

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: P928082

Luminaire Tested: DFN2DIP-HX4F0-100D090US850-RLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928082  
REPORT IS A COMBINATION OF REPORTS P900922 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-100D090US850-RLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

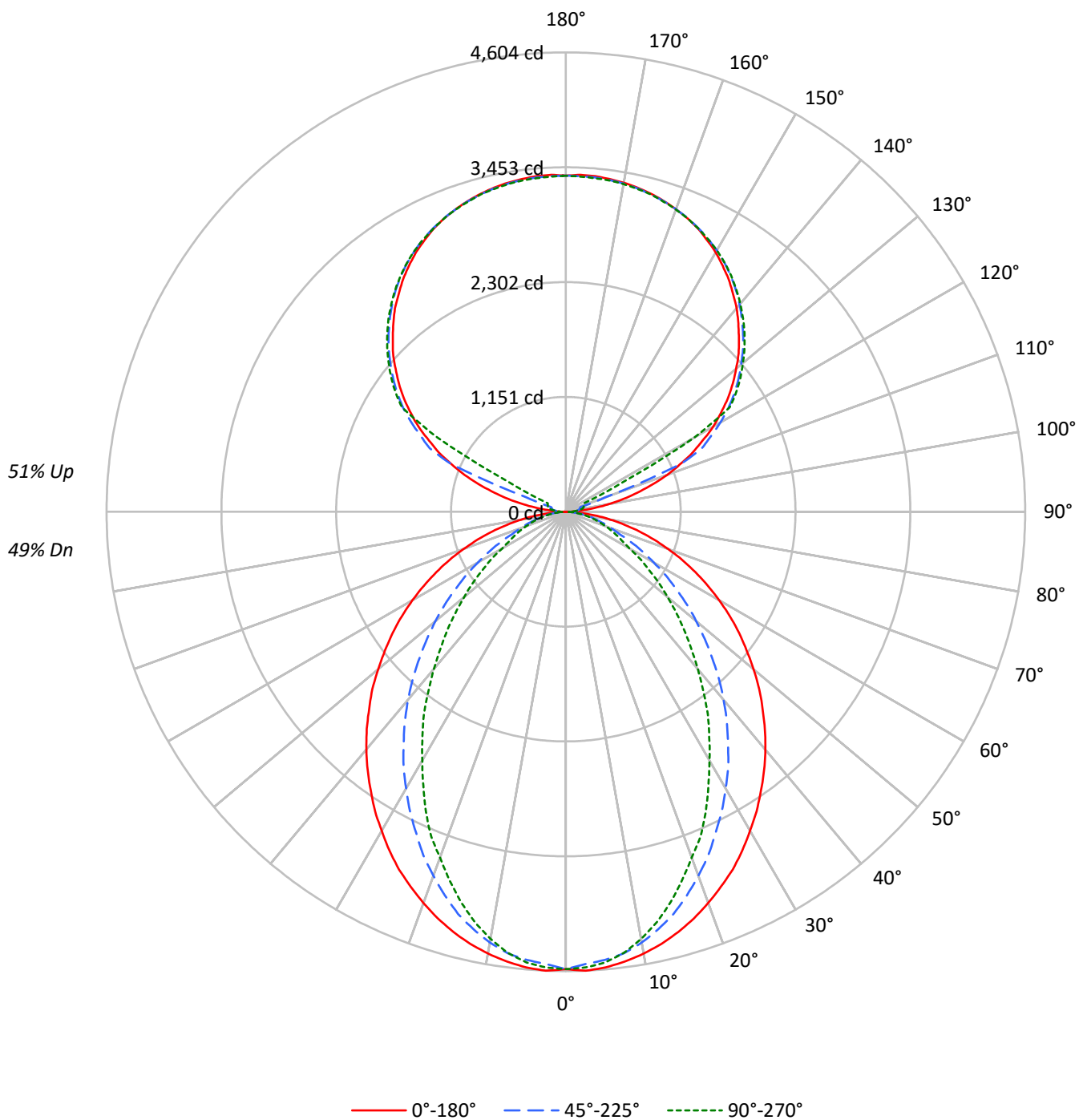
Lumens per Lamp: N/A  
Luminaire Lumens: 19307.7 lumens  
Efficiency: N/A  
Efficacy: 115.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 167.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.946  
Total Harmonic Distortion (THDi): 0.132  
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   | 107 | 107 | 107 | 107 | 98 | 98 | 98 | 98 | 83 | 83 | 83 | 68 | 68 | 68 | 55 | 55 | 55 |
| 1   | 98  | 94  | 90  | 87  | 90 | 87 | 83 | 81 | 73 | 71 | 69 | 61 | 59 | 58 | 49 | 48 | 47 |
| 2   | 90  | 83  | 77  | 72  | 82 | 76 | 71 | 67 | 65 | 61 | 58 | 54 | 51 | 49 | 44 | 42 | 41 |
| 3   | 82  | 73  | 66  | 60  | 75 | 68 | 61 | 56 | 57 | 53 | 49 | 48 | 45 | 42 | 39 | 37 | 35 |
| 4   | 75  | 65  | 57  | 51  | 69 | 60 | 53 | 48 | 51 | 46 | 42 | 43 | 39 | 36 | 36 | 33 | 31 |
| 5   | 69  | 58  | 50  | 44  | 64 | 54 | 47 | 42 | 46 | 41 | 37 | 39 | 35 | 32 | 32 | 29 | 27 |
| 6   | 64  | 52  | 44  | 39  | 59 | 49 | 42 | 37 | 42 | 36 | 32 | 35 | 31 | 28 | 29 | 26 | 24 |
| 7   | 59  | 47  | 40  | 34  | 55 | 44 | 37 | 32 | 38 | 33 | 29 | 32 | 28 | 25 | 27 | 24 | 22 |
| 8   | 55  | 43  | 35  | 30  | 51 | 40 | 33 | 29 | 35 | 29 | 26 | 30 | 26 | 22 | 25 | 22 | 19 |
| 9   | 51  | 39  | 32  | 27  | 47 | 37 | 30 | 26 | 32 | 27 | 23 | 27 | 23 | 20 | 23 | 20 | 18 |
| 10  | 48  | 36  | 29  | 24  | 44 | 34 | 28 | 23 | 30 | 24 | 21 | 25 | 21 | 18 | 21 | 18 | 16 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3408 | 3408 | 3408 |
| 5°  | 3414 | 3354 | 3376 |
| 10° | 3380 | 3289 | 3266 |
| 15° | 3334 | 3180 | 3096 |
| 20° | 3273 | 3031 | 2888 |
| 25° | 3210 | 2863 | 2687 |
| 30° | 3126 | 2691 | 2432 |
| 35° | 3043 | 2506 | 2208 |
| 40° | 2959 | 2315 | 1951 |
| 45° | 2861 | 2103 | 1718 |
| 50° | 2760 | 1888 | 1490 |
| 55° | 2655 | 1659 | 1272 |
| 60° | 2533 | 1420 | 1047 |
| 65° | 2393 | 1176 | 942  |
| 70° | 2222 | 949  | 853  |
| 75° | 2009 | 837  | 777  |
| 80° | 1699 | 703  | 674  |
| 85° | 1188 | 471  | 508  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2861 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 429.6   | 2.2       |
| 10°-20°   | 1179.3  | 6.1       |
| 20°-30°   | 1655.6  | 8.6       |
| 30°-40°   | 1804.7  | 9.3       |
| 40°-50°   | 1658.8  | 8.6       |
| 50°-60°   | 1302.7  | 6.7       |
| 60°-70°   | 847.9   | 4.4       |
| 70°-80°   | 436.5   | 2.3       |
| 80°-90°   | 117.4   | 0.6       |
| 90°-100°  | 111.1   | 0.6       |
| 100°-110° | 414.0   | 2.1       |
| 110°-120° | 1098.2  | 5.7       |
| 120°-130° | 1821.4  | 9.4       |
| 130°-140° | 1934.7  | 10.0      |
| 140°-150° | 1798.1  | 9.3       |
| 150°-160° | 1445.6  | 7.5       |
| 160°-170° | 931.5   | 4.8       |
| 170°-180° | 320.6   | 1.7       |
| 0°-30°    | 3264.5  | 16.9      |
| 0°-40°    | 5069.2  | 26.3      |
| 0°-60°    | 8030.6  | 41.6      |
| 0°-90°    | 9432.4  | 48.9      |
| 90°-120°  | 1623.3  | 8.4       |
| 90°-150°  | 7177.5  | 37.2      |
| 90°-180°  | 9875.0  | 51.1      |
| 0°-180°   | 19307.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4584 | 4584  | 4584 | 4584  | 4584 |      |
| 5°   | 4584 | 4563  | 4509 | 4546  | 4534 | 435  |
| 15°  | 4360 | 4314  | 4173 | 4094  | 4053 | 1228 |
| 25°  | 3957 | 3824  | 3551 | 3381  | 3318 | 1820 |
| 35°  | 3410 | 3198  | 2833 | 2572  | 2480 | 2134 |
| 45°  | 2788 | 2509  | 2074 | 1779  | 1680 | 2153 |
| 55°  | 2119 | 1796  | 1348 | 1099  | 1020 | 1894 |
| 65°  | 1431 | 1095  | 722  | 581   | 568  | 1419 |
| 75°  | 763  | 473   | 332  | 303   | 299  | 807  |
| 85°  | 178  | 91    | 79   | 79    | 79   | 205  |
| 90°  | 2    | 29    | 49   | 61    | 66   | 18   |
| 95°  | 158  | 78    | 95   | 107   | 105  | 188  |
| 105° | 741  | 814   | 149  | 175   | 185  | 792  |
| 115° | 1401 | 1443  | 1504 | 375   | 200  | 1380 |
| 125° | 1982 | 2013  | 2060 | 2077  | 2084 | 1767 |
| 135° | 2452 | 2491  | 2513 | 2538  | 2533 | 1894 |
| 145° | 2845 | 2842  | 2883 | 2900  | 2888 | 1779 |
| 155° | 3132 | 3110  | 3140 | 3154  | 3135 | 1443 |
| 165° | 3300 | 3286  | 3293 | 3310  | 3293 | 932  |
| 175° | 3376 | 3359  | 3364 | 3381  | 3356 | 321  |
| 180° | 3368 | 3368  | 3368 | 3368  | 3368 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4583.5 | 4583.5 | 4583.5 | 4583.5 | 4583.5 |
| 2.5°   | 4604.1 | 4583.5 | 4537.7 | 4579.5 | 4571.2 |
| 5°     | 4583.5 | 4562.8 | 4508.6 | 4546.1 | 4533.7 |
| 7.5°   | 4546.1 | 4521.4 | 4463.3 | 4479.6 | 4459.0 |
| 10°    | 4496.3 | 4467.3 | 4384.5 | 4371.8 | 4347.2 |
| 12.5°  | 4434.3 | 4396.9 | 4284.6 | 4260.0 | 4214.2 |
| 15°    | 4359.5 | 4313.7 | 4172.8 | 4094.1 | 4052.7 |
| 17.5°  | 4272.3 | 4205.9 | 4031.7 | 3940.5 | 3874.1 |
| 20°    | 4172.8 | 4089.7 | 3882.4 | 3779.0 | 3687.4 |
| 22.5°  | 4065.0 | 3969.6 | 3728.8 | 3588.1 | 3526.0 |
| 25°    | 3957.2 | 3824.4 | 3550.6 | 3380.7 | 3318.2 |
| 27.5°  | 3828.7 | 3687.4 | 3384.7 | 3189.7 | 3094.2 |
| 30°    | 3691.9 | 3533.8 | 3202.0 | 2990.9 | 2878.6 |
| 32.5°  | 3559.0 | 3367.9 | 3028.2 | 2779.2 | 2675.2 |
| 35°    | 3409.7 | 3198.1 | 2833.3 | 2571.9 | 2480.3 |
| 37.5°  | 3264.6 | 3036.1 | 2650.6 | 2364.2 | 2260.7 |
| 40°    | 3111.0 | 2862.3 | 2459.7 | 2165.2 | 2057.4 |
| 42.5°  | 2953.4 | 2688.0 | 2269.1 | 1961.9 | 1858.5 |
| 45°    | 2787.5 | 2509.3 | 2074.2 | 1779.3 | 1679.8 |
| 47.5°  | 2630.0 | 2335.6 | 1887.5 | 1592.6 | 1501.6 |
| 50°    | 2455.7 | 2161.2 | 1704.9 | 1418.4 | 1331.7 |
| 52.5°  | 2285.3 | 1974.2 | 1530.6 | 1256.8 | 1178.1 |
| 55°    | 2119.4 | 1796.0 | 1348.0 | 1099.4 | 1020.5 |
| 57.5°  | 1949.6 | 1617.7 | 1186.5 | 954.1  | 887.6  |
| 60°    | 1775.3 | 1443.5 | 1016.2 | 804.9  | 738.5  |
| 62.5°  | 1605.4 | 1273.6 | 870.9  | 672.1  | 639.0  |
| 65°    | 1431.2 | 1094.9 | 721.7  | 580.9  | 568.1  |
| 67.5°  | 1265.3 | 929.0  | 580.9  | 510.0  | 497.7  |
| 70°    | 1090.9 | 767.5  | 481.0  | 439.6  | 423.0  |
| 72.5°  | 925.0  | 617.8  | 402.2  | 369.2  | 360.9  |
| 75°    | 763.1  | 472.7  | 331.8  | 302.8  | 298.8  |
| 77.5°  | 601.6  | 335.8  | 261.4  | 244.6  | 236.3  |
| 80°    | 451.9  | 240.8  | 199.0  | 182.7  | 182.7  |
| 82.5°  | 315.1  | 161.9  | 136.9  | 128.5  | 128.5  |
| 85°    | 178.2  | 91.0   | 78.7   | 78.7   | 78.7   |
| 87.5°  | 66.4   | 33.0   | 33.0   | 29.1   | 29.1   |
| 90°    | 2.3    | 29.3   | 48.6   | 61.1   | 65.7   |
| 92.5°  | 61.1   | 51.2   | 58.4   | 63.4   | 65.7   |
| 95°    | 158.4  | 77.9   | 94.9   | 107.4  | 104.8  |
| 97.5°  | 285.1  | 85.4   | 124.2  | 131.6  | 134.0  |
| 100°   | 431.5  | 97.6   | 139.0  | 158.4  | 163.2  |
| 102.5° | 592.2  | 587.5  | 143.8  | 170.5  | 178.0  |
| 105°   | 740.9  | 814.2  | 148.7  | 175.4  | 185.2  |
| 107.5° | 914.0  | 974.8  | 153.7  | 180.3  | 190.2  |
| 110°   | 1079.8 | 1130.8 | 426.6  | 182.9  | 192.5  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1235.9 | 1279.6 | 1238.2 | 187.5  | 195.1  |
| 115°   | 1401.4 | 1442.8 | 1503.9 | 375.4  | 200.0  |
| 117.5° | 1545.3 | 1594.0 | 1635.6 | 1286.9 | 648.3  |
| 120°   | 1706.2 | 1742.7 | 1786.7 | 1815.9 | 1486.8 |
| 122.5° | 1842.6 | 1881.6 | 1930.5 | 1945.0 | 1947.6 |
| 125°   | 1981.5 | 2013.3 | 2059.6 | 2076.7 | 2083.9 |
| 127.5° | 2108.2 | 2142.4 | 2179.2 | 2203.5 | 2205.8 |
| 130°   | 2227.8 | 2266.9 | 2293.5 | 2320.4 | 2318.1 |
| 132.5° | 2349.6 | 2381.5 | 2408.1 | 2430.2 | 2427.8 |
| 135°   | 2452.1 | 2491.1 | 2512.9 | 2537.5 | 2532.6 |
| 137.5° | 2559.2 | 2588.4 | 2613.0 | 2637.3 | 2630.1 |
| 140°   | 2663.9 | 2683.7 | 2710.3 | 2732.2 | 2720.2 |
| 142.5° | 2752.0 | 2769.1 | 2800.6 | 2820.0 | 2807.9 |
| 145°   | 2844.6 | 2841.9 | 2883.4 | 2900.5 | 2888.3 |
| 147.5° | 2924.8 | 2917.6 | 2958.9 | 2971.1 | 2961.5 |
| 150°   | 3003.0 | 2985.9 | 3024.9 | 3039.3 | 3027.2 |
| 152.5° | 3068.6 | 3049.2 | 3085.7 | 3100.4 | 3083.4 |
| 155°   | 3132.0 | 3110.3 | 3139.5 | 3154.0 | 3134.6 |
| 157.5° | 3183.3 | 3163.9 | 3185.8 | 3202.9 | 3183.3 |
| 160°   | 3227.2 | 3212.4 | 3227.2 | 3241.7 | 3224.6 |
| 162.5° | 3266.0 | 3251.5 | 3263.7 | 3280.8 | 3258.8 |
| 165°   | 3300.2 | 3285.6 | 3293.0 | 3310.0 | 3293.0 |
| 167.5° | 3327.1 | 3312.4 | 3319.8 | 3336.9 | 3314.9 |
| 170°   | 3349.1 | 3334.3 | 3339.2 | 3356.3 | 3334.3 |
| 172.5° | 3363.6 | 3349.1 | 3353.9 | 3371.0 | 3349.1 |
| 175°   | 3375.7 | 3358.6 | 3363.6 | 3380.6 | 3356.3 |
| 177.5° | 3380.6 | 3363.6 | 3366.1 | 3383.2 | 3361.3 |
| 180°   | 3368.5 | 3368.5 | 3368.5 | 3368.5 | 3368.5 |

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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 | 11.30            | 12.12 | 12.27 | 13.10 | 14.39 | 7.27           | 8.09  | 8.25  | 9.08  | 10.37 |
|                 | 3H   | 12.98            | 13.71 | 13.96 | 14.70 | 16.02 | 8.46           | 9.20  | 9.45  | 10.19 | 11.50 |
|                 | 4H   | 13.59            | 14.28 | 14.58 | 15.28 | 16.60 | 8.91           | 9.61  | 9.91  | 10.60 | 11.92 |
|                 | 6H   | 14.01            | 14.65 | 15.02 | 15.65 | 16.98 | 9.24           | 9.87  | 10.24 | 10.87 | 12.21 |
|                 | 8H   | 14.13            | 14.74 | 15.15 | 15.76 | 17.09 | 9.33           | 9.93  | 10.34 | 10.95 | 12.28 |
|                 | 12H  | 14.20            | 14.77 | 15.22 | 15.78 | 17.14 | 9.37           | 9.95  | 10.39 | 10.96 | 12.31 |
| 4H              | 2H   | 11.32            | 12.01 | 12.32 | 13.01 | 14.33 | 7.87           | 8.56  | 8.87  | 9.56  | 10.88 |
|                 | 3H   | 13.15            | 13.72 | 14.16 | 14.75 | 16.08 | 9.22           | 9.80  | 10.23 | 10.82 | 12.15 |
|                 | 4H   | 13.84            | 14.37 | 14.86 | 15.38 | 16.74 | 9.77           | 10.29 | 10.79 | 11.31 | 12.67 |
|                 | 6H   | 14.35            | 14.81 | 15.39 | 15.85 | 17.20 | 10.19          | 10.64 | 11.22 | 11.68 | 13.04 |
|                 | 8H   | 14.53            | 14.95 | 15.56 | 15.99 | 17.35 | 10.32          | 10.74 | 11.35 | 11.77 | 13.14 |
|                 | 12H  | 14.63            | 15.01 | 15.68 | 16.06 | 17.43 | 10.38          | 10.77 | 11.43 | 11.81 | 13.19 |
| 8H              | 4H   | 13.81            | 14.23 | 14.84 | 15.26 | 16.63 | 10.05          | 10.47 | 11.08 | 11.50 | 12.87 |
|                 | 6H   | 14.37            | 14.72 | 15.43 | 15.80 | 17.16 | 10.57          | 10.92 | 11.62 | 11.99 | 13.36 |
|                 | 8H   | 14.59            | 14.90 | 15.65 | 15.96 | 17.34 | 10.76          | 11.07 | 11.82 | 12.13 | 13.51 |
|                 | 12H  | 14.73            | 15.00 | 15.80 | 16.05 | 17.48 | 10.88          | 11.15 | 11.95 | 12.21 | 13.63 |
| 12H             | 4H   | 13.76            | 14.14 | 14.81 | 15.19 | 16.56 | 10.05          | 10.43 | 11.10 | 11.48 | 12.86 |
|                 | 6H   | 14.35            | 14.66 | 15.41 | 15.72 | 17.10 | 10.62          | 10.92 | 11.68 | 11.99 | 13.37 |
|                 | 8H   | 14.57            | 14.84 | 15.64 | 15.89 | 17.32 | 10.83          | 11.10 | 11.90 | 12.15 | 13.58 |