

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: P928722

Luminaire Tested: DFN2DIP-HX4F0-100D070US930-RLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928722  
REPORT IS A COMBINATION OF REPORTS P900886 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-100D070US930-RLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

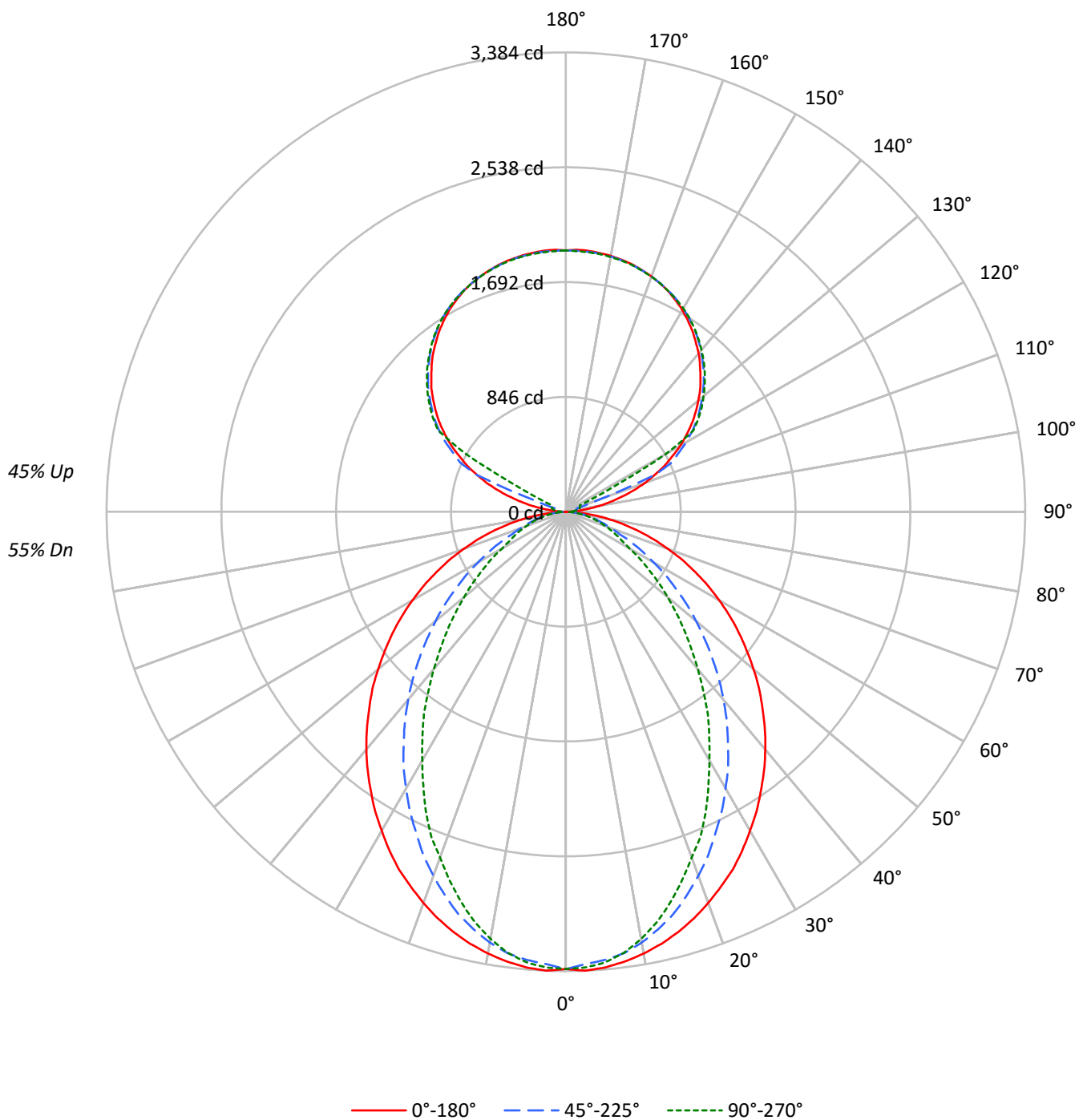
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 12575.5 lumens  
Efficiency: N/A  
Efficacy: 83.1 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): 151.4  
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   | 108 | 108 | 108 | 108 | 101 | 101 | 101 | 101 | 86 | 86 | 86 | 73 | 73 | 73 | 61 | 61 | 61 |
| 1   | 99  | 95  | 92  | 88  | 92  | 89  | 86  | 83  | 76 | 74 | 72 | 65 | 63 | 62 | 55 | 53 | 52 |
| 2   | 91  | 84  | 78  | 73  | 84  | 78  | 73  | 69  | 68 | 64 | 60 | 58 | 55 | 52 | 49 | 47 | 45 |
| 3   | 83  | 74  | 67  | 61  | 77  | 69  | 63  | 58  | 60 | 55 | 51 | 52 | 48 | 45 | 44 | 41 | 39 |
| 4   | 77  | 66  | 58  | 52  | 71  | 62  | 55  | 50  | 54 | 48 | 44 | 46 | 42 | 39 | 39 | 36 | 34 |
| 5   | 70  | 59  | 51  | 45  | 65  | 55  | 48  | 43  | 48 | 43 | 39 | 42 | 38 | 34 | 36 | 33 | 30 |
| 6   | 65  | 53  | 45  | 40  | 60  | 50  | 43  | 38  | 44 | 38 | 34 | 38 | 34 | 30 | 33 | 29 | 27 |
| 7   | 60  | 48  | 41  | 35  | 56  | 45  | 38  | 33  | 40 | 34 | 30 | 35 | 30 | 27 | 30 | 27 | 24 |
| 8   | 56  | 44  | 36  | 31  | 52  | 41  | 35  | 30  | 37 | 31 | 27 | 32 | 28 | 24 | 28 | 24 | 22 |
| 9   | 52  | 40  | 33  | 28  | 49  | 38  | 31  | 27  | 34 | 28 | 24 | 29 | 25 | 22 | 26 | 22 | 20 |
| 10  | 49  | 37  | 30  | 25  | 46  | 35  | 29  | 24  | 31 | 26 | 22 | 27 | 23 | 20 | 24 | 20 | 18 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2505 | 2505 | 2505 |
| 5°  | 2509 | 2465 | 2481 |
| 10° | 2484 | 2417 | 2400 |
| 15° | 2450 | 2337 | 2275 |
| 20° | 2405 | 2227 | 2122 |
| 25° | 2359 | 2104 | 1975 |
| 30° | 2297 | 1978 | 1787 |
| 35° | 2236 | 1842 | 1622 |
| 40° | 2174 | 1701 | 1434 |
| 45° | 2103 | 1545 | 1262 |
| 50° | 2029 | 1388 | 1095 |
| 55° | 1951 | 1219 | 935  |
| 60° | 1861 | 1043 | 769  |
| 65° | 1758 | 864  | 693  |
| 70° | 1633 | 697  | 627  |
| 75° | 1476 | 615  | 571  |
| 80° | 1249 | 517  | 495  |
| 85° | 873  | 346  | 373  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2103 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 315.7   | 2.5       |
| 10°-20°   | 866.6   | 6.9       |
| 20°-30°   | 1216.7  | 9.7       |
| 30°-40°   | 1326.3  | 10.5      |
| 40°-50°   | 1219.0  | 9.7       |
| 50°-60°   | 957.3   | 7.6       |
| 60°-70°   | 623.1   | 5.0       |
| 70°-80°   | 320.8   | 2.6       |
| 80°-90°   | 85.3    | 0.7       |
| 90°-100°  | 63.5    | 0.5       |
| 100°-110° | 236.7   | 1.9       |
| 110°-120° | 627.7   | 5.0       |
| 120°-130° | 1041.1  | 8.3       |
| 130°-140° | 1105.9  | 8.8       |
| 140°-150° | 1027.8  | 8.2       |
| 150°-160° | 826.3   | 6.6       |
| 160°-170° | 532.4   | 4.2       |
| 170°-180° | 183.3   | 1.5       |
| 0°-30°    | 2399.0  | 19.1      |
| 0°-40°    | 3725.3  | 29.6      |
| 0°-60°    | 5901.7  | 46.9      |
| 0°-90°    | 6930.9  | 55.1      |
| 90°-120°  | 927.9   | 7.4       |
| 90°-150°  | 4102.6  | 32.6      |
| 90°-180°  | 5645.0  | 44.9      |
| 0°-180°   | 12575.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3368 | 3368  | 3368 | 3368  | 3368 |      |
| 5°   | 3368 | 3353  | 3313 | 3341  | 3332 | 319  |
| 15°  | 3204 | 3170  | 3067 | 3009  | 2978 | 903  |
| 25°  | 2908 | 2810  | 2609 | 2484  | 2439 | 1337 |
| 35°  | 2506 | 2350  | 2082 | 1890  | 1823 | 1568 |
| 45°  | 2048 | 1844  | 1524 | 1308  | 1234 | 1582 |
| 55°  | 1558 | 1320  | 991  | 808   | 750  | 1392 |
| 65°  | 1052 | 805   | 530  | 427   | 418  | 1043 |
| 75°  | 561  | 347   | 244  | 222   | 220  | 593  |
| 85°  | 131  | 67    | 58   | 58    | 58   | 150  |
| 90°  | 1    | 17    | 28   | 35    | 38   | 12   |
| 95°  | 90   | 44    | 54   | 61    | 60   | 107  |
| 105° | 424  | 465   | 85   | 100   | 106  | 453  |
| 115° | 801  | 825   | 860  | 215   | 114  | 789  |
| 125° | 1133 | 1151  | 1177 | 1187  | 1191 | 1010 |
| 135° | 1402 | 1424  | 1436 | 1450  | 1448 | 1083 |
| 145° | 1626 | 1624  | 1648 | 1658  | 1651 | 1017 |
| 155° | 1790 | 1778  | 1794 | 1803  | 1792 | 825  |
| 165° | 1886 | 1878  | 1882 | 1892  | 1882 | 533  |
| 175° | 1930 | 1920  | 1923 | 1932  | 1918 | 184  |
| 180° | 1925 | 1925  | 1925 | 1925  | 1925 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3368.4 | 3368.4 | 3368.4 | 3368.4 | 3368.4 |
| 2.5°   | 3383.6 | 3368.4 | 3334.7 | 3365.5 | 3359.3 |
| 5°     | 3368.4 | 3353.2 | 3313.4 | 3340.9 | 3331.8 |
| 7.5°   | 3340.9 | 3322.8 | 3280.0 | 3292.0 | 3276.9 |
| 10°    | 3304.3 | 3283.0 | 3222.2 | 3212.8 | 3194.7 |
| 12.5°  | 3258.8 | 3231.2 | 3148.8 | 3130.7 | 3097.0 |
| 15°    | 3203.8 | 3170.1 | 3066.6 | 3008.7 | 2978.3 |
| 17.5°  | 3139.7 | 3090.9 | 2962.9 | 2895.9 | 2847.0 |
| 20°    | 3066.6 | 3005.5 | 2853.2 | 2777.2 | 2709.9 |
| 22.5°  | 2987.4 | 2917.2 | 2740.3 | 2636.9 | 2591.2 |
| 25°    | 2908.2 | 2810.5 | 2609.3 | 2484.4 | 2438.6 |
| 27.5°  | 2813.7 | 2709.9 | 2487.4 | 2344.1 | 2273.9 |
| 30°    | 2713.1 | 2597.0 | 2353.1 | 2198.0 | 2115.5 |
| 32.5°  | 2615.5 | 2475.1 | 2225.4 | 2042.4 | 1966.0 |
| 35°    | 2505.8 | 2350.3 | 2082.2 | 1890.1 | 1822.7 |
| 37.5°  | 2399.1 | 2231.2 | 1947.9 | 1737.4 | 1661.4 |
| 40°    | 2286.2 | 2103.5 | 1807.6 | 1591.2 | 1512.0 |
| 42.5°  | 2170.4 | 1975.4 | 1667.6 | 1441.8 | 1365.8 |
| 45°    | 2048.5 | 1844.1 | 1524.3 | 1307.6 | 1234.5 |
| 47.5°  | 1932.8 | 1716.4 | 1387.1 | 1170.4 | 1103.5 |
| 50°    | 1804.7 | 1588.3 | 1252.9 | 1042.4 | 978.7  |
| 52.5°  | 1679.5 | 1450.9 | 1124.9 | 923.6  | 865.8  |
| 55°    | 1557.5 | 1319.9 | 990.6  | 807.9  | 750.0  |
| 57.5°  | 1432.8 | 1188.8 | 872.0  | 701.1  | 652.3  |
| 60°    | 1304.7 | 1060.8 | 746.8  | 591.5  | 542.7  |
| 62.5°  | 1179.8 | 935.9  | 640.0  | 493.9  | 469.6  |
| 65°    | 1051.8 | 804.6  | 530.4  | 426.9  | 417.5  |
| 67.5°  | 929.8  | 682.7  | 426.9  | 374.8  | 365.8  |
| 70°    | 801.7  | 564.1  | 353.5  | 323.1  | 310.8  |
| 72.5°  | 679.8  | 454.0  | 295.6  | 271.3  | 265.2  |
| 75°    | 560.8  | 347.4  | 243.8  | 222.5  | 219.6  |
| 77.5°  | 442.1  | 246.8  | 192.1  | 179.8  | 173.7  |
| 80°    | 332.1  | 176.9  | 146.2  | 134.2  | 134.2  |
| 82.5°  | 231.5  | 119.0  | 100.6  | 94.5   | 94.5   |
| 85°    | 131.0  | 66.9   | 57.9   | 57.9   | 57.9   |
| 87.5°  | 48.8   | 24.3   | 24.3   | 21.4   | 21.4   |
| 90°    | 1.3    | 16.7   | 27.8   | 34.9   | 37.6   |
| 92.5°  | 34.9   | 29.3   | 33.4   | 36.3   | 37.6   |
| 95°    | 90.5   | 44.5   | 54.3   | 61.4   | 59.9   |
| 97.5°  | 162.9  | 48.8   | 71.0   | 75.3   | 76.6   |
| 100°   | 246.7  | 55.7   | 79.4   | 90.5   | 93.3   |
| 102.5° | 338.5  | 335.9  | 82.2   | 97.5   | 101.7  |
| 105°   | 423.6  | 465.4  | 85.0   | 100.2  | 105.9  |
| 107.5° | 522.4  | 557.2  | 87.9   | 103.1  | 108.7  |
| 110°   | 617.3  | 646.4  | 243.8  | 104.6  | 110.0  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 706.4  | 731.4  | 707.7  | 107.2  | 111.5  |
| 115°   | 801.1  | 824.7  | 859.6  | 214.6  | 114.3  |
| 117.5° | 883.3  | 911.1  | 934.9  | 735.5  | 370.6  |
| 120°   | 975.2  | 996.1  | 1021.3 | 1038.0 | 849.9  |
| 122.5° | 1053.1 | 1075.5 | 1103.5 | 1111.7 | 1113.2 |
| 125°   | 1132.6 | 1150.8 | 1177.3 | 1187.0 | 1191.1 |
| 127.5° | 1205.1 | 1224.5 | 1245.6 | 1259.5 | 1260.8 |
| 130°   | 1273.4 | 1295.7 | 1310.9 | 1326.3 | 1325.0 |
| 132.5° | 1343.0 | 1361.2 | 1376.5 | 1389.0 | 1387.7 |
| 135°   | 1401.6 | 1423.9 | 1436.4 | 1450.4 | 1447.6 |
| 137.5° | 1462.8 | 1479.6 | 1493.6 | 1507.5 | 1503.3 |
| 140°   | 1522.7 | 1533.9 | 1549.2 | 1561.7 | 1554.8 |
| 142.5° | 1572.9 | 1582.7 | 1600.7 | 1611.8 | 1604.9 |
| 145°   | 1625.9 | 1624.5 | 1648.1 | 1657.9 | 1650.9 |
| 147.5° | 1671.7 | 1667.7 | 1691.3 | 1698.2 | 1692.8 |
| 150°   | 1716.4 | 1706.7 | 1729.0 | 1737.3 | 1730.3 |
| 152.5° | 1754.0 | 1742.9 | 1763.7 | 1772.1 | 1762.4 |
| 155°   | 1790.2 | 1777.8 | 1794.5 | 1802.8 | 1791.7 |
| 157.5° | 1819.5 | 1808.4 | 1821.0 | 1830.7 | 1819.5 |
| 160°   | 1844.7 | 1836.2 | 1844.7 | 1852.9 | 1843.1 |
| 162.5° | 1866.8 | 1858.5 | 1865.5 | 1875.2 | 1862.7 |
| 165°   | 1886.3 | 1878.1 | 1882.2 | 1891.9 | 1882.2 |
| 167.5° | 1901.7 | 1893.2 | 1897.6 | 1907.3 | 1894.8 |
| 170°   | 1914.3 | 1905.9 | 1908.6 | 1918.4 | 1905.9 |
| 172.5° | 1922.6 | 1914.3 | 1917.1 | 1926.8 | 1914.3 |
| 175°   | 1929.5 | 1919.7 | 1922.6 | 1932.3 | 1918.4 |
| 177.5° | 1932.3 | 1922.6 | 1924.1 | 1933.8 | 1921.2 |
| 180°   | 1925.4 | 1925.4 | 1925.4 | 1925.4 | 1925.4 |

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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 | 10.80            | 11.68 | 11.72 | 12.61 | 13.81 | 6.78           | 7.65  | 7.69  | 8.58  | 9.78  |
|                 | 3H   | 12.48            | 13.27 | 13.42 | 14.21 | 15.43 | 7.97           | 8.75  | 8.90  | 9.69  | 10.92 |
|                 | 4H   | 13.10            | 13.83 | 14.04 | 14.78 | 16.01 | 8.42           | 9.16  | 9.37  | 10.11 | 11.34 |
|                 | 6H   | 13.52            | 14.20 | 14.48 | 15.15 | 16.40 | 8.75           | 9.43  | 9.70  | 10.38 | 11.62 |
|                 | 8H   | 13.65            | 14.29 | 14.61 | 15.26 | 16.51 | 8.84           | 9.49  | 9.80  | 10.46 | 11.70 |
|                 | 12H  | 13.71            | 14.33 | 14.68 | 15.29 | 16.56 | 8.89           | 9.50  | 9.86  | 10.46 | 11.73 |
| 4H              | 2H   | 10.83            | 11.56 | 11.78 | 12.51 | 13.74 | 7.38           | 8.11  | 8.33  | 9.06  | 10.29 |
|                 | 3H   | 12.66            | 13.27 | 13.62 | 14.25 | 15.50 | 8.73           | 9.35  | 9.69  | 10.32 | 11.57 |
|                 | 4H   | 13.36            | 13.92 | 14.33 | 14.89 | 16.16 | 9.28           | 9.84  | 10.25 | 10.81 | 12.09 |
|                 | 6H   | 13.87            | 14.36 | 14.86 | 15.35 | 16.62 | 9.71           | 10.19 | 10.69 | 11.18 | 12.45 |
|                 | 8H   | 14.05            | 14.50 | 15.04 | 15.49 | 16.77 | 9.84           | 10.29 | 10.82 | 11.28 | 12.56 |
|                 | 12H  | 14.15            | 14.55 | 15.15 | 15.56 | 16.85 | 9.91           | 10.31 | 10.91 | 11.32 | 12.61 |
| 8H              | 4H   | 13.33            | 13.78 | 14.31 | 14.76 | 16.05 | 9.57           | 10.02 | 10.55 | 11.01 | 12.29 |
|                 | 6H   | 13.90            | 14.27 | 14.91 | 15.30 | 16.58 | 10.09          | 10.46 | 11.10 | 11.49 | 12.77 |
|                 | 8H   | 14.11            | 14.44 | 15.13 | 15.46 | 16.76 | 10.28          | 10.61 | 11.30 | 11.63 | 12.93 |
|                 | 12H  | 14.25            | 14.54 | 15.27 | 15.55 | 16.90 | 10.41          | 10.69 | 11.43 | 11.70 | 13.05 |
| 12H             | 4H   | 13.28            | 13.69 | 14.28 | 14.69 | 15.98 | 9.58           | 9.98  | 10.58 | 10.98 | 12.27 |
|                 | 6H   | 13.87            | 14.20 | 14.89 | 15.22 | 16.52 | 10.14          | 10.47 | 11.16 | 11.48 | 12.79 |
|                 | 8H   | 14.10            | 14.38 | 15.12 | 15.39 | 16.74 | 10.35          | 10.64 | 11.37 | 11.65 | 13.00 |