

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: P907863

Luminaire Tested: DFN2DIP-4P4F0-080D060US840-FLLONL

Issue Date: 11/21/2024

Test Information

Test Method: LM-79-2019
Report Number: P907863
REPORT IS A COMBINATION OF REPORTS P900645 AND P897523
Test Lab: INNOVATION CENTER
Issue Date: 11/21/2024
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: NEO-RAY
Catalog Number: DFN2DIP-4P4F0-080D060US840-FLLONL
Description: 4 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Open No Lens
Light Source: -
Ballast/Driver: -

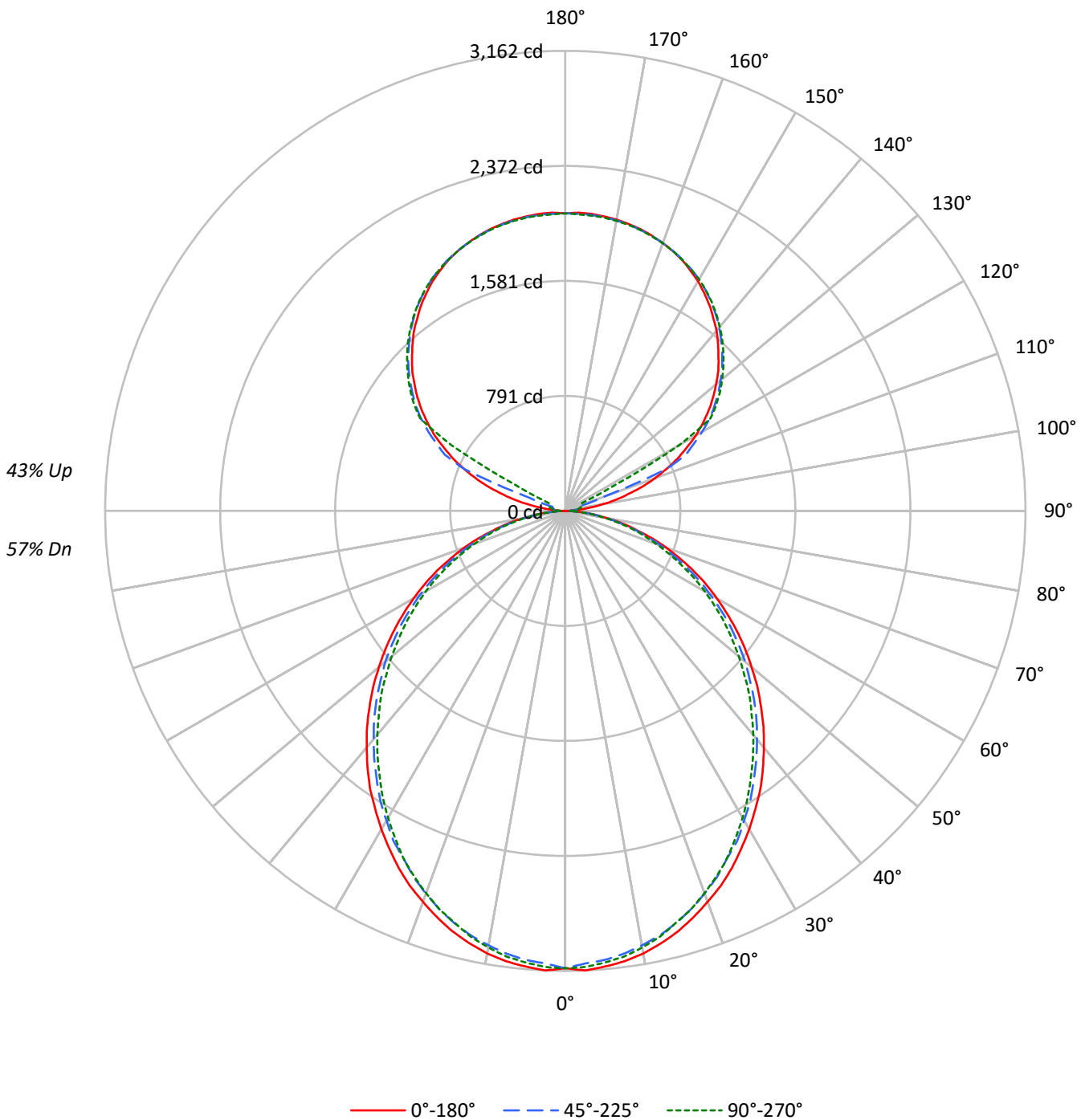
Summary

Lumens per Lamp: N/A
Luminaire Lumens: 13996.7 lumens
Efficiency: N/A
Efficacy: 102.8 lumens/watt
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29
Luminous Opening: Rectangular w/ Sides (W: 4.07' x L: 4.07' x H: 0.1')
CIE Type: General Diffuse

Input Watts (W): 136.1
Input Voltage (V):
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: 0.9971
Total Harmonic Distortion (THDi): 0.049
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 | | 0 | |
| RW | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR | | | | | | | | | | | | | | | | | | | | |
| 0 | 109 | 109 | 109 | 109 | 101 | 101 | 101 | 101 | 87 | 87 | 87 | 74 | 74 | 74 | 63 | 63 | 63 | 57 | 57 | 57 |
| 1 | 99 | 95 | 91 | 88 | 92 | 89 | 85 | 82 | 77 | 74 | 72 | 66 | 64 | 62 | 55 | 54 | 53 | 48 | 48 | 48 |
| 2 | 91 | 83 | 77 | 72 | 84 | 77 | 72 | 67 | 67 | 63 | 59 | 58 | 55 | 52 | 49 | 47 | 45 | 40 | 40 | 40 |
| 3 | 83 | 73 | 66 | 60 | 77 | 68 | 62 | 56 | 59 | 54 | 50 | 51 | 47 | 44 | 43 | 40 | 38 | 34 | 34 | 34 |
| 4 | 76 | 65 | 57 | 50 | 70 | 61 | 53 | 48 | 53 | 47 | 43 | 45 | 41 | 38 | 39 | 35 | 33 | 29 | 29 | 29 |
| 5 | 69 | 58 | 49 | 43 | 64 | 54 | 47 | 41 | 47 | 41 | 37 | 41 | 36 | 33 | 35 | 31 | 29 | 26 | 26 | 26 |
| 6 | 64 | 52 | 44 | 38 | 59 | 49 | 41 | 36 | 43 | 37 | 32 | 37 | 32 | 29 | 32 | 28 | 25 | 22 | 22 | 22 |
| 7 | 59 | 47 | 39 | 33 | 55 | 44 | 37 | 31 | 39 | 33 | 28 | 34 | 29 | 25 | 29 | 25 | 22 | 20 | 20 | 20 |
| 8 | 55 | 43 | 35 | 29 | 51 | 40 | 33 | 28 | 35 | 29 | 25 | 31 | 26 | 23 | 27 | 23 | 20 | 18 | 18 | 18 |
| 9 | 51 | 39 | 31 | 26 | 48 | 37 | 30 | 25 | 32 | 27 | 23 | 28 | 24 | 20 | 25 | 21 | 18 | 16 | 16 | 16 |
| 10 | 48 | 36 | 28 | 24 | 45 | 34 | 27 | 22 | 30 | 24 | 20 | 26 | 22 | 18 | 23 | 19 | 17 | 15 | 15 | 15 |

AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|-----|------|------|------|
| 0° | 2039 | 2039 | 2039 |
| 5° | 2043 | 2012 | 2025 |
| 10° | 2026 | 1985 | 1999 |
| 15° | 1997 | 1953 | 1956 |
| 20° | 1957 | 1908 | 1913 |
| 25° | 1917 | 1855 | 1863 |
| 30° | 1867 | 1805 | 1800 |
| 35° | 1819 | 1746 | 1732 |
| 40° | 1761 | 1686 | 1668 |
| 45° | 1703 | 1627 | 1603 |
| 50° | 1639 | 1564 | 1526 |
| 55° | 1572 | 1492 | 1457 |
| 60° | 1497 | 1406 | 1377 |
| 65° | 1415 | 1317 | 1283 |
| 70° | 1311 | 1209 | 1182 |
| 75° | 1166 | 1080 | 1090 |
| 80° | 992 | 915 | 912 |
| 85° | 720 | 629 | 615 |

MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 0°
 Vertical Angle: 45°
 Luminance: 1703 cd/sqm



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ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 295.9 | 2.1 |
| 10°-20° | 832.5 | 5.9 |
| 20°-30° | 1223.4 | 8.7 |
| 30°-40° | 1420.9 | 10.2 |
| 40°-50° | 1419.1 | 10.1 |
| 50°-60° | 1237.5 | 8.8 |
| 60°-70° | 914.7 | 6.5 |
| 70°-80° | 517.6 | 3.7 |
| 80°-90° | 140.2 | 1.0 |
| 90°-100° | 67.4 | 0.5 |
| 100°-110° | 251.4 | 1.8 |
| 110°-120° | 666.7 | 4.8 |
| 120°-130° | 1105.7 | 7.9 |
| 130°-140° | 1174.5 | 8.4 |
| 140°-150° | 1091.6 | 7.8 |
| 150°-160° | 877.6 | 6.3 |
| 160°-170° | 565.5 | 4.0 |
| 170°-180° | 194.6 | 1.4 |
| 0°-30° | 2351.8 | 16.8 |
| 0°-40° | 3772.7 | 27.0 |
| 0°-60° | 6429.3 | 45.9 |
| 0°-90° | 8001.8 | 57.2 |
| 90°-120° | 985.5 | 7.0 |
| 90°-150° | 4357.2 | 31.1 |
| 90°-180° | 5995.0 | 42.8 |
| 0°-180° | 13996.7 | 100.0 |

CANDELA DISTRIBUTION:

| | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|------|------|-------|------|-------|------|------|
| 0° | 3144 | 3144 | 3144 | 3144 | 3144 | |
| 5° | 3144 | 3132 | 3098 | 3122 | 3117 | 298 |
| 15° | 2992 | 2975 | 2935 | 2947 | 2932 | 843 |
| 25° | 2708 | 2684 | 2633 | 2639 | 2633 | 1246 |
| 35° | 2337 | 2306 | 2258 | 2240 | 2225 | 1459 |
| 45° | 1902 | 1880 | 1835 | 1802 | 1790 | 1467 |
| 55° | 1439 | 1421 | 1384 | 1348 | 1333 | 1287 |
| 65° | 970 | 952 | 922 | 895 | 880 | 959 |
| 75° | 508 | 502 | 487 | 469 | 475 | 542 |
| 85° | 124 | 121 | 118 | 109 | 106 | 138 |
| 90° | 1 | 18 | 30 | 37 | 40 | 13 |
| 95° | 96 | 47 | 58 | 65 | 64 | 114 |
| 105° | 450 | 494 | 90 | 106 | 112 | 481 |
| 115° | 851 | 876 | 913 | 228 | 121 | 838 |
| 125° | 1203 | 1222 | 1250 | 1261 | 1265 | 1073 |
| 135° | 1489 | 1512 | 1526 | 1540 | 1537 | 1150 |
| 145° | 1727 | 1725 | 1750 | 1761 | 1753 | 1080 |
| 155° | 1901 | 1888 | 1906 | 1915 | 1903 | 876 |
| 165° | 2004 | 1995 | 1999 | 2009 | 1999 | 566 |
| 175° | 2049 | 2039 | 2042 | 2052 | 2038 | 195 |
| 180° | 2045 | 2045 | 2045 | 2045 | 2045 | |



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CANDELA DISTRIBUTION (FULL):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|--------|--------|--------|--------|--------|
| 0° | 3143.5 | 3143.5 | 3143.5 | 3143.5 | 3143.5 |
| 2.5° | 3161.8 | 3146.7 | 3113.4 | 3143.5 | 3137.8 |
| 5° | 3143.5 | 3131.7 | 3098.4 | 3122.4 | 3116.6 |
| 7.5° | 3122.4 | 3104.4 | 3071.1 | 3095.4 | 3089.4 |
| 10° | 3089.4 | 3068.2 | 3031.9 | 3056.0 | 3047.1 |
| 12.5° | 3043.8 | 3025.9 | 2989.6 | 3004.7 | 2998.6 |
| 15° | 2992.5 | 2974.6 | 2935.1 | 2947.3 | 2932.2 |
| 17.5° | 2929.0 | 2911.0 | 2871.6 | 2886.7 | 2871.6 |
| 20° | 2859.4 | 2841.5 | 2799.1 | 2808.1 | 2796.2 |
| 22.5° | 2790.2 | 2762.9 | 2723.4 | 2723.4 | 2717.3 |
| 25° | 2708.4 | 2684.3 | 2633.0 | 2638.8 | 2633.0 |
| 27.5° | 2617.6 | 2596.5 | 2557.3 | 2548.3 | 2533.2 |
| 30° | 2527.2 | 2502.7 | 2457.6 | 2448.6 | 2436.4 |
| 32.5° | 2430.3 | 2412.4 | 2363.9 | 2345.6 | 2333.5 |
| 35° | 2336.6 | 2306.5 | 2258.1 | 2239.8 | 2224.7 |
| 37.5° | 2230.8 | 2203.5 | 2155.2 | 2133.9 | 2118.9 |
| 40° | 2122.1 | 2097.7 | 2049.3 | 2022.4 | 2010.1 |
| 42.5° | 2016.3 | 1991.9 | 1943.8 | 1913.3 | 1895.4 |
| 45° | 1901.5 | 1880.3 | 1834.7 | 1801.7 | 1789.6 |
| 47.5° | 1789.6 | 1768.4 | 1719.9 | 1686.6 | 1668.6 |
| 50° | 1671.5 | 1656.5 | 1614.1 | 1571.8 | 1556.7 |
| 52.5° | 1556.7 | 1535.5 | 1496.4 | 1463.1 | 1441.9 |
| 55° | 1439.0 | 1420.7 | 1384.5 | 1348.3 | 1333.1 |
| 57.5° | 1321.0 | 1306.0 | 1266.5 | 1230.2 | 1218.0 |
| 60° | 1203.0 | 1191.1 | 1148.7 | 1115.4 | 1106.4 |
| 62.5° | 1088.1 | 1067.0 | 1036.8 | 1006.7 | 994.5 |
| 65° | 970.5 | 952.2 | 922.0 | 894.7 | 879.7 |
| 67.5° | 849.5 | 834.1 | 807.2 | 786.1 | 773.9 |
| 70° | 737.6 | 725.4 | 698.2 | 677.0 | 665.1 |
| 72.5° | 622.8 | 610.7 | 595.5 | 574.4 | 565.4 |
| 75° | 507.7 | 501.9 | 486.6 | 468.6 | 474.6 |
| 77.5° | 405.1 | 392.8 | 386.8 | 377.8 | 368.8 |
| 80° | 302.5 | 299.2 | 293.2 | 284.2 | 278.0 |
| 82.5° | 205.6 | 205.6 | 202.7 | 190.5 | 190.5 |
| 85° | 123.8 | 120.9 | 118.1 | 108.8 | 105.8 |
| 87.5° | 54.5 | 48.5 | 42.3 | 33.3 | 30.2 |
| 90° | 1.4 | 17.8 | 29.5 | 37.1 | 39.9 |
| 92.5° | 37.1 | 31.1 | 35.4 | 38.5 | 39.9 |
| 95° | 96.1 | 47.3 | 57.7 | 65.2 | 63.6 |
| 97.5° | 173.1 | 51.8 | 75.3 | 80.0 | 81.4 |
| 100° | 262.0 | 59.2 | 84.3 | 96.1 | 99.1 |
| 102.5° | 359.5 | 356.7 | 87.4 | 103.5 | 108.1 |
| 105° | 449.8 | 494.2 | 90.3 | 106.4 | 112.5 |
| 107.5° | 554.9 | 591.8 | 93.3 | 109.5 | 115.4 |
| 110° | 655.6 | 686.5 | 259.0 | 111.1 | 116.8 |



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CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 750.2 | 776.8 | 751.6 | 113.8 | 118.5 |
| 115° | 850.8 | 876.0 | 913.0 | 227.9 | 121.4 |
| 117.5° | 938.1 | 967.7 | 992.9 | 781.2 | 393.5 |
| 120° | 1035.8 | 1057.9 | 1084.7 | 1102.4 | 902.6 |
| 122.5° | 1118.5 | 1142.3 | 1171.9 | 1180.7 | 1182.4 |
| 125° | 1203.0 | 1222.2 | 1250.3 | 1260.7 | 1265.1 |
| 127.5° | 1279.9 | 1300.6 | 1322.9 | 1337.7 | 1339.1 |
| 130° | 1352.4 | 1376.1 | 1392.3 | 1408.7 | 1407.2 |
| 132.5° | 1426.4 | 1445.7 | 1461.9 | 1475.2 | 1473.8 |
| 135° | 1488.6 | 1512.4 | 1525.5 | 1540.4 | 1537.4 |
| 137.5° | 1553.6 | 1571.4 | 1586.3 | 1601.0 | 1596.7 |
| 140° | 1617.2 | 1629.2 | 1645.4 | 1658.7 | 1651.3 |
| 142.5° | 1670.6 | 1681.0 | 1700.2 | 1711.9 | 1704.6 |
| 145° | 1726.9 | 1725.3 | 1750.4 | 1760.8 | 1753.4 |
| 147.5° | 1775.5 | 1771.1 | 1796.2 | 1803.6 | 1797.9 |
| 150° | 1823.0 | 1812.6 | 1836.3 | 1845.1 | 1837.8 |
| 152.5° | 1862.9 | 1851.1 | 1873.2 | 1882.2 | 1871.8 |
| 155° | 1901.4 | 1888.1 | 1905.9 | 1914.7 | 1902.9 |
| 157.5° | 1932.5 | 1920.7 | 1934.0 | 1944.4 | 1932.5 |
| 160° | 1959.1 | 1950.2 | 1959.1 | 1967.9 | 1957.6 |
| 162.5° | 1982.7 | 1973.9 | 1981.3 | 1991.7 | 1978.3 |
| 165° | 2003.5 | 1994.7 | 1999.0 | 2009.4 | 1999.0 |
| 167.5° | 2019.7 | 2010.8 | 2015.4 | 2025.8 | 2012.4 |
| 170° | 2033.2 | 2024.2 | 2027.2 | 2037.5 | 2024.2 |
| 172.5° | 2041.9 | 2033.2 | 2036.1 | 2046.5 | 2033.2 |
| 175° | 2049.3 | 2038.9 | 2041.9 | 2052.2 | 2037.5 |
| 177.5° | 2052.2 | 2041.9 | 2043.5 | 2053.9 | 2040.5 |
| 180° | 2044.9 | 2044.9 | 2044.9 | 2044.9 | 2044.9 |



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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 | 10.40 | 11.33 | 11.30 | 12.25 | 13.41 | 9.96 | 10.89 | 10.85 | 11.80 | 12.97 |
| | 3H | 12.07 | 12.91 | 12.98 | 13.83 | 15.02 | 11.58 | 12.42 | 12.49 | 13.34 | 14.53 |
| | 4H | 12.67 | 13.46 | 13.59 | 14.39 | 15.59 | 12.18 | 12.96 | 13.10 | 13.89 | 15.09 |
| | 6H | 13.08 | 13.80 | 14.01 | 14.74 | 15.95 | 12.58 | 13.30 | 13.51 | 14.24 | 15.45 |
| | 8H | 13.19 | 13.88 | 14.13 | 14.83 | 16.04 | 12.68 | 13.38 | 13.62 | 14.33 | 15.54 |
| | 12H | 13.24 | 13.90 | 14.18 | 14.84 | 16.08 | 12.73 | 13.39 | 13.67 | 14.33 | 15.57 |
| 4H | 2H | 10.87 | 11.66 | 11.80 | 12.59 | 13.79 | 10.52 | 11.31 | 11.44 | 12.24 | 13.44 |
| | 3H | 12.75 | 13.41 | 13.69 | 14.37 | 15.58 | 12.34 | 13.00 | 13.28 | 13.96 | 15.18 |
| | 4H | 13.47 | 14.08 | 14.42 | 15.03 | 16.27 | 13.05 | 13.65 | 14.00 | 14.60 | 15.84 |
| | 6H | 14.00 | 14.52 | 14.96 | 15.49 | 16.73 | 13.57 | 14.08 | 14.53 | 15.06 | 16.30 |
| | 8H | 14.15 | 14.64 | 15.11 | 15.61 | 16.86 | 13.72 | 14.20 | 14.68 | 15.17 | 16.42 |
| | 12H | 14.23 | 14.67 | 15.21 | 15.66 | 16.92 | 13.78 | 14.22 | 14.76 | 15.21 | 16.47 |
| 8H | 4H | 13.68 | 14.16 | 14.64 | 15.13 | 16.39 | 13.30 | 13.79 | 14.26 | 14.76 | 16.01 |
| | 6H | 14.32 | 14.72 | 15.31 | 15.73 | 16.98 | 13.93 | 14.34 | 14.92 | 15.35 | 16.60 |
| | 8H | 14.54 | 14.90 | 15.54 | 15.90 | 17.17 | 14.15 | 14.50 | 15.15 | 15.51 | 16.77 |
| | 12H | 14.68 | 14.99 | 15.68 | 15.99 | 17.30 | 14.27 | 14.58 | 15.27 | 15.58 | 16.89 |
| 12H | 4H | 13.67 | 14.10 | 14.65 | 15.09 | 16.35 | 13.30 | 13.74 | 14.28 | 14.72 | 15.98 |
| | 6H | 14.35 | 14.70 | 15.34 | 15.70 | 16.97 | 13.98 | 14.33 | 14.97 | 15.33 | 16.60 |
| | 8H | 14.60 | 14.91 | 15.60 | 15.90 | 17.22 | 14.22 | 14.53 | 15.22 | 15.52 | 16.84 |