |
| 175°   | 2620.8 | 2607.5 | 2611.4 | 2624.6 | 2605.7 |
| 177.5° | 2624.6 | 2611.4 | 2613.4 | 2626.6 | 2609.6 |
| 180°   | 2615.2 | 2615.2 | 2615.2 | 2615.2 | 2615.2 |

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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 | 9.32             | 10.10 | 10.34 | 11.12 | 12.49 | 5.29           | 6.07 | 6.31 | 7.09  | 8.46  |
|                 | 3H   | 10.99            | 11.69 | 12.02 | 12.72 | 14.11 | 6.48           | 7.17 | 7.51 | 8.21  | 9.59  |
|                 | 4H   | 11.60            | 12.26 | 12.64 | 13.29 | 14.69 | 6.93           | 7.59 | 7.97 | 8.62  | 10.01 |
|                 | 6H   | 12.02            | 12.62 | 13.07 | 13.66 | 15.07 | 7.25           | 7.85 | 8.30 | 8.89  | 10.30 |
|                 | 8H   | 12.14            | 12.72 | 13.20 | 13.77 | 15.17 | 7.34           | 7.91 | 8.39 | 8.97  | 10.37 |
|                 | 12H  | 12.20            | 12.75 | 13.26 | 13.80 | 15.22 | 7.38           | 7.93 | 8.44 | 8.97  | 10.40 |
| 4H              | 2H   | 9.33             | 9.99  | 10.38 | 11.03 | 12.42 | 5.88           | 6.54 | 6.93 | 7.58  | 8.97  |
|                 | 3H   | 11.16            | 11.70 | 12.21 | 12.77 | 14.17 | 7.23           | 7.78 | 8.28 | 8.84  | 10.25 |
|                 | 4H   | 11.85            | 12.35 | 12.91 | 13.40 | 14.83 | 7.78           | 8.28 | 8.84 | 9.33  | 10.76 |
|                 | 6H   | 12.36            | 12.79 | 13.43 | 13.87 | 15.29 | 8.19           | 8.62 | 9.26 | 9.70  | 11.12 |
|                 | 8H   | 12.53            | 12.93 | 13.60 | 14.00 | 15.44 | 8.32           | 8.72 | 9.39 | 9.79  | 11.23 |
|                 | 12H  | 12.62            | 12.99 | 13.71 | 14.07 | 15.52 | 8.38           | 8.75 | 9.47 | 9.83  | 11.27 |
| 8H              | 4H   | 11.81            | 12.21 | 12.88 | 13.28 | 14.72 | 8.05           | 8.45 | 9.12 | 9.52  | 10.96 |
|                 | 6H   | 12.37            | 12.71 | 13.47 | 13.82 | 15.25 | 8.57           | 8.90 | 9.66 | 10.01 | 11.45 |
|                 | 8H   | 12.59            | 12.88 | 13.69 | 13.98 | 15.43 | 8.76           | 9.05 | 9.86 | 10.15 | 11.60 |
|                 | 12H  | 12.73            | 12.98 | 13.83 | 14.07 | 15.57 | 8.88           | 9.13 | 9.98 | 10.22 | 11.72 |
| 12H             | 4H   | 11.76            | 12.12 | 12.85 | 13.21 | 14.65 | 8.05           | 8.42 | 9.14 | 9.50  | 10.94 |
|                 | 6H   | 12.35            | 12.64 | 13.45 | 13.74 | 15.19 | 8.62           | 8.91 | 9.72 | 10.00 | 11.46 |
|                 | 8H   | 12.57            | 12.82 | 13.67 | 13.91 | 15.41 | 8.83           | 9.08 | 9.93 | 10.17 | 11.67 |