

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: P918465

Luminaire Tested: DFN2DIP-TR4F0-110D110US930-RLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P918465  
REPORT IS A COMBINATION OF REPORTS P902030 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-110D110US930-RLLONL  
Description: 4 foot, Triangle Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

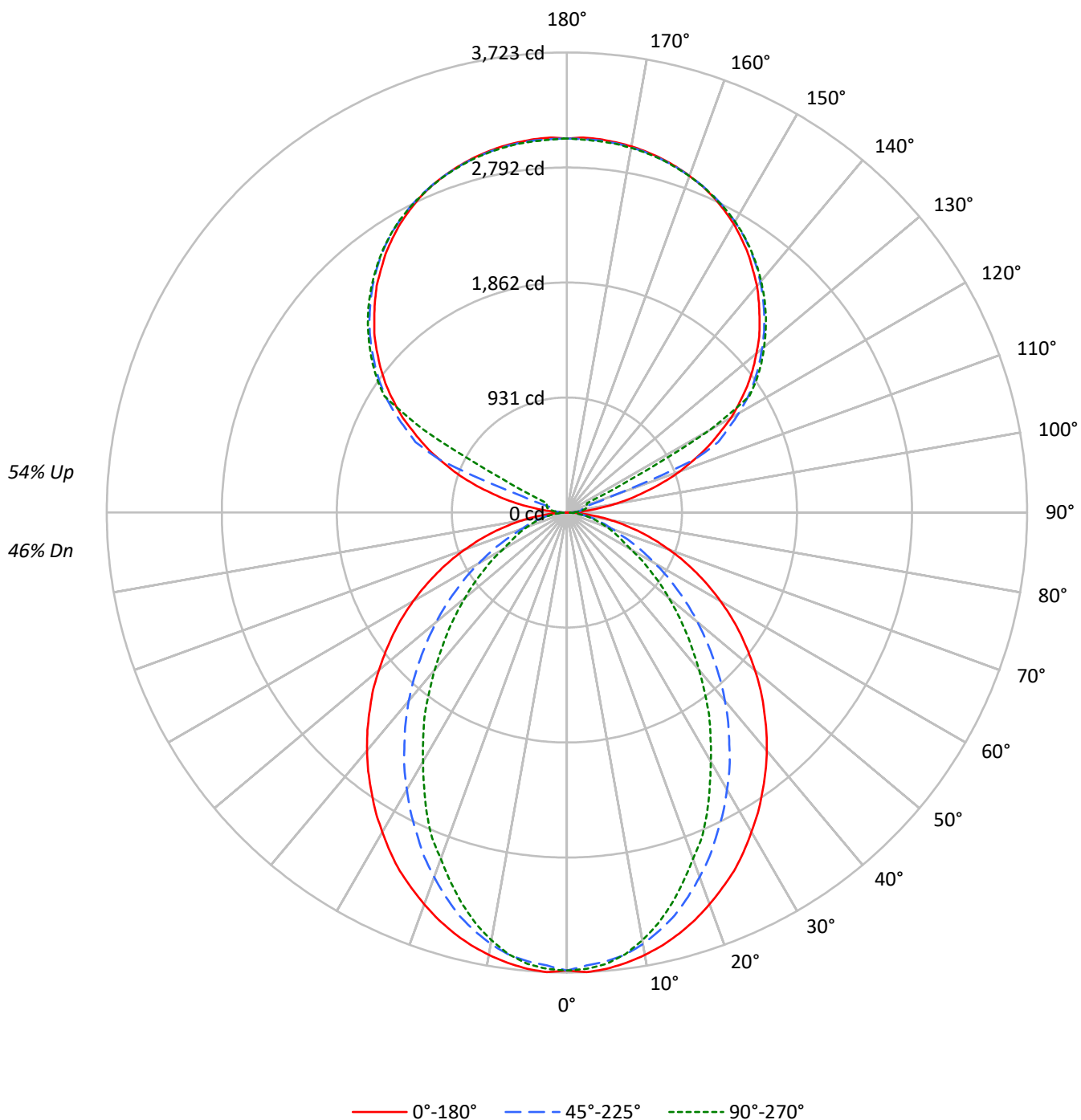
Lumens per Lamp: N/A  
Luminaire Lumens: 16501.6 lumens  
Efficiency: N/A  
Efficacy: 83.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 197.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9613  
Total Harmonic Distortion (THDi): 0.083  
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 | 98 | 98 | 98 | 98 | 81 | 81 | 81 | 66 | 66 | 66 | 53 | 53 | 53 |
| 1   | 97  | 93  | 90  | 86  | 89 | 86 | 83 | 80 | 72 | 70 | 68 | 59 | 58 | 56 | 47 | 46 | 45 |
| 2   | 89  | 82  | 76  | 71  | 82 | 76 | 70 | 66 | 63 | 60 | 57 | 52 | 50 | 48 | 42 | 40 | 39 |
| 3   | 81  | 72  | 65  | 60  | 75 | 67 | 61 | 56 | 56 | 52 | 48 | 47 | 43 | 41 | 38 | 35 | 34 |
| 4   | 75  | 64  | 57  | 51  | 68 | 60 | 53 | 48 | 50 | 45 | 41 | 42 | 38 | 35 | 34 | 31 | 29 |
| 5   | 69  | 58  | 50  | 44  | 63 | 53 | 46 | 41 | 45 | 40 | 36 | 38 | 34 | 31 | 31 | 28 | 26 |
| 6   | 63  | 52  | 44  | 38  | 58 | 48 | 41 | 36 | 41 | 36 | 32 | 34 | 30 | 27 | 28 | 25 | 23 |
| 7   | 59  | 47  | 39  | 34  | 54 | 44 | 37 | 32 | 37 | 32 | 28 | 31 | 27 | 24 | 26 | 23 | 21 |
| 8   | 55  | 43  | 35  | 30  | 50 | 40 | 33 | 28 | 34 | 29 | 25 | 29 | 25 | 22 | 24 | 21 | 19 |
| 9   | 51  | 39  | 32  | 27  | 47 | 36 | 30 | 25 | 31 | 26 | 22 | 27 | 23 | 20 | 22 | 19 | 17 |
| 10  | 48  | 36  | 29  | 24  | 44 | 33 | 27 | 23 | 29 | 24 | 20 | 25 | 21 | 18 | 20 | 18 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2945 | 2945 | 2945 |
| 5°  | 2949 | 2898 | 2916 |
| 10° | 2920 | 2841 | 2821 |
| 15° | 2880 | 2747 | 2675 |
| 20° | 2827 | 2618 | 2495 |
| 25° | 2772 | 2472 | 2321 |
| 30° | 2699 | 2324 | 2100 |
| 35° | 2628 | 2164 | 1906 |
| 40° | 2555 | 1998 | 1684 |
| 45° | 2470 | 1815 | 1483 |
| 50° | 2382 | 1629 | 1286 |
| 55° | 2291 | 1431 | 1097 |
| 60° | 2185 | 1224 | 903  |
| 65° | 2064 | 1014 | 813  |
| 70° | 1916 | 817  | 735  |
| 75° | 1731 | 720  | 669  |
| 80° | 1462 | 604  | 580  |
| 85° | 1019 | 403  | 435  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2470 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 347.4   | 2.1       |
| 10°-20°   | 953.6   | 5.8       |
| 20°-30°   | 1338.9  | 8.1       |
| 30°-40°   | 1459.5  | 8.8       |
| 40°-50°   | 1341.4  | 8.1       |
| 50°-60°   | 1053.5  | 6.4       |
| 60°-70°   | 685.7   | 4.2       |
| 70°-80°   | 353.0   | 2.1       |
| 80°-90°   | 95.4    | 0.6       |
| 90°-100°  | 99.8    | 0.6       |
| 100°-110° | 372.1   | 2.3       |
| 110°-120° | 986.7   | 6.0       |
| 120°-130° | 1636.6  | 9.9       |
| 130°-140° | 1738.4  | 10.5      |
| 140°-150° | 1615.7  | 9.8       |
| 150°-160° | 1298.9  | 7.9       |
| 160°-170° | 837.0   | 5.1       |
| 170°-180° | 288.1   | 1.7       |
| <hr/>     |         |           |
| 0°-30°    | 2639.9  | 16.0      |
| 0°-40°    | 4099.4  | 24.8      |
| 0°-60°    | 6494.2  | 39.4      |
| 0°-90°    | 7628.4  | 46.2      |
| 90°-120°  | 1458.6  | 8.8       |
| 90°-150°  | 6449.2  | 39.1      |
| 90°-180°  | 8873.0  | 53.8      |
| 0°-180°   | 16501.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3707 | 3707  | 3707 | 3707  | 3707 |      |
| 5°   | 3707 | 3690  | 3646 | 3676  | 3666 | 351  |
| 15°  | 3525 | 3488  | 3374 | 3311  | 3277 | 993  |
| 25°  | 3200 | 3093  | 2871 | 2734  | 2683 | 1472 |
| 35°  | 2757 | 2586  | 2291 | 2080  | 2006 | 1726 |
| 45°  | 2254 | 2029  | 1677 | 1439  | 1358 | 1741 |
| 55°  | 1714 | 1452  | 1090 | 889   | 825  | 1532 |
| 65°  | 1157 | 885   | 584  | 470   | 459  | 1147 |
| 75°  | 617  | 382   | 268  | 245   | 242  | 653  |
| 85°  | 144  | 74    | 64   | 64    | 64   | 165  |
| 90°  | 2    | 26    | 44   | 55    | 59   | 15   |
| 95°  | 142  | 70    | 85   | 96    | 94   | 169  |
| 105° | 666  | 732   | 134  | 158   | 166  | 711  |
| 115° | 1259 | 1296  | 1351 | 337   | 180  | 1240 |
| 125° | 1780 | 1809  | 1851 | 1866  | 1872 | 1588 |
| 135° | 2203 | 2238  | 2258 | 2280  | 2276 | 1702 |
| 145° | 2556 | 2554  | 2591 | 2606  | 2595 | 1599 |
| 155° | 2814 | 2795  | 2821 | 2834  | 2816 | 1297 |
| 165° | 2965 | 2952  | 2959 | 2974  | 2959 | 838  |
| 175° | 3033 | 3018  | 3022 | 3038  | 3016 | 289  |
| 180° | 3027 | 3027  | 3027 | 3027  | 3027 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3706.6 | 3706.6 | 3706.6 | 3706.6 | 3706.6 |
| 2.5°   | 3723.3 | 3706.6 | 3669.6 | 3703.4 | 3696.6 |
| 5°     | 3706.6 | 3689.9 | 3646.1 | 3676.3 | 3666.4 |
| 7.5°   | 3676.3 | 3656.4 | 3609.4 | 3622.6 | 3605.8 |
| 10°    | 3636.1 | 3612.6 | 3545.7 | 3535.4 | 3515.5 |
| 12.5°  | 3585.9 | 3555.7 | 3464.9 | 3445.0 | 3407.9 |
| 15°    | 3525.4 | 3488.4 | 3374.5 | 3310.8 | 3277.3 |
| 17.5°  | 3455.0 | 3401.3 | 3260.3 | 3186.6 | 3132.9 |
| 20°    | 3374.5 | 3307.3 | 3139.6 | 3056.0 | 2982.0 |
| 22.5°  | 3287.4 | 3210.1 | 3015.5 | 2901.6 | 2851.3 |
| 25°    | 3200.1 | 3092.7 | 2871.3 | 2733.9 | 2683.4 |
| 27.5°  | 3096.3 | 2982.0 | 2737.1 | 2579.4 | 2502.2 |
| 30°    | 2985.5 | 2857.8 | 2589.5 | 2418.6 | 2327.8 |
| 32.5°  | 2878.1 | 2723.6 | 2448.8 | 2247.5 | 2163.5 |
| 35°    | 2757.4 | 2586.2 | 2291.2 | 2079.8 | 2005.8 |
| 37.5°  | 2640.0 | 2455.3 | 2143.5 | 1911.8 | 1828.2 |
| 40°    | 2515.8 | 2314.7 | 1989.1 | 1750.9 | 1663.8 |
| 42.5°  | 2388.3 | 2173.7 | 1835.0 | 1586.6 | 1502.9 |
| 45°    | 2254.2 | 2029.3 | 1677.3 | 1438.8 | 1358.4 |
| 47.5°  | 2126.8 | 1888.7 | 1526.4 | 1287.9 | 1214.3 |
| 50°    | 1985.8 | 1747.8 | 1378.8 | 1147.0 | 1076.9 |
| 52.5°  | 1848.1 | 1596.5 | 1237.8 | 1016.4 | 952.7  |
| 55°    | 1713.9 | 1452.4 | 1090.1 | 889.0  | 825.3  |
| 57.5°  | 1576.6 | 1308.2 | 959.4  | 771.6  | 717.8  |
| 60°    | 1435.7 | 1167.3 | 821.7  | 650.9  | 597.2  |
| 62.5°  | 1298.3 | 1030.0 | 704.3  | 543.5  | 516.7  |
| 65°    | 1157.3 | 885.4  | 583.7  | 469.8  | 459.4  |
| 67.5°  | 1023.2 | 751.3  | 469.8  | 412.5  | 402.5  |
| 70°    | 882.2  | 620.7  | 389.0  | 355.6  | 342.0  |
| 72.5°  | 748.0  | 499.7  | 325.3  | 298.6  | 291.8  |
| 75°    | 617.1  | 382.2  | 268.3  | 244.8  | 241.7  |
| 77.5°  | 486.5  | 271.6  | 211.4  | 197.9  | 191.1  |
| 80°    | 365.5  | 194.7  | 160.9  | 147.7  | 147.7  |
| 82.5°  | 254.8  | 130.9  | 110.7  | 104.0  | 104.0  |
| 85°    | 144.1  | 73.7   | 63.7   | 63.7   | 63.7   |
| 87.5°  | 53.7   | 26.7   | 26.7   | 23.5   | 23.5   |
| 90°    | 2.1    | 26.3   | 43.7   | 54.9   | 59.0   |
| 92.5°  | 54.9   | 46.1   | 52.5   | 57.0   | 59.0   |
| 95°    | 142.3  | 70.0   | 85.3   | 96.4   | 94.2   |
| 97.5°  | 256.2  | 76.7   | 111.5  | 118.3  | 120.4  |
| 100°   | 387.8  | 87.6   | 124.8  | 142.3  | 146.7  |
| 102.5° | 532.1  | 527.9  | 129.2  | 153.2  | 160.0  |
| 105°   | 665.8  | 731.6  | 133.7  | 157.6  | 166.5  |
| 107.5° | 821.3  | 875.9  | 138.1  | 162.0  | 170.9  |
| 110°   | 970.3  | 1016.1 | 383.4  | 164.4  | 172.9  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1110.5 | 1149.7 | 1112.6 | 168.5  | 175.3  |
| 115°   | 1259.2 | 1296.4 | 1351.4 | 337.3  | 179.7  |
| 117.5° | 1388.5 | 1432.2 | 1469.7 | 1156.3 | 582.5  |
| 120°   | 1533.1 | 1565.9 | 1605.4 | 1631.7 | 1335.9 |
| 122.5° | 1655.6 | 1690.7 | 1734.6 | 1747.7 | 1750.0 |
| 125°   | 1780.4 | 1809.1 | 1850.6 | 1866.0 | 1872.5 |
| 127.5° | 1894.3 | 1925.0 | 1958.0 | 1979.9 | 1982.0 |
| 130°   | 2001.7 | 2036.9 | 2060.7 | 2085.0 | 2082.9 |
| 132.5° | 2111.2 | 2139.8 | 2163.8 | 2183.5 | 2181.5 |
| 135°   | 2203.3 | 2238.4 | 2257.9 | 2280.1 | 2275.6 |
| 137.5° | 2299.5 | 2325.8 | 2347.9 | 2369.7 | 2363.2 |
| 140°   | 2393.7 | 2411.3 | 2435.3 | 2455.0 | 2444.1 |
| 142.5° | 2472.7 | 2488.0 | 2516.4 | 2533.9 | 2522.9 |
| 145°   | 2556.0 | 2553.6 | 2590.8 | 2606.2 | 2595.3 |
| 147.5° | 2628.0 | 2621.5 | 2658.7 | 2669.6 | 2661.1 |
| 150°   | 2698.2 | 2682.9 | 2718.0 | 2731.0 | 2720.1 |
| 152.5° | 2757.3 | 2739.8 | 2772.6 | 2785.9 | 2770.5 |
| 155°   | 2814.2 | 2794.7 | 2820.9 | 2834.0 | 2816.5 |
| 157.5° | 2860.2 | 2842.8 | 2862.6 | 2877.9 | 2860.2 |
| 160°   | 2899.8 | 2886.5 | 2899.8 | 2912.7 | 2897.4 |
| 162.5° | 2934.6 | 2921.6 | 2932.5 | 2947.9 | 2928.1 |
| 165°   | 2965.3 | 2952.3 | 2958.8 | 2974.1 | 2958.8 |
| 167.5° | 2989.5 | 2976.2 | 2983.0 | 2998.3 | 2978.6 |
| 170°   | 3009.3 | 2996.0 | 3000.4 | 3015.8 | 2996.0 |
| 172.5° | 3022.2 | 3009.3 | 3013.7 | 3029.0 | 3009.3 |
| 175°   | 3033.2 | 3017.8 | 3022.2 | 3037.6 | 3015.8 |
| 177.5° | 3037.6 | 3022.2 | 3024.6 | 3039.9 | 3020.2 |
| 180°   | 3026.7 | 3026.7 | 3026.7 | 3026.7 | 3026.7 |

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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 | 10.53            | 11.33 | 11.53 | 12.33 | 13.66 | 6.50           | 7.31  | 7.50  | 8.31  | 9.63  |
|                 | 3H   | 12.21            | 12.92 | 13.21 | 13.93 | 15.28 | 7.69           | 8.41  | 8.70  | 9.42  | 10.77 |
|                 | 4H   | 12.81            | 13.49 | 13.83 | 14.50 | 15.86 | 8.14           | 8.82  | 9.16  | 9.83  | 11.19 |
|                 | 6H   | 13.23            | 13.86 | 14.26 | 14.87 | 16.24 | 8.46           | 9.08  | 9.49  | 10.10 | 11.47 |
|                 | 8H   | 13.36            | 13.95 | 14.39 | 14.99 | 16.35 | 8.55           | 9.14  | 9.59  | 10.18 | 11.54 |
|                 | 12H  | 13.42            | 13.98 | 14.46 | 15.01 | 16.40 | 8.60           | 9.16  | 9.63  | 10.19 | 11.57 |
| 4H              | 2H   | 10.55            | 11.22 | 11.57 | 12.24 | 13.59 | 7.10           | 7.77  | 8.12  | 8.79  | 10.14 |
|                 | 3H   | 12.37            | 12.93 | 13.41 | 13.98 | 15.35 | 8.44           | 9.01  | 9.48  | 10.05 | 11.42 |
|                 | 4H   | 13.06            | 13.58 | 14.10 | 14.61 | 16.00 | 8.99           | 9.51  | 10.03 | 10.54 | 11.93 |
|                 | 6H   | 13.58            | 14.02 | 14.63 | 15.08 | 16.46 | 9.41           | 9.85  | 10.46 | 10.91 | 12.30 |
|                 | 8H   | 13.75            | 14.16 | 14.80 | 15.21 | 16.62 | 9.54           | 9.95  | 10.59 | 11.00 | 12.41 |
|                 | 12H  | 13.84            | 14.22 | 14.91 | 15.28 | 16.69 | 9.60           | 9.98  | 10.67 | 11.04 | 12.45 |
| 8H              | 4H   | 13.03            | 13.44 | 14.08 | 14.49 | 15.89 | 9.27           | 9.68  | 10.32 | 10.73 | 12.14 |
|                 | 6H   | 13.59            | 13.93 | 14.67 | 15.03 | 16.43 | 9.79           | 10.13 | 10.86 | 11.22 | 12.62 |
|                 | 8H   | 13.81            | 14.11 | 14.89 | 15.19 | 16.60 | 9.98           | 10.28 | 11.06 | 11.36 | 12.78 |
|                 | 12H  | 13.95            | 14.21 | 15.03 | 15.28 | 16.74 | 10.10          | 10.36 | 11.18 | 11.43 | 12.89 |
| 12H             | 4H   | 12.98            | 13.35 | 14.05 | 14.42 | 15.82 | 9.27           | 9.65  | 10.34 | 10.71 | 12.12 |
|                 | 6H   | 13.57            | 13.87 | 14.65 | 14.95 | 16.36 | 9.84           | 10.14 | 10.92 | 11.21 | 12.63 |
|                 | 8H   | 13.79            | 14.05 | 14.87 | 15.12 | 16.58 | 10.05          | 10.31 | 11.13 | 11.38 | 12.84 |