

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: P913757

Luminaire Tested: DFN2DIP-HX4F0-120D110US927-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P913757  
REPORT IS A COMBINATION OF REPORTS P899442 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-120D110US927-RLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

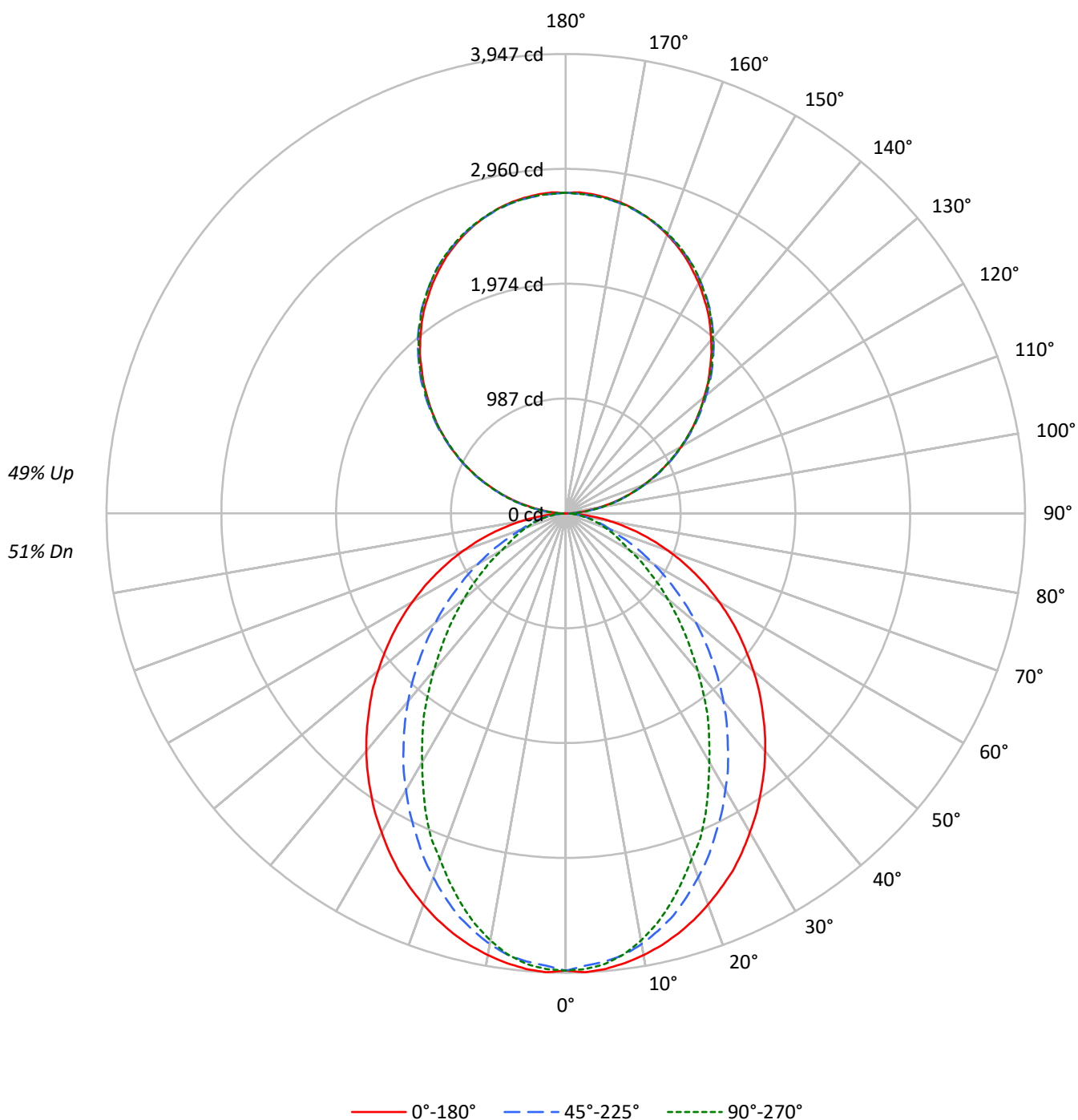
Lumens per Lamp: N/A  
Luminaire Lumens: 15792.1 lumens  
Efficiency: N/A  
Efficacy: 82.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 191.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9954  
Total Harmonic Distortion (THDi): 0.076  
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



TEST NUMBER: P913757

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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 | 99 | 99 | 99 | 99 | 84 | 84 | 84 | 70 | 70 | 70 | 57 | 57 | 57 |
| 1   | 99  | 94  | 91  | 87  | 91 | 87 | 84 | 81 | 74 | 72 | 70 | 62 | 61 | 59 | 51 | 50 | 49 |
| 2   | 90  | 83  | 77  | 72  | 83 | 77 | 72 | 68 | 66 | 62 | 59 | 55 | 53 | 50 | 46 | 44 | 42 |
| 3   | 83  | 73  | 66  | 61  | 76 | 68 | 62 | 57 | 58 | 54 | 50 | 49 | 46 | 43 | 41 | 39 | 37 |
| 4   | 76  | 65  | 58  | 52  | 70 | 61 | 54 | 49 | 52 | 47 | 43 | 44 | 41 | 37 | 37 | 34 | 32 |
| 5   | 70  | 58  | 51  | 45  | 64 | 54 | 47 | 42 | 47 | 42 | 37 | 40 | 36 | 33 | 34 | 31 | 28 |
| 6   | 64  | 53  | 45  | 39  | 59 | 49 | 42 | 37 | 43 | 37 | 33 | 36 | 32 | 29 | 31 | 27 | 25 |
| 7   | 60  | 48  | 40  | 34  | 55 | 45 | 38 | 33 | 39 | 33 | 29 | 33 | 29 | 26 | 28 | 25 | 22 |
| 8   | 55  | 43  | 36  | 31  | 51 | 41 | 34 | 29 | 35 | 30 | 26 | 31 | 26 | 23 | 26 | 23 | 20 |
| 9   | 52  | 40  | 32  | 27  | 48 | 37 | 31 | 26 | 33 | 27 | 24 | 28 | 24 | 21 | 24 | 21 | 18 |
| 10  | 48  | 37  | 29  | 25  | 45 | 34 | 28 | 24 | 30 | 25 | 21 | 26 | 22 | 19 | 22 | 19 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2921 | 2921 | 2921 |
| 5°  | 2926 | 2875 | 2894 |
| 10° | 2898 | 2819 | 2800 |
| 15° | 2858 | 2726 | 2654 |
| 20° | 2805 | 2598 | 2476 |
| 25° | 2752 | 2454 | 2303 |
| 30° | 2679 | 2307 | 2085 |
| 35° | 2608 | 2148 | 1892 |
| 40° | 2536 | 1984 | 1672 |
| 45° | 2453 | 1802 | 1473 |
| 50° | 2366 | 1619 | 1277 |
| 55° | 2276 | 1422 | 1090 |
| 60° | 2171 | 1217 | 897  |
| 65° | 2051 | 1008 | 808  |
| 70° | 1905 | 813  | 731  |
| 75° | 1722 | 718  | 666  |
| 80° | 1457 | 603  | 578  |
| 85° | 1019 | 404  | 435  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2453 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 368.2   | 2.3       |
| 10°-20°   | 1010.8  | 6.4       |
| 20°-30°   | 1419.2  | 9.0       |
| 30°-40°   | 1547.0  | 9.8       |
| 40°-50°   | 1421.9  | 9.0       |
| 50°-60°   | 1116.7  | 7.1       |
| 60°-70°   | 726.9   | 4.6       |
| 70°-80°   | 374.2   | 2.4       |
| 80°-90°   | 103.3   | 0.7       |
| 90°-100°  | 170.5   | 1.1       |
| 100°-110° | 541.8   | 3.4       |
| 110°-120° | 927.3   | 5.9       |
| 120°-130° | 1219.5  | 7.7       |
| 130°-140° | 1368.8  | 8.7       |
| 140°-150° | 1342.3  | 8.5       |
| 150°-160° | 1126.0  | 7.1       |
| 160°-170° | 746.7   | 4.7       |
| 170°-180° | 261.0   | 1.7       |
| 0°-30°    | 2798.2  | 17.7      |
| 0°-40°    | 4345.2  | 27.5      |
| 0°-60°    | 6883.7  | 43.6      |
| 0°-90°    | 8088.1  | 51.2      |
| 90°-120°  | 1639.7  | 10.4      |
| 90°-150°  | 5570.3  | 35.3      |
| 90°-180°  | 7704.0  | 48.8      |
| 0°-180°   | 15792.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3929 | 3929  | 3929 | 3929  | 3929 |      |
| 5°   | 3929 | 3911  | 3865 | 3897  | 3886 | 373  |
| 15°  | 3737 | 3698  | 3577 | 3509  | 3474 | 1053 |
| 25°  | 3392 | 3278  | 3044 | 2898  | 2844 | 1560 |
| 35°  | 2923 | 2741  | 2429 | 2205  | 2126 | 1829 |
| 45°  | 2389 | 2151  | 1778 | 1525  | 1440 | 1845 |
| 55°  | 1817 | 1540  | 1156 | 942   | 875  | 1623 |
| 65°  | 1227 | 939   | 619  | 498   | 487  | 1216 |
| 75°  | 654  | 405   | 284  | 260   | 256  | 692  |
| 85°  | 153  | 78    | 68   | 68    | 68   | 175  |
| 90°  | 2    | 30    | 81   | 76    | 79   | 16   |
| 95°  | 121  | 145   | 149  | 149   | 145  | 135  |
| 105° | 500  | 507   | 512  | 516   | 516  | 528  |
| 115° | 931  | 944   | 940  | 937   | 931  | 920  |
| 125° | 1353 | 1374  | 1368 | 1360  | 1358 | 1209 |
| 135° | 1751 | 1776  | 1781 | 1779  | 1772 | 1353 |
| 145° | 2125 | 2142  | 2155 | 2158  | 2149 | 1328 |
| 155° | 2430 | 2437  | 2444 | 2456  | 2448 | 1119 |
| 165° | 2644 | 2641  | 2641 | 2658  | 2646 | 746  |
| 175° | 2751 | 2744  | 2739 | 2756  | 2742 | 261  |
| 180° | 2756 | 2756  | 2756 | 2756  | 2756 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3928.9 | 3928.9 | 3928.9 | 3928.9 | 3928.9 |
| 2.5°   | 3946.6 | 3928.9 | 3889.7 | 3925.5 | 3918.3 |
| 5°     | 3928.9 | 3911.2 | 3864.7 | 3896.8 | 3886.3 |
| 7.5°   | 3896.8 | 3875.7 | 3825.9 | 3839.9 | 3822.1 |
| 10°    | 3854.2 | 3829.3 | 3758.3 | 3747.4 | 3726.3 |
| 12.5°  | 3801.0 | 3769.0 | 3672.7 | 3651.6 | 3612.4 |
| 15°    | 3736.9 | 3697.7 | 3576.9 | 3509.4 | 3474.0 |
| 17.5°  | 3662.2 | 3605.2 | 3455.8 | 3377.8 | 3320.8 |
| 20°    | 3576.9 | 3505.6 | 3328.0 | 3239.3 | 3160.8 |
| 22.5°  | 3484.5 | 3402.7 | 3196.3 | 3075.6 | 3022.4 |
| 25°    | 3392.1 | 3278.1 | 3043.5 | 2897.9 | 2844.3 |
| 27.5°  | 3281.9 | 3160.8 | 2901.3 | 2734.2 | 2652.3 |
| 30°    | 3164.6 | 3029.2 | 2744.7 | 2563.7 | 2467.5 |
| 32.5°  | 3050.7 | 2886.9 | 2595.7 | 2382.2 | 2293.2 |
| 35°    | 2922.8 | 2741.3 | 2428.6 | 2204.6 | 2126.1 |
| 37.5°  | 2798.3 | 2602.6 | 2272.1 | 2026.5 | 1937.8 |
| 40°    | 2666.6 | 2453.5 | 2108.4 | 1856.0 | 1763.6 |
| 42.5°  | 2531.6 | 2304.1 | 1945.0 | 1681.7 | 1593.1 |
| 45°    | 2389.4 | 2151.0 | 1777.9 | 1525.2 | 1439.9 |
| 47.5°  | 2254.3 | 2002.0 | 1618.0 | 1365.2 | 1287.1 |
| 50°    | 2105.0 | 1852.6 | 1461.4 | 1215.8 | 1141.5 |
| 52.5°  | 1959.0 | 1692.3 | 1312.0 | 1077.4 | 1009.9 |
| 55°    | 1816.8 | 1539.5 | 1155.5 | 942.3  | 874.8  |
| 57.5°  | 1671.1 | 1386.7 | 1017.0 | 817.8  | 760.9  |
| 60°    | 1521.8 | 1237.3 | 871.0  | 690.0  | 633.0  |
| 62.5°  | 1376.2 | 1091.7 | 746.6  | 576.1  | 547.7  |
| 65°    | 1226.8 | 938.6  | 618.7  | 498.0  | 487.0  |
| 67.5°  | 1084.6 | 796.3  | 498.0  | 437.2  | 426.7  |
| 70°    | 935.2  | 657.9  | 412.3  | 376.8  | 362.5  |
| 72.5°  | 793.0  | 529.7  | 344.8  | 316.5  | 309.3  |
| 75°    | 654.1  | 405.1  | 284.5  | 259.5  | 256.1  |
| 77.5°  | 515.7  | 287.8  | 224.1  | 209.8  | 202.6  |
| 80°    | 387.5  | 206.4  | 170.5  | 156.5  | 156.5  |
| 82.5°  | 270.1  | 138.8  | 117.3  | 110.1  | 110.1  |
| 85°    | 152.8  | 78.1   | 67.5   | 67.5   | 67.5   |
| 87.5°  | 57.0   | 28.3   | 28.3   | 24.9   | 24.9   |
| 90°    | 2.5    | 29.9   | 81.4   | 76.4   | 78.9   |
| 92.5°  | 51.5   | 69.8   | 72.2   | 74.8   | 74.8   |
| 95°    | 121.3  | 144.6  | 148.7  | 148.7  | 144.6  |
| 97.5°  | 201.9  | 223.5  | 232.7  | 232.7  | 232.7  |
| 100°   | 294.9  | 314.0  | 320.7  | 320.7  | 318.2  |
| 102.5° | 393.0  | 407.1  | 416.3  | 418.7  | 416.3  |
| 105°   | 500.2  | 506.8  | 511.8  | 515.9  | 515.9  |
| 107.5° | 606.5  | 616.5  | 616.5  | 618.1  | 606.5  |
| 110°   | 709.6  | 722.9  | 722.9  | 722.9  | 716.2  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 820.9  | 835.0  | 832.5  | 825.8  | 820.9  |
| 115°   | 930.6  | 943.8  | 939.7  | 937.2  | 930.6  |
| 117.5° | 1039.4 | 1057.6 | 1046.0 | 1039.4 | 1032.8 |
| 120°   | 1149.1 | 1167.4 | 1149.1 | 1149.1 | 1141.6 |
| 122.5° | 1248.8 | 1272.0 | 1260.4 | 1253.7 | 1248.8 |
| 125°   | 1353.4 | 1374.2 | 1367.5 | 1360.1 | 1357.6 |
| 127.5° | 1455.6 | 1481.4 | 1472.3 | 1462.3 | 1455.6 |
| 130°   | 1551.2 | 1581.1 | 1576.9 | 1571.9 | 1562.8 |
| 132.5° | 1658.4 | 1681.6 | 1683.3 | 1671.7 | 1665.0 |
| 135°   | 1750.6 | 1776.3 | 1781.3 | 1778.8 | 1772.2 |
| 137.5° | 1853.6 | 1874.4 | 1878.5 | 1876.8 | 1866.9 |
| 140°   | 1944.2 | 1964.9 | 1976.6 | 1976.6 | 1967.5 |
| 142.5° | 2037.3 | 2058.0 | 2064.7 | 2067.1 | 2058.0 |
| 145°   | 2125.3 | 2141.9 | 2155.2 | 2157.7 | 2148.6 |
| 147.5° | 2204.2 | 2225.0 | 2235.0 | 2239.1 | 2230.0 |
| 150°   | 2285.7 | 2299.8 | 2308.9 | 2316.4 | 2308.9 |
| 152.5° | 2357.9 | 2372.0 | 2383.7 | 2392.9 | 2383.7 |
| 155°   | 2430.3 | 2436.8 | 2444.4 | 2456.0 | 2448.5 |
| 157.5° | 2492.5 | 2497.5 | 2501.6 | 2518.3 | 2506.6 |
| 160°   | 2548.2 | 2553.2 | 2555.7 | 2569.8 | 2559.9 |
| 162.5° | 2599.7 | 2599.7 | 2602.2 | 2618.0 | 2606.4 |
| 165°   | 2643.7 | 2641.2 | 2641.2 | 2657.8 | 2646.2 |
| 167.5° | 2683.6 | 2676.1 | 2676.1 | 2692.8 | 2681.1 |
| 170°   | 2713.5 | 2706.9 | 2704.4 | 2721.0 | 2706.9 |
| 172.5° | 2734.3 | 2727.6 | 2725.2 | 2741.8 | 2727.6 |
| 175°   | 2750.9 | 2744.3 | 2739.3 | 2755.9 | 2741.8 |
| 177.5° | 2760.0 | 2753.4 | 2748.4 | 2762.6 | 2748.4 |
| 180°   | 2755.9 | 2755.9 | 2755.9 | 2755.9 | 2755.9 |

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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 | 10.98            | 11.82 | 11.94 | 12.79 | 14.05 | 6.96           | 7.80  | 7.91  | 8.76  | 10.02 |
|                 | 3H   | 12.66            | 13.41 | 13.63 | 14.39 | 15.67 | 8.15           | 8.90  | 9.11  | 9.87  | 11.15 |
|                 | 4H   | 13.27            | 13.98 | 14.25 | 14.96 | 16.25 | 8.60           | 9.31  | 9.58  | 10.29 | 11.58 |
|                 | 6H   | 13.70            | 14.35 | 14.69 | 15.33 | 16.63 | 8.92           | 9.58  | 9.91  | 10.56 | 11.86 |
|                 | 8H   | 13.82            | 14.45 | 14.82 | 15.44 | 16.74 | 9.02           | 9.64  | 10.01 | 10.64 | 11.93 |
|                 | 12H  | 13.89            | 14.48 | 14.89 | 15.47 | 16.79 | 9.06           | 9.65  | 10.06 | 10.64 | 11.97 |
| 4H              | 2H   | 11.00            | 11.71 | 11.99 | 12.69 | 13.98 | 7.55           | 8.26  | 8.54  | 9.24  | 10.53 |
|                 | 3H   | 12.84            | 13.43 | 13.83 | 14.43 | 15.73 | 8.91           | 9.50  | 9.90  | 10.50 | 11.81 |
|                 | 4H   | 13.53            | 14.07 | 14.53 | 15.07 | 16.39 | 9.46           | 10.00 | 10.46 | 11.00 | 12.32 |
|                 | 6H   | 14.05            | 14.51 | 15.06 | 15.53 | 16.86 | 9.88           | 10.34 | 10.89 | 11.37 | 12.69 |
|                 | 8H   | 14.22            | 14.65 | 15.24 | 15.67 | 17.01 | 10.01          | 10.44 | 11.02 | 11.46 | 12.80 |
|                 | 12H  | 14.32            | 14.71 | 15.35 | 15.74 | 17.08 | 10.08          | 10.47 | 11.11 | 11.50 | 12.84 |
| 8H              | 4H   | 13.50            | 13.93 | 14.51 | 14.95 | 16.28 | 9.74           | 10.17 | 10.75 | 11.19 | 12.53 |
|                 | 6H   | 14.07            | 14.42 | 15.10 | 15.48 | 16.82 | 10.26          | 10.62 | 11.30 | 11.68 | 13.01 |
|                 | 8H   | 14.28            | 14.60 | 15.33 | 15.64 | 17.00 | 10.45          | 10.77 | 11.50 | 11.81 | 13.17 |
|                 | 12H  | 14.42            | 14.70 | 15.47 | 15.74 | 17.14 | 10.57          | 10.85 | 11.62 | 11.89 | 13.29 |
| 12H             | 4H   | 13.45            | 13.84 | 14.48 | 14.87 | 16.21 | 9.74           | 10.13 | 10.78 | 11.17 | 12.51 |
|                 | 6H   | 14.04            | 14.36 | 15.09 | 15.40 | 16.75 | 10.31          | 10.62 | 11.36 | 11.67 | 13.02 |
|                 | 8H   | 14.26            | 14.54 | 15.31 | 15.58 | 16.98 | 10.52          | 10.80 | 11.57 | 11.84 | 13.23 |