

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: P909512

Luminaire Tested: DFN2DIP-SQ4F0-090D090US840-FLLFLL

Issue Date: 11/21/2024

Test Information

Test Method: LM-79-2019
Report Number: P909512
REPORT IS A COMBINATION OF REPORTS P900119 AND P896915
Test Lab: INNOVATION CENTER
Issue Date: 11/21/2024
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: NEO-RAY
Catalog Number: DFN2DIP-SQ4F0-090D090US840-FLLFLL
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens
Light Source: -
Ballast/Driver: -

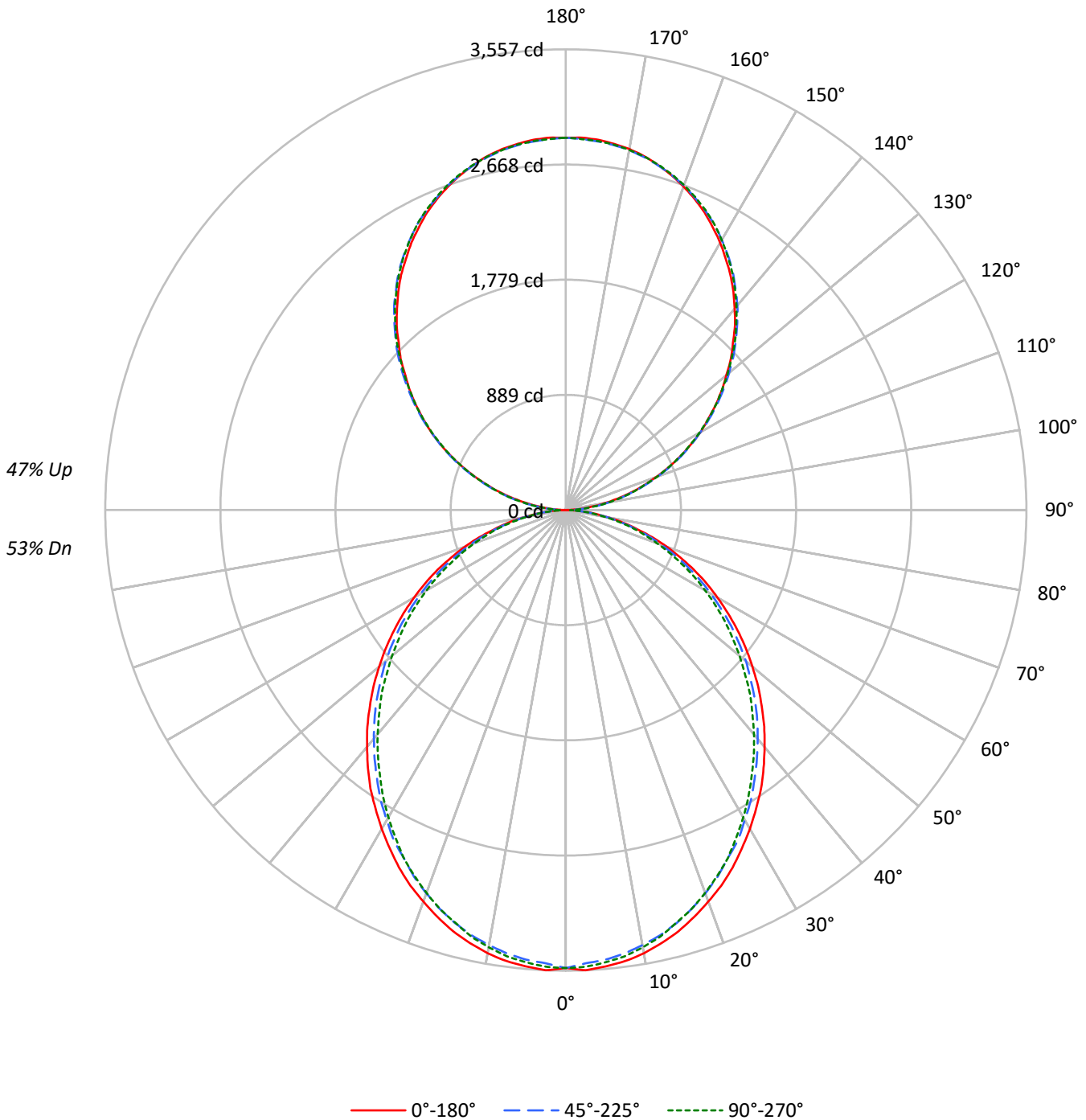
Summary

Lumens per Lamp: N/A
Luminaire Lumens: 17041.5 lumens
Efficiency: N/A
Efficacy: 114.1 lumens/watt
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')
CIE Type: General Diffuse

Input Watts (W): 149.4
Input Voltage (V):
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: 0.983
Total Harmonic Distortion (THDi): 0.073
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: P909512

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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 | 0 |
| RCR | | | | | | | | | | | | | | | | | | | | | |
| 0 | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 71 | 71 | 71 | 59 | 59 | 59 | 53 | | | |
| 1 | 98 | 94 | 90 | 87 | 91 | 87 | 84 | 81 | 74 | 72 | 70 | 63 | 61 | 59 | 52 | 51 | 50 | 45 | | | |
| 2 | 90 | 82 | 76 | 71 | 83 | 76 | 71 | 66 | 65 | 61 | 58 | 55 | 52 | 50 | 46 | 44 | 42 | 37 | | | |
| 3 | 82 | 72 | 65 | 59 | 75 | 67 | 61 | 55 | 58 | 53 | 49 | 49 | 45 | 42 | 41 | 38 | 36 | 32 | | | |
| 4 | 75 | 64 | 56 | 50 | 69 | 60 | 52 | 47 | 51 | 46 | 41 | 43 | 39 | 36 | 36 | 33 | 31 | 27 | | | |
| 5 | 69 | 57 | 49 | 43 | 63 | 53 | 46 | 40 | 46 | 40 | 36 | 39 | 35 | 31 | 33 | 29 | 27 | 24 | | | |
| 6 | 63 | 51 | 43 | 37 | 58 | 48 | 40 | 35 | 41 | 36 | 31 | 35 | 31 | 27 | 30 | 26 | 24 | 21 | | | |
| 7 | 59 | 46 | 38 | 33 | 54 | 43 | 36 | 31 | 37 | 32 | 28 | 32 | 28 | 24 | 27 | 24 | 21 | 18 | | | |
| 8 | 54 | 42 | 34 | 29 | 50 | 39 | 32 | 27 | 34 | 29 | 24 | 29 | 25 | 22 | 25 | 21 | 19 | 16 | | | |
| 9 | 51 | 38 | 31 | 26 | 47 | 36 | 29 | 24 | 31 | 26 | 22 | 27 | 23 | 19 | 23 | 20 | 17 | 15 | | | |
| 10 | 47 | 35 | 28 | 23 | 44 | 33 | 26 | 22 | 29 | 23 | 20 | 25 | 21 | 18 | 21 | 18 | 15 | 13 | | | |

AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|-----|------|------|------|
| 0° | 2481 | 2481 | 2481 |
| 5° | 2485 | 2447 | 2464 |
| 10° | 2465 | 2415 | 2431 |
| 15° | 2429 | 2376 | 2380 |
| 20° | 2380 | 2321 | 2327 |
| 25° | 2331 | 2255 | 2266 |
| 30° | 2270 | 2194 | 2189 |
| 35° | 2212 | 2122 | 2106 |
| 40° | 2141 | 2050 | 2028 |
| 45° | 2070 | 1977 | 1948 |
| 50° | 1992 | 1900 | 1855 |
| 55° | 1911 | 1812 | 1770 |
| 60° | 1819 | 1707 | 1673 |
| 65° | 1719 | 1598 | 1558 |
| 70° | 1591 | 1466 | 1435 |
| 75° | 1414 | 1308 | 1322 |
| 80° | 1201 | 1106 | 1104 |
| 85° | 868 | 757 | 742 |

MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 90°
 Vertical Angle: 90°
 Luminance: 2262 cd/sqm



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ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 332.9 | 2.0 |
| 10°-20° | 936.5 | 5.5 |
| 20°-30° | 1376.3 | 8.1 |
| 30°-40° | 1598.5 | 9.4 |
| 40°-50° | 1596.5 | 9.4 |
| 50°-60° | 1392.1 | 8.2 |
| 60°-70° | 1029.1 | 6.0 |
| 70°-80° | 582.2 | 3.4 |
| 80°-90° | 161.8 | 0.9 |
| 90°-100° | 177.9 | 1.0 |
| 100°-110° | 565.2 | 3.3 |
| 110°-120° | 967.2 | 5.7 |
| 120°-130° | 1272.0 | 7.5 |
| 130°-140° | 1427.7 | 8.4 |
| 140°-150° | 1400.0 | 8.2 |
| 150°-160° | 1174.4 | 6.9 |
| 160°-170° | 778.9 | 4.6 |
| 170°-180° | 272.2 | 1.6 |
| 0°-30° | 2645.7 | 15.5 |
| 0°-40° | 4244.2 | 24.9 |
| 0°-60° | 7232.9 | 42.4 |
| 0°-90° | 9006.1 | 52.8 |
| 90°-120° | 1710.2 | 10.0 |
| 90°-150° | 5809.9 | 34.1 |
| 90°-180° | 8035.0 | 47.1 |
| 0°-180° | 17041.5 | 100.0 |

CANDELA DISTRIBUTION:

| | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|------|------|-------|------|-------|------|------|
| 0° | 3536 | 3536 | 3536 | 3536 | 3536 | |
| 5° | 3536 | 3523 | 3486 | 3513 | 3506 | 336 |
| 15° | 3367 | 3346 | 3302 | 3316 | 3299 | 948 |
| 25° | 3047 | 3020 | 2962 | 2969 | 2962 | 1402 |
| 35° | 2629 | 2595 | 2540 | 2520 | 2503 | 1642 |
| 45° | 2139 | 2115 | 2064 | 2027 | 2013 | 1651 |
| 55° | 1619 | 1598 | 1558 | 1517 | 1500 | 1447 |
| 65° | 1092 | 1071 | 1037 | 1007 | 990 | 1079 |
| 75° | 571 | 565 | 547 | 527 | 534 | 610 |
| 85° | 139 | 136 | 133 | 122 | 119 | 155 |
| 90° | 3 | 31 | 85 | 80 | 82 | 16 |
| 95° | 126 | 151 | 155 | 155 | 151 | 141 |
| 105° | 522 | 529 | 534 | 538 | 538 | 551 |
| 115° | 971 | 984 | 980 | 978 | 971 | 960 |
| 125° | 1412 | 1433 | 1426 | 1419 | 1416 | 1261 |
| 135° | 1826 | 1853 | 1858 | 1855 | 1848 | 1411 |
| 145° | 2217 | 2234 | 2248 | 2250 | 2241 | 1385 |
| 155° | 2535 | 2542 | 2550 | 2562 | 2554 | 1167 |
| 165° | 2757 | 2755 | 2755 | 2772 | 2760 | 778 |
| 175° | 2869 | 2862 | 2857 | 2874 | 2860 | 273 |
| 180° | 2874 | 2874 | 2874 | 2874 | 2874 | |



TEST NUMBER: P909512

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CANDELA DISTRIBUTION (FULL):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|--------|--------|--------|--------|--------|
| 0° | 3536.4 | 3536.4 | 3536.4 | 3536.4 | 3536.4 |
| 2.5° | 3557.0 | 3540.1 | 3502.6 | 3536.4 | 3530.0 |
| 5° | 3536.4 | 3523.1 | 3485.7 | 3512.7 | 3506.2 |
| 7.5° | 3512.7 | 3492.5 | 3455.0 | 3482.4 | 3475.6 |
| 10° | 3475.6 | 3451.7 | 3410.9 | 3438.0 | 3427.9 |
| 12.5° | 3424.3 | 3404.1 | 3363.4 | 3380.2 | 3373.5 |
| 15° | 3366.6 | 3346.4 | 3302.0 | 3315.7 | 3298.7 |
| 17.5° | 3295.1 | 3274.9 | 3230.6 | 3247.5 | 3230.6 |
| 20° | 3216.8 | 3196.6 | 3149.0 | 3159.1 | 3145.7 |
| 22.5° | 3138.9 | 3108.3 | 3063.8 | 3063.8 | 3057.0 |
| 25° | 3046.9 | 3019.8 | 2962.1 | 2968.6 | 2962.1 |
| 27.5° | 2944.8 | 2920.9 | 2877.0 | 2866.9 | 2849.9 |
| 30° | 2843.1 | 2815.6 | 2764.7 | 2754.6 | 2741.0 |
| 32.5° | 2734.1 | 2713.9 | 2659.4 | 2638.9 | 2625.1 |
| 35° | 2628.8 | 2594.8 | 2540.3 | 2519.8 | 2502.9 |
| 37.5° | 2509.7 | 2479.0 | 2424.5 | 2400.8 | 2383.8 |
| 40° | 2387.3 | 2360.0 | 2305.4 | 2275.1 | 2261.5 |
| 42.5° | 2268.3 | 2240.9 | 2186.8 | 2152.5 | 2132.3 |
| 45° | 2139.1 | 2115.4 | 2064.1 | 2026.9 | 2013.3 |
| 47.5° | 2013.3 | 1989.4 | 1934.9 | 1897.4 | 1877.2 |
| 50° | 1880.5 | 1863.5 | 1815.8 | 1768.3 | 1751.3 |
| 52.5° | 1751.3 | 1727.5 | 1683.4 | 1646.0 | 1622.1 |
| 55° | 1618.9 | 1598.3 | 1557.5 | 1516.8 | 1499.9 |
| 57.5° | 1486.1 | 1469.2 | 1424.8 | 1384.0 | 1370.3 |
| 60° | 1353.3 | 1340.0 | 1292.3 | 1254.9 | 1244.8 |
| 62.5° | 1224.2 | 1200.3 | 1166.4 | 1132.6 | 1118.8 |
| 65° | 1091.8 | 1071.2 | 1037.2 | 1006.6 | 989.7 |
| 67.5° | 955.7 | 938.5 | 908.1 | 884.3 | 870.6 |
| 70° | 829.8 | 816.1 | 785.5 | 761.6 | 748.3 |
| 72.5° | 700.6 | 686.9 | 669.9 | 646.2 | 636.1 |
| 75° | 571.2 | 564.6 | 547.3 | 527.1 | 534.0 |
| 77.5° | 455.7 | 442.0 | 435.2 | 425.1 | 415.0 |
| 80° | 340.2 | 336.6 | 329.7 | 319.6 | 312.9 |
| 82.5° | 231.3 | 231.3 | 228.0 | 214.3 | 214.3 |
| 85° | 139.3 | 136.0 | 132.8 | 122.3 | 119.1 |
| 87.5° | 61.3 | 54.4 | 47.7 | 37.6 | 33.9 |
| 90° | 2.6 | 31.2 | 84.9 | 79.7 | 82.3 |
| 92.5° | 53.7 | 72.8 | 75.4 | 78.0 | 78.0 |
| 95° | 126.5 | 150.8 | 155.1 | 155.1 | 150.8 |
| 97.5° | 210.6 | 233.1 | 242.7 | 242.7 | 242.7 |
| 100° | 307.6 | 327.6 | 334.5 | 334.5 | 331.9 |
| 102.5° | 409.9 | 424.6 | 434.1 | 436.8 | 434.1 |
| 105° | 521.7 | 528.6 | 533.8 | 538.2 | 538.2 |
| 107.5° | 632.6 | 643.0 | 643.0 | 644.7 | 632.6 |
| 110° | 740.0 | 754.0 | 754.0 | 754.0 | 747.0 |



TEST NUMBER: P909512

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CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 856.2 | 870.9 | 868.3 | 861.4 | 856.2 |
| 115° | 970.6 | 984.4 | 980.1 | 977.5 | 970.6 |
| 117.5° | 1084.1 | 1103.2 | 1091.1 | 1084.1 | 1077.1 |
| 120° | 1198.5 | 1217.5 | 1198.5 | 1198.5 | 1190.6 |
| 122.5° | 1302.4 | 1326.8 | 1314.6 | 1307.7 | 1302.4 |
| 125° | 1411.7 | 1433.3 | 1426.4 | 1418.6 | 1416.0 |
| 127.5° | 1518.2 | 1545.1 | 1535.6 | 1525.2 | 1518.2 |
| 130° | 1617.9 | 1649.1 | 1644.8 | 1639.5 | 1630.0 |
| 132.5° | 1729.7 | 1753.9 | 1755.7 | 1743.5 | 1736.7 |
| 135° | 1825.8 | 1852.7 | 1858.0 | 1855.3 | 1848.5 |
| 137.5° | 1933.3 | 1955.0 | 1959.3 | 1957.6 | 1947.2 |
| 140° | 2027.8 | 2049.4 | 2061.5 | 2061.5 | 2052.0 |
| 142.5° | 2124.9 | 2146.5 | 2153.4 | 2156.1 | 2146.5 |
| 145° | 2216.8 | 2234.0 | 2247.9 | 2250.5 | 2241.0 |
| 147.5° | 2299.1 | 2320.7 | 2331.1 | 2335.4 | 2325.9 |
| 150° | 2384.0 | 2398.7 | 2408.2 | 2416.0 | 2408.2 |
| 152.5° | 2459.3 | 2474.1 | 2486.2 | 2495.8 | 2486.2 |
| 155° | 2534.8 | 2541.6 | 2549.5 | 2561.6 | 2553.8 |
| 157.5° | 2599.7 | 2604.9 | 2609.3 | 2626.6 | 2614.4 |
| 160° | 2657.8 | 2663.0 | 2665.6 | 2680.3 | 2669.9 |
| 162.5° | 2711.5 | 2711.5 | 2714.1 | 2730.6 | 2718.5 |
| 165° | 2757.4 | 2754.8 | 2754.8 | 2772.2 | 2760.1 |
| 167.5° | 2799.0 | 2791.3 | 2791.3 | 2808.5 | 2796.4 |
| 170° | 2830.2 | 2823.3 | 2820.8 | 2838.0 | 2823.3 |
| 172.5° | 2851.9 | 2845.0 | 2842.4 | 2859.7 | 2845.0 |
| 175° | 2869.2 | 2862.3 | 2857.1 | 2874.5 | 2859.7 |
| 177.5° | 2878.7 | 2871.9 | 2866.6 | 2881.3 | 2866.6 |
| 180° | 2874.5 | 2874.5 | 2874.5 | 2874.5 | 2874.5 |



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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 | 10.70 | 11.59 | 11.63 | 12.54 | 13.77 | 10.26 | 11.14 | 11.19 | 12.09 | 13.32 |
| | 3H | 12.37 | 13.16 | 13.31 | 14.12 | 15.38 | 11.88 | 12.67 | 12.82 | 13.63 | 14.89 |
| | 4H | 12.96 | 13.71 | 13.92 | 14.68 | 15.94 | 12.46 | 13.22 | 13.42 | 14.18 | 15.44 |
| | 6H | 13.36 | 14.06 | 14.33 | 15.03 | 16.30 | 12.86 | 13.56 | 13.83 | 14.53 | 15.80 |
| | 8H | 13.47 | 14.13 | 14.45 | 15.12 | 16.39 | 12.97 | 13.63 | 13.95 | 14.62 | 15.89 |
| | 12H | 13.52 | 14.15 | 14.50 | 15.13 | 16.43 | 13.01 | 13.64 | 13.99 | 14.62 | 15.92 |
| 4H | 2H | 11.17 | 11.92 | 12.13 | 12.88 | 14.14 | 10.81 | 11.56 | 11.77 | 12.53 | 13.79 |
| | 3H | 13.04 | 13.67 | 14.01 | 14.66 | 15.94 | 12.63 | 13.26 | 13.60 | 14.25 | 15.53 |
| | 4H | 13.76 | 14.33 | 14.74 | 15.32 | 16.62 | 13.33 | 13.91 | 14.32 | 14.89 | 16.19 |
| | 6H | 14.28 | 14.77 | 15.27 | 15.78 | 17.08 | 13.85 | 14.34 | 14.84 | 15.35 | 16.65 |
| | 8H | 14.43 | 14.89 | 15.43 | 15.90 | 17.21 | 13.99 | 14.46 | 14.99 | 15.46 | 16.77 |
| | 12H | 14.51 | 14.92 | 15.52 | 15.94 | 17.26 | 14.06 | 14.48 | 15.07 | 15.49 | 16.81 |
| 8H | 4H | 13.96 | 14.42 | 14.95 | 15.42 | 16.74 | 13.58 | 14.04 | 14.58 | 15.05 | 16.36 |
| | 6H | 14.59 | 14.98 | 15.61 | 16.02 | 17.33 | 14.21 | 14.59 | 15.23 | 15.64 | 16.95 |
| | 8H | 14.82 | 15.15 | 15.85 | 16.19 | 17.52 | 14.42 | 14.76 | 15.45 | 15.79 | 17.12 |
| | 12H | 14.95 | 15.25 | 15.99 | 16.28 | 17.65 | 14.54 | 14.84 | 15.57 | 15.87 | 17.24 |
| 12H | 4H | 13.94 | 14.36 | 14.96 | 15.38 | 16.70 | 13.58 | 13.99 | 14.59 | 15.01 | 16.33 |
| | 6H | 14.62 | 14.96 | 15.65 | 15.99 | 17.32 | 14.25 | 14.59 | 15.28 | 15.62 | 16.95 |
| | 8H | 14.87 | 15.17 | 15.90 | 16.19 | 17.57 | 14.49 | 14.79 | 15.52 | 15.81 | 17.19 |