

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: P921886

Luminaire Tested: DFN2DIP-HX4F0-090D110US940-FLLFLL

Issue Date: 11/21/2024

Test Information

Test Method: LM-79-2019
Report Number: P921886
REPORT IS A COMBINATION OF REPORTS P899435 AND P896188
Test Lab: INNOVATION CENTER
Issue Date: 11/21/2024
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: NEO-RAY
Catalog Number: DFN2DIP-HX4F0-090D110US940-FLLFLL
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens
Light Source: -
Ballast/Driver: -

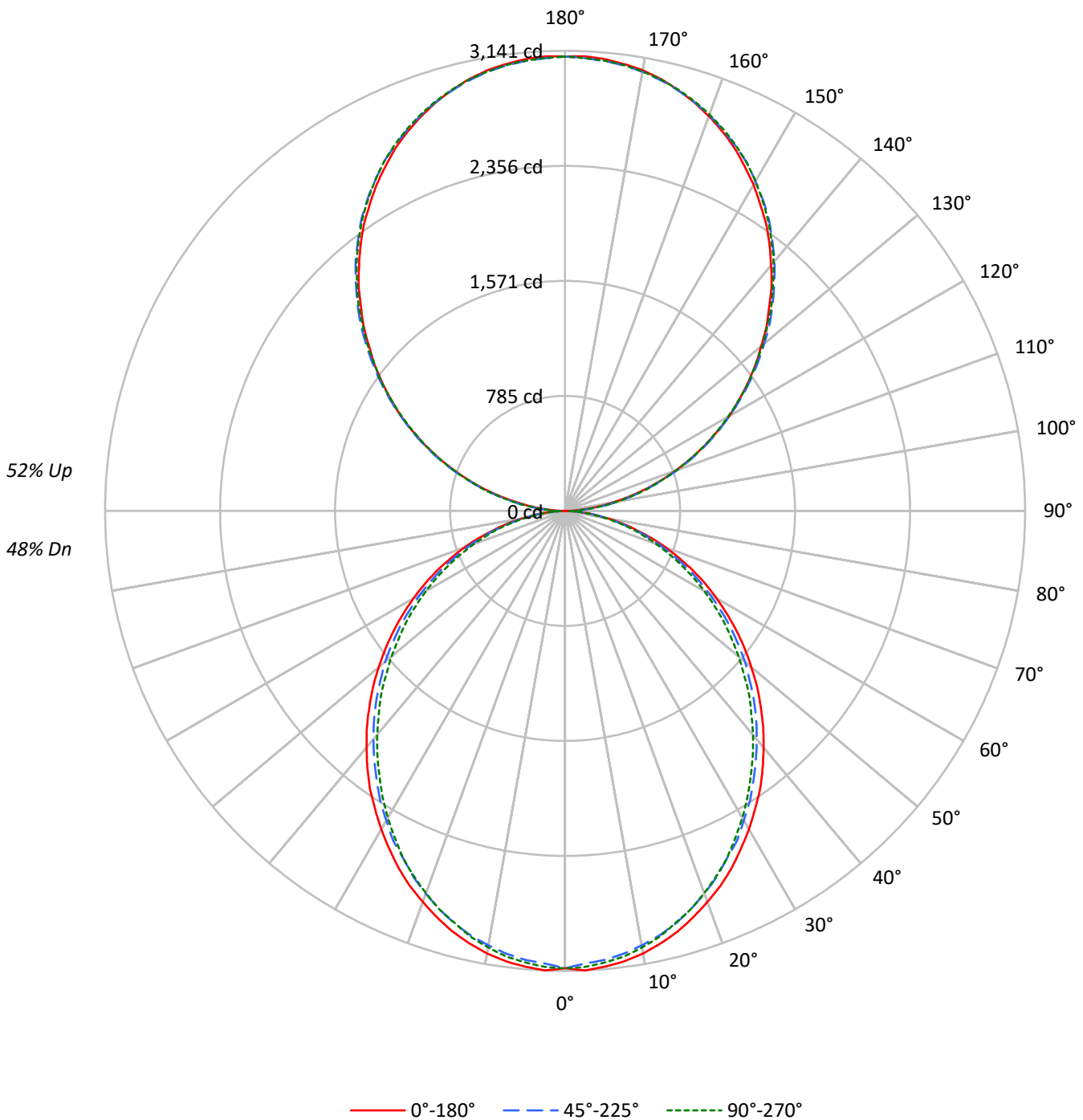
Summary

Lumens per Lamp: N/A
Luminaire Lumens: 16626.0 lumens
Efficiency: N/A
Efficacy: 108.0 lumens/watt
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')
CIE Type: General Diffuse

Input Watts (W): 153.9
Input Voltage (V):
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: 0.9821
Total Harmonic Distortion (THDi): 0.08
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: P921886

CATALOG NUMBER: DFN2DIP-HX4F0-090D110US940-FLLFLL

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 | 50 | 30 | 10 |
| RCR | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 107 | 107 | 107 | 107 | 98 | 98 | 98 | 98 | 82 | 82 | 82 | 68 | 68 | 68 | 54 | 54 | 54 | 48 | 48 | 48 | 48 | 48 | 48 |
| 1 | 97 | 93 | 89 | 86 | 89 | 86 | 82 | 79 | 72 | 70 | 67 | 59 | 58 | 56 | 48 | 47 | 46 | 40 | 40 | 40 | 40 | 40 | 40 |
| 2 | 89 | 81 | 75 | 70 | 81 | 75 | 70 | 65 | 63 | 59 | 56 | 52 | 49 | 47 | 42 | 40 | 38 | 34 | 34 | 34 | 34 | 34 | 34 |
| 3 | 81 | 71 | 64 | 58 | 74 | 66 | 60 | 54 | 56 | 51 | 47 | 46 | 43 | 40 | 37 | 35 | 33 | 29 | 29 | 29 | 29 | 29 | 29 |
| 4 | 74 | 63 | 55 | 49 | 68 | 58 | 51 | 46 | 49 | 44 | 40 | 41 | 37 | 34 | 33 | 31 | 28 | 25 | 25 | 25 | 25 | 25 | 25 |
| 5 | 68 | 56 | 48 | 42 | 62 | 52 | 45 | 40 | 44 | 39 | 34 | 37 | 33 | 29 | 30 | 27 | 25 | 21 | 21 | 21 | 21 | 21 | 21 |
| 6 | 62 | 50 | 42 | 37 | 57 | 47 | 40 | 34 | 40 | 34 | 30 | 33 | 29 | 26 | 27 | 24 | 22 | 19 | 19 | 19 | 19 | 19 | 19 |
| 7 | 58 | 46 | 38 | 32 | 53 | 42 | 35 | 30 | 36 | 31 | 26 | 30 | 26 | 23 | 25 | 22 | 19 | 17 | 17 | 17 | 17 | 17 | 17 |
| 8 | 54 | 41 | 34 | 28 | 49 | 38 | 32 | 27 | 33 | 27 | 24 | 28 | 23 | 20 | 23 | 20 | 17 | 15 | 15 | 15 | 15 | 15 | 15 |
| 9 | 50 | 38 | 30 | 25 | 46 | 35 | 28 | 24 | 30 | 25 | 21 | 26 | 21 | 18 | 21 | 18 | 16 | 13 | 13 | 13 | 13 | 13 | 13 |
| 10 | 47 | 35 | 27 | 23 | 43 | 32 | 26 | 21 | 28 | 23 | 19 | 24 | 19 | 17 | 20 | 16 | 14 | 12 | 12 | 12 | 12 | 12 | 12 |

AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|-----|------|------|------|
| 0° | 2322 | 2322 | 2322 |
| 5° | 2326 | 2290 | 2305 |
| 10° | 2307 | 2259 | 2274 |
| 15° | 2273 | 2222 | 2225 |
| 20° | 2228 | 2171 | 2176 |
| 25° | 2182 | 2109 | 2118 |
| 30° | 2125 | 2052 | 2045 |
| 35° | 2072 | 1984 | 1967 |
| 40° | 2005 | 1916 | 1893 |
| 45° | 1939 | 1848 | 1818 |
| 50° | 1866 | 1776 | 1731 |
| 55° | 1791 | 1693 | 1650 |
| 60° | 1705 | 1594 | 1558 |
| 65° | 1612 | 1492 | 1450 |
| 70° | 1493 | 1368 | 1333 |
| 75° | 1328 | 1219 | 1225 |
| 80° | 1130 | 1029 | 1020 |
| 85° | 820 | 702 | 678 |

MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 90°
 Vertical Angle: 90°
 Luminance: 2338 cd/sqm



TEST NUMBER: P921886

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ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 293.9 | 1.8 |
| 10°-20° | 827.0 | 5.0 |
| 20°-30° | 1215.3 | 7.3 |
| 30°-40° | 1411.5 | 8.5 |
| 40°-50° | 1409.7 | 8.5 |
| 50°-60° | 1229.3 | 7.4 |
| 60°-70° | 908.7 | 5.5 |
| 70°-80° | 514.1 | 3.1 |
| 80°-90° | 144.5 | 0.9 |
| 90°-100° | 192.0 | 1.2 |
| 100°-110° | 609.9 | 3.7 |
| 110°-120° | 1043.8 | 6.3 |
| 120°-130° | 1372.7 | 8.3 |
| 130°-140° | 1540.8 | 9.3 |
| 140°-150° | 1511.0 | 9.1 |
| 150°-160° | 1267.5 | 7.6 |
| 160°-170° | 840.6 | 5.1 |
| 170°-180° | 293.8 | 1.8 |
| 0°-30° | 2336.2 | 14.1 |
| 0°-40° | 3747.7 | 22.5 |
| 0°-60° | 6386.7 | 38.4 |
| 0°-90° | 7954.0 | 47.8 |
| 90°-120° | 1845.7 | 11.1 |
| 90°-150° | 6270.1 | 37.7 |
| 90°-180° | 8672.0 | 52.2 |
| 0°-180° | 16626.0 | 100.0 |

CANDELA DISTRIBUTION:

| | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|------|------|-------|------|-------|------|------|
| 0° | 3123 | 3123 | 3123 | 3123 | 3123 | |
| 5° | 3123 | 3111 | 3078 | 3102 | 3096 | 296 |
| 15° | 2973 | 2955 | 2916 | 2928 | 2913 | 837 |
| 25° | 2690 | 2666 | 2616 | 2621 | 2616 | 1238 |
| 35° | 2321 | 2291 | 2243 | 2225 | 2210 | 1449 |
| 45° | 1889 | 1868 | 1823 | 1790 | 1778 | 1458 |
| 55° | 1430 | 1411 | 1375 | 1339 | 1324 | 1278 |
| 65° | 964 | 946 | 916 | 889 | 874 | 953 |
| 75° | 504 | 499 | 483 | 466 | 472 | 538 |
| 85° | 123 | 120 | 117 | 108 | 105 | 137 |
| 90° | 3 | 34 | 92 | 86 | 89 | 16 |
| 95° | 136 | 163 | 167 | 167 | 163 | 152 |
| 105° | 563 | 570 | 576 | 581 | 581 | 594 |
| 115° | 1048 | 1062 | 1058 | 1055 | 1048 | 1036 |
| 125° | 1524 | 1547 | 1539 | 1531 | 1528 | 1361 |
| 135° | 1970 | 2000 | 2005 | 2002 | 1995 | 1523 |
| 145° | 2392 | 2411 | 2426 | 2429 | 2418 | 1495 |
| 155° | 2736 | 2743 | 2752 | 2765 | 2756 | 1259 |
| 165° | 2976 | 2973 | 2973 | 2992 | 2979 | 840 |
| 175° | 3097 | 3089 | 3083 | 3102 | 3086 | 294 |
| 180° | 3102 | 3102 | 3102 | 3102 | 3102 | |



TEST NUMBER: P921886

CATALOG NUMBER: DFN2DIP-HX4F0-090D110US940-FLLFLL

CANDELA DISTRIBUTION (FULL):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|--------|--------|--------|--------|--------|
| 0° | 3122.7 | 3122.7 | 3122.7 | 3122.7 | 3122.7 |
| 2.5° | 3140.9 | 3125.9 | 3092.8 | 3122.7 | 3117.0 |
| 5° | 3122.7 | 3110.9 | 3077.8 | 3101.7 | 3095.9 |
| 7.5° | 3101.7 | 3083.9 | 3050.7 | 3075.0 | 3068.9 |
| 10° | 3068.9 | 3047.9 | 3011.8 | 3035.7 | 3026.8 |
| 12.5° | 3023.6 | 3005.8 | 2969.8 | 2984.7 | 2978.8 |
| 15° | 2972.7 | 2954.9 | 2915.6 | 2927.8 | 2912.8 |
| 17.5° | 2909.6 | 2891.7 | 2852.6 | 2867.6 | 2852.6 |
| 20° | 2840.5 | 2822.6 | 2780.5 | 2789.4 | 2777.7 |
| 22.5° | 2771.6 | 2744.6 | 2705.4 | 2705.4 | 2699.3 |
| 25° | 2690.4 | 2666.5 | 2615.6 | 2621.3 | 2615.6 |
| 27.5° | 2600.2 | 2579.2 | 2540.4 | 2531.5 | 2516.5 |
| 30° | 2510.4 | 2486.2 | 2441.2 | 2432.3 | 2420.3 |
| 32.5° | 2414.2 | 2396.4 | 2348.2 | 2330.1 | 2318.0 |
| 35° | 2321.2 | 2291.2 | 2243.1 | 2225.0 | 2210.0 |
| 37.5° | 2216.1 | 2189.0 | 2140.8 | 2119.9 | 2104.9 |
| 40° | 2108.0 | 2083.8 | 2035.7 | 2008.9 | 1996.9 |
| 42.5° | 2002.9 | 1978.7 | 1930.9 | 1900.7 | 1882.8 |
| 45° | 1888.8 | 1867.9 | 1822.6 | 1789.8 | 1777.7 |
| 47.5° | 1777.7 | 1756.7 | 1708.5 | 1675.4 | 1657.6 |
| 50° | 1660.5 | 1645.5 | 1603.4 | 1561.4 | 1546.4 |
| 52.5° | 1546.4 | 1525.4 | 1486.5 | 1453.4 | 1432.4 |
| 55° | 1429.5 | 1411.3 | 1375.3 | 1339.3 | 1324.4 |
| 57.5° | 1312.2 | 1297.3 | 1258.1 | 1222.1 | 1210.0 |
| 60° | 1195.0 | 1183.2 | 1141.1 | 1108.0 | 1099.1 |
| 62.5° | 1080.9 | 1059.9 | 1029.9 | 1000.1 | 987.9 |
| 65° | 964.0 | 945.8 | 915.9 | 888.9 | 873.9 |
| 67.5° | 843.9 | 828.7 | 801.8 | 780.9 | 768.7 |
| 70° | 732.7 | 720.6 | 693.6 | 672.5 | 660.8 |
| 72.5° | 618.7 | 606.5 | 591.6 | 570.6 | 561.7 |
| 75° | 504.4 | 498.6 | 483.3 | 465.5 | 471.5 |
| 77.5° | 402.3 | 390.3 | 384.2 | 375.3 | 366.4 |
| 80° | 300.4 | 297.2 | 291.1 | 282.2 | 276.3 |
| 82.5° | 204.2 | 204.2 | 201.3 | 189.2 | 189.2 |
| 85° | 123.0 | 120.1 | 117.3 | 108.0 | 105.1 |
| 87.5° | 54.1 | 48.1 | 42.1 | 33.2 | 30.0 |
| 90° | 2.8 | 33.7 | 91.7 | 86.1 | 88.8 |
| 92.5° | 58.0 | 78.6 | 81.3 | 84.2 | 84.2 |
| 95° | 136.5 | 162.7 | 167.4 | 167.4 | 162.7 |
| 97.5° | 227.3 | 251.6 | 261.9 | 261.9 | 261.9 |
| 100° | 332.0 | 353.5 | 361.0 | 361.0 | 358.2 |
| 102.5° | 442.4 | 458.2 | 468.6 | 471.4 | 468.6 |
| 105° | 563.0 | 570.5 | 576.1 | 580.8 | 580.8 |
| 107.5° | 682.7 | 693.9 | 693.9 | 695.8 | 682.7 |
| 110° | 798.7 | 813.7 | 813.7 | 813.7 | 806.2 |



TEST NUMBER: P921886

CATALOG NUMBER: DFN2DIP-HX4F0-090D110US940-FLLFLL

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 924.0 | 939.9 | 937.1 | 929.6 | 924.0 |
| 115° | 1047.5 | 1062.4 | 1057.7 | 1055.0 | 1047.5 |
| 117.5° | 1170.0 | 1190.5 | 1177.4 | 1170.0 | 1162.5 |
| 120° | 1293.4 | 1314.0 | 1293.4 | 1293.4 | 1285.0 |
| 122.5° | 1405.7 | 1431.8 | 1418.7 | 1411.2 | 1405.7 |
| 125° | 1523.5 | 1546.8 | 1539.4 | 1531.0 | 1528.1 |
| 127.5° | 1638.5 | 1667.5 | 1657.2 | 1646.0 | 1638.5 |
| 130° | 1746.1 | 1779.8 | 1775.0 | 1769.4 | 1759.2 |
| 132.5° | 1866.7 | 1892.9 | 1894.8 | 1881.7 | 1874.2 |
| 135° | 1970.5 | 1999.5 | 2005.1 | 2002.3 | 1994.8 |
| 137.5° | 2086.5 | 2109.9 | 2114.5 | 2112.6 | 2101.5 |
| 140° | 2188.4 | 2211.8 | 2224.9 | 2224.9 | 2214.7 |
| 142.5° | 2293.2 | 2316.6 | 2324.1 | 2326.8 | 2316.6 |
| 145° | 2392.3 | 2411.0 | 2426.0 | 2428.8 | 2418.5 |
| 147.5° | 2481.2 | 2504.5 | 2515.8 | 2520.4 | 2510.2 |
| 150° | 2572.9 | 2588.7 | 2599.0 | 2607.5 | 2599.0 |
| 152.5° | 2654.2 | 2670.0 | 2683.2 | 2693.5 | 2683.2 |
| 155° | 2735.6 | 2743.0 | 2751.5 | 2764.6 | 2756.1 |
| 157.5° | 2805.7 | 2811.3 | 2815.9 | 2834.7 | 2821.5 |
| 160° | 2868.4 | 2874.0 | 2876.7 | 2892.7 | 2881.5 |
| 162.5° | 2926.3 | 2926.3 | 2929.2 | 2946.9 | 2933.8 |
| 165° | 2975.9 | 2973.1 | 2973.1 | 2991.8 | 2978.7 |
| 167.5° | 3020.8 | 3012.4 | 3012.4 | 3031.1 | 3018.0 |
| 170° | 3054.5 | 3047.0 | 3044.2 | 3062.8 | 3047.0 |
| 172.5° | 3077.8 | 3070.3 | 3067.6 | 3086.3 | 3070.3 |
| 175° | 3096.6 | 3089.1 | 3083.4 | 3102.2 | 3086.3 |
| 177.5° | 3106.8 | 3099.3 | 3093.7 | 3109.7 | 3093.7 |
| 180° | 3102.2 | 3102.2 | 3102.2 | 3102.2 | 3102.2 |



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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 | 9.99 | 10.84 | 10.97 | 11.83 | 13.13 | 9.56 | 10.41 | 10.54 | 11.39 | 12.70 |
| | 3H | 11.65 | 12.41 | 12.64 | 13.41 | 14.73 | 11.18 | 11.94 | 12.17 | 12.93 | 14.26 |
| | 4H | 12.24 | 12.96 | 13.24 | 13.96 | 15.29 | 11.77 | 12.48 | 12.77 | 13.49 | 14.82 |
| | 6H | 12.64 | 13.30 | 13.65 | 14.31 | 15.65 | 12.17 | 12.82 | 13.18 | 13.83 | 15.18 |
| | 8H | 12.75 | 13.37 | 13.76 | 14.40 | 15.74 | 12.27 | 12.90 | 13.29 | 13.92 | 15.26 |
| | 12H | 12.79 | 13.39 | 13.82 | 14.41 | 15.77 | 12.31 | 12.91 | 13.33 | 13.93 | 15.29 |
| 4H | 2H | 10.45 | 11.17 | 11.46 | 12.17 | 13.50 | 10.11 | 10.83 | 11.12 | 11.83 | 13.16 |
| | 3H | 12.32 | 12.92 | 13.33 | 13.95 | 15.29 | 11.93 | 12.52 | 12.94 | 13.55 | 14.90 |
| | 4H | 13.03 | 13.58 | 14.06 | 14.60 | 15.97 | 12.63 | 13.17 | 13.65 | 14.20 | 15.57 |
| | 6H | 13.55 | 14.02 | 14.58 | 15.07 | 16.43 | 13.14 | 13.61 | 14.17 | 14.66 | 16.02 |
| | 8H | 13.70 | 14.14 | 14.73 | 15.18 | 16.56 | 13.29 | 13.73 | 14.32 | 14.76 | 16.14 |
| | 12H | 13.77 | 14.17 | 14.82 | 15.22 | 16.61 | 13.35 | 13.75 | 14.40 | 14.80 | 16.19 |
| 8H | 4H | 13.23 | 13.67 | 14.26 | 14.71 | 16.09 | 12.87 | 13.31 | 13.90 | 14.35 | 15.73 |
| | 6H | 13.86 | 14.23 | 14.92 | 15.31 | 16.68 | 13.50 | 13.86 | 14.56 | 14.94 | 16.32 |
| | 8H | 14.08 | 14.40 | 15.15 | 15.47 | 16.86 | 13.71 | 14.03 | 14.78 | 15.10 | 16.50 |
| | 12H | 14.21 | 14.50 | 15.28 | 15.56 | 16.99 | 13.83 | 14.11 | 14.90 | 15.17 | 16.61 |
| 12H | 4H | 13.22 | 13.61 | 14.27 | 14.67 | 16.05 | 12.86 | 13.26 | 13.92 | 14.31 | 15.70 |
| | 6H | 13.89 | 14.21 | 14.96 | 15.28 | 16.67 | 13.54 | 13.86 | 14.61 | 14.93 | 16.32 |
| | 8H | 14.13 | 14.42 | 15.20 | 15.48 | 16.91 | 13.78 | 14.06 | 14.85 | 15.12 | 16.56 |