

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: P916463

Luminaire Tested: DFN2DIP-HX4F0-110D090US930-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P916463  
REPORT IS A COMBINATION OF REPORTS P899404 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-110D090US930-RLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

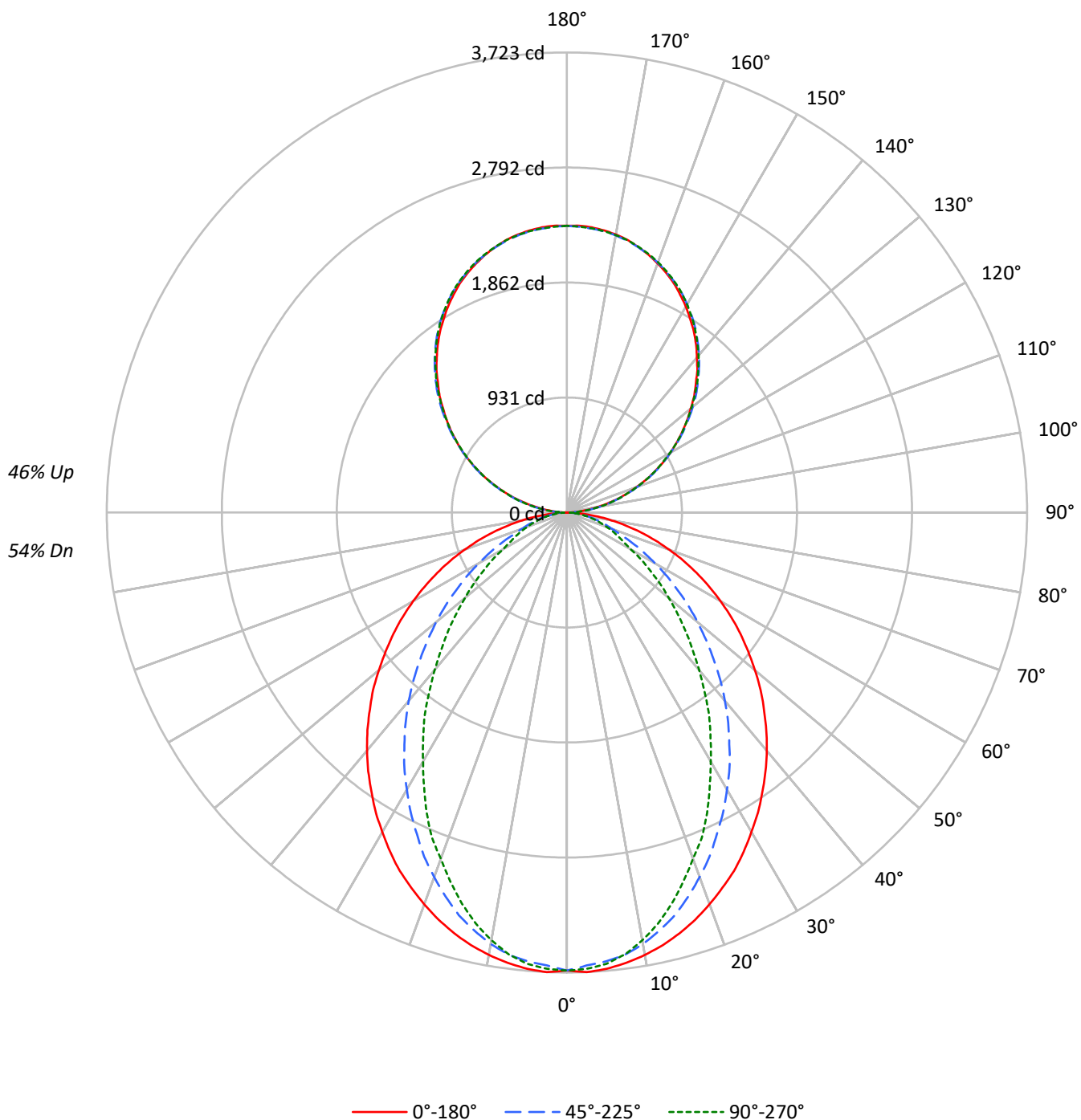
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 14116.9 lumens  
Efficiency: N/A  
Efficacy: 86.4 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): 163.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9967  
Total Harmonic Distortion (THDi): 0.063  
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 |    |  |    |    | 0  |
| RW  | 70  | 50  | 30  | 10  |  | 70  | 50  | 30  | 10  |  | 50 | 30 | 10 |  | 50 | 30 | 10 |  | 50 | 30 | 10 |
| RCR |     |     |     |     |  |     |     |     |     |  |    |    |    |  |    |    |    |  |    |    |    |
| 0   | 108 | 108 | 108 | 108 |  | 100 | 100 | 100 | 100 |  | 86 | 86 | 86 |  | 72 | 72 | 72 |  | 60 | 60 | 60 |
| 1   | 99  | 95  | 91  | 88  |  | 92  | 88  | 85  | 82  |  | 76 | 73 | 71 |  | 64 | 63 | 61 |  | 54 | 53 | 52 |
| 2   | 91  | 84  | 78  | 73  |  | 84  | 78  | 73  | 68  |  | 67 | 63 | 60 |  | 57 | 54 | 52 |  | 48 | 46 | 44 |
| 3   | 83  | 74  | 67  | 61  |  | 77  | 69  | 63  | 58  |  | 60 | 55 | 51 |  | 51 | 47 | 45 |  | 43 | 40 | 38 |
| 4   | 76  | 66  | 58  | 52  |  | 71  | 62  | 55  | 49  |  | 53 | 48 | 44 |  | 46 | 42 | 39 |  | 39 | 36 | 33 |
| 5   | 70  | 59  | 51  | 45  |  | 65  | 55  | 48  | 43  |  | 48 | 42 | 38 |  | 41 | 37 | 34 |  | 35 | 32 | 29 |
| 6   | 65  | 53  | 45  | 39  |  | 60  | 50  | 43  | 38  |  | 43 | 38 | 34 |  | 38 | 33 | 30 |  | 32 | 29 | 26 |
| 7   | 60  | 48  | 40  | 35  |  | 56  | 45  | 38  | 33  |  | 40 | 34 | 30 |  | 34 | 30 | 27 |  | 29 | 26 | 23 |
| 8   | 56  | 44  | 36  | 31  |  | 52  | 41  | 34  | 30  |  | 36 | 31 | 27 |  | 32 | 27 | 24 |  | 27 | 24 | 21 |
| 9   | 52  | 40  | 33  | 28  |  | 49  | 38  | 31  | 27  |  | 33 | 28 | 24 |  | 29 | 25 | 22 |  | 25 | 22 | 19 |
| 10  | 49  | 37  | 30  | 25  |  | 45  | 35  | 28  | 24  |  | 31 | 26 | 22 |  | 27 | 23 | 20 |  | 23 | 20 | 18 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2756 | 2756 | 2756 |
| 5°  | 2761 | 2713 | 2730 |
| 10° | 2734 | 2660 | 2641 |
| 15° | 2696 | 2572 | 2504 |
| 20° | 2647 | 2451 | 2336 |
| 25° | 2596 | 2315 | 2173 |
| 30° | 2528 | 2177 | 1967 |
| 35° | 2461 | 2027 | 1785 |
| 40° | 2393 | 1872 | 1578 |
| 45° | 2314 | 1700 | 1389 |
| 50° | 2232 | 1527 | 1205 |
| 55° | 2147 | 1342 | 1028 |
| 60° | 2048 | 1148 | 847  |
| 65° | 1935 | 951  | 762  |
| 70° | 1797 | 767  | 690  |
| 75° | 1625 | 677  | 628  |
| 80° | 1374 | 569  | 545  |
| 85° | 961  | 381  | 411  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2314 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 347.4   | 2.5       |
| 10°-20°   | 953.6   | 6.8       |
| 20°-30°   | 1338.9  | 9.5       |
| 30°-40°   | 1459.5  | 10.3      |
| 40°-50°   | 1341.4  | 9.5       |
| 50°-60°   | 1053.5  | 7.5       |
| 60°-70°   | 685.7   | 4.9       |
| 70°-80°   | 353.0   | 2.5       |
| 80°-90°   | 96.7    | 0.7       |
| 90°-100°  | 143.6   | 1.0       |
| 100°-110° | 456.3   | 3.2       |
| 110°-120° | 780.8   | 5.5       |
| 120°-130° | 1026.9  | 7.3       |
| 130°-140° | 1152.6  | 8.2       |
| 140°-150° | 1130.3  | 8.0       |
| 150°-160° | 948.2   | 6.7       |
| 160°-170° | 628.8   | 4.5       |
| 170°-180° | 219.8   | 1.6       |
| 0°-30°    | 2639.9  | 18.7      |
| 0°-40°    | 4099.4  | 29.0      |
| 0°-60°    | 6494.2  | 46.0      |
| 0°-90°    | 7629.6  | 54.0      |
| 90°-120°  | 1380.7  | 9.8       |
| 90°-150°  | 4690.5  | 33.2      |
| 90°-180°  | 6487.0  | 46.0      |
| 0°-180°   | 14116.9 | 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    | 25    | 69   | 64    | 66   | 14   |
| 95°  | 102  | 122   | 125  | 125   | 122  | 114  |
| 105° | 421  | 427   | 431  | 434   | 434  | 444  |
| 115° | 784  | 795   | 791  | 789   | 784  | 775  |
| 125° | 1140 | 1157  | 1152 | 1145  | 1143 | 1018 |
| 135° | 1474 | 1496  | 1500 | 1498  | 1492 | 1139 |
| 145° | 1790 | 1804  | 1815 | 1817  | 1809 | 1118 |
| 155° | 2046 | 2052  | 2058 | 2068  | 2062 | 942  |
| 165° | 2226 | 2224  | 2224 | 2238  | 2228 | 628  |
| 175° | 2316 | 2311  | 2307 | 2321  | 2309 | 220  |
| 180° | 2321 | 2321  | 2321 | 2321  | 2321 |      |

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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    | 25.2   | 68.6   | 64.3   | 66.4   |
| 92.5°  | 43.4   | 58.8   | 60.9   | 62.9   | 62.9   |
| 95°    | 102.2  | 121.7  | 125.2  | 125.2  | 121.7  |
| 97.5°  | 170.0  | 188.2  | 195.9  | 195.9  | 195.9  |
| 100°   | 248.3  | 264.5  | 270.0  | 270.0  | 268.0  |
| 102.5° | 330.9  | 342.8  | 350.5  | 352.6  | 350.5  |
| 105°   | 421.2  | 426.7  | 431.0  | 434.5  | 434.5  |
| 107.5° | 510.7  | 519.1  | 519.1  | 520.5  | 510.7  |
| 110°   | 597.5  | 608.7  | 608.7  | 608.7  | 603.1  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 691.2  | 703.1  | 701.0  | 695.4  | 691.2  |
| 115°   | 783.6  | 794.8  | 791.2  | 789.2  | 783.6  |
| 117.5° | 875.2  | 890.6  | 880.8  | 875.2  | 869.6  |
| 120°   | 967.6  | 982.9  | 967.6  | 967.6  | 961.2  |
| 122.5° | 1051.5 | 1071.1 | 1061.4 | 1055.7 | 1051.5 |
| 125°   | 1139.7 | 1157.2 | 1151.6 | 1145.2 | 1143.2 |
| 127.5° | 1225.7 | 1247.4 | 1239.7 | 1231.3 | 1225.7 |
| 130°   | 1306.2 | 1331.4 | 1327.9 | 1323.6 | 1316.0 |
| 132.5° | 1396.4 | 1416.0 | 1417.4 | 1407.6 | 1402.1 |
| 135°   | 1474.1 | 1495.7 | 1500.0 | 1497.9 | 1492.3 |
| 137.5° | 1560.8 | 1578.3 | 1581.8 | 1580.5 | 1572.1 |
| 140°   | 1637.1 | 1654.6 | 1664.3 | 1664.3 | 1656.7 |
| 142.5° | 1715.5 | 1732.9 | 1738.5 | 1740.7 | 1732.9 |
| 145°   | 1789.7 | 1803.6 | 1814.8 | 1816.9 | 1809.2 |
| 147.5° | 1856.1 | 1873.6 | 1882.0 | 1885.5 | 1877.8 |
| 150°   | 1924.7 | 1936.6 | 1944.2 | 1950.5 | 1944.2 |
| 152.5° | 1985.5 | 1997.4 | 2007.2 | 2014.9 | 2007.2 |
| 155°   | 2046.4 | 2051.9 | 2058.3 | 2068.1 | 2061.8 |
| 157.5° | 2098.8 | 2103.1 | 2106.6 | 2120.5 | 2110.7 |
| 160°   | 2145.7 | 2149.9 | 2152.1 | 2163.9 | 2155.5 |
| 162.5° | 2189.1 | 2189.1 | 2191.2 | 2204.5 | 2194.7 |
| 165°   | 2226.2 | 2224.1 | 2224.1 | 2238.1 | 2228.3 |
| 167.5° | 2259.8 | 2253.5 | 2253.5 | 2267.4 | 2257.6 |
| 170°   | 2285.0 | 2279.3 | 2277.3 | 2291.2 | 2279.3 |
| 172.5° | 2302.4 | 2296.9 | 2294.7 | 2308.8 | 2296.9 |
| 175°   | 2316.4 | 2310.8 | 2306.6 | 2320.7 | 2308.8 |
| 177.5° | 2324.1 | 2318.5 | 2314.3 | 2326.2 | 2314.3 |
| 180°   | 2320.7 | 2320.7 | 2320.7 | 2320.7 | 2320.7 |

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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 | 11.04            | 11.90 | 11.97 | 12.85 | 14.06 | 7.01           | 7.88  | 7.94  | 8.82  | 10.03 |
|                 | 3H   | 12.72            | 13.49 | 13.66 | 14.44 | 15.68 | 8.21           | 8.98  | 9.15  | 9.93  | 11.17 |
|                 | 4H   | 13.33            | 14.06 | 14.29 | 15.02 | 16.26 | 8.66           | 9.39  | 9.61  | 10.34 | 11.59 |
|                 | 6H   | 13.76            | 14.43 | 14.72 | 15.39 | 16.65 | 8.98           | 9.66  | 9.95  | 10.62 | 11.88 |
|                 | 8H   | 13.88            | 14.52 | 14.86 | 15.50 | 16.76 | 9.08           | 9.72  | 10.05 | 10.69 | 11.95 |
|                 | 12H  | 13.95            | 14.55 | 14.92 | 15.53 | 16.81 | 9.12           | 9.73  | 10.10 | 10.70 | 11.98 |
| 4H              | 2H   | 11.06            | 11.79 | 12.02 | 12.75 | 14.00 | 7.61           | 8.34  | 8.57  | 9.30  | 10.55 |
|                 | 3H   | 12.90            | 13.50 | 13.87 | 14.49 | 15.75 | 8.97           | 9.57  | 9.94  | 10.56 | 11.82 |
|                 | 4H   | 13.59            | 14.14 | 14.57 | 15.12 | 16.41 | 9.52           | 10.07 | 10.50 | 11.05 | 12.34 |
|                 | 6H   | 14.11            | 14.58 | 15.10 | 15.59 | 16.87 | 9.94           | 10.42 | 10.93 | 11.42 | 12.71 |
|                 | 8H   | 14.28            | 14.73 | 15.28 | 15.72 | 17.02 | 10.07          | 10.52 | 11.07 | 11.51 | 12.81 |
|                 | 12H  | 14.38            | 14.78 | 15.39 | 15.79 | 17.10 | 10.14          | 10.54 | 11.15 | 11.55 | 12.86 |
| 8H              | 4H   | 13.56            | 14.00 | 14.55 | 15.00 | 16.30 | 9.80           | 10.25 | 10.79 | 11.24 | 12.54 |
|                 | 6H   | 14.13            | 14.50 | 15.15 | 15.53 | 16.83 | 10.32          | 10.69 | 11.34 | 11.73 | 13.03 |
|                 | 8H   | 14.35            | 14.67 | 15.37 | 15.70 | 17.01 | 10.52          | 10.84 | 11.54 | 11.87 | 13.18 |
|                 | 12H  | 14.49            | 14.77 | 15.52 | 15.79 | 17.15 | 10.64          | 10.92 | 11.67 | 11.94 | 13.30 |
| 12H             | 4H   | 13.51            | 13.91 | 14.52 | 14.93 | 16.23 | 9.81           | 10.21 | 10.82 | 11.22 | 12.53 |
|                 | 6H   | 14.10            | 14.43 | 15.13 | 15.45 | 16.77 | 10.37          | 10.70 | 11.40 | 11.72 | 13.04 |
|                 | 8H   | 14.33            | 14.61 | 15.36 | 15.63 | 16.99 | 10.59          | 10.87 | 11.62 | 11.89 | 13.25 |