

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: P906969

Luminaire Tested: DFN2DIP-SQ4F0-160D100US835-FLLONL

Issue Date: 11/21/2024

Test Information

Test Method: LM-79-2019
Report Number: P906969
REPORT IS A COMBINATION OF REPORTS P901667 AND P898471
Test Lab: INNOVATION CENTER
Issue Date: 11/21/2024
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: NEO-RAY
Catalog Number: DFN2DIP-SQ4F0-160D100US835-FLLONL
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens
Light Source: -
Ballast/Driver: -

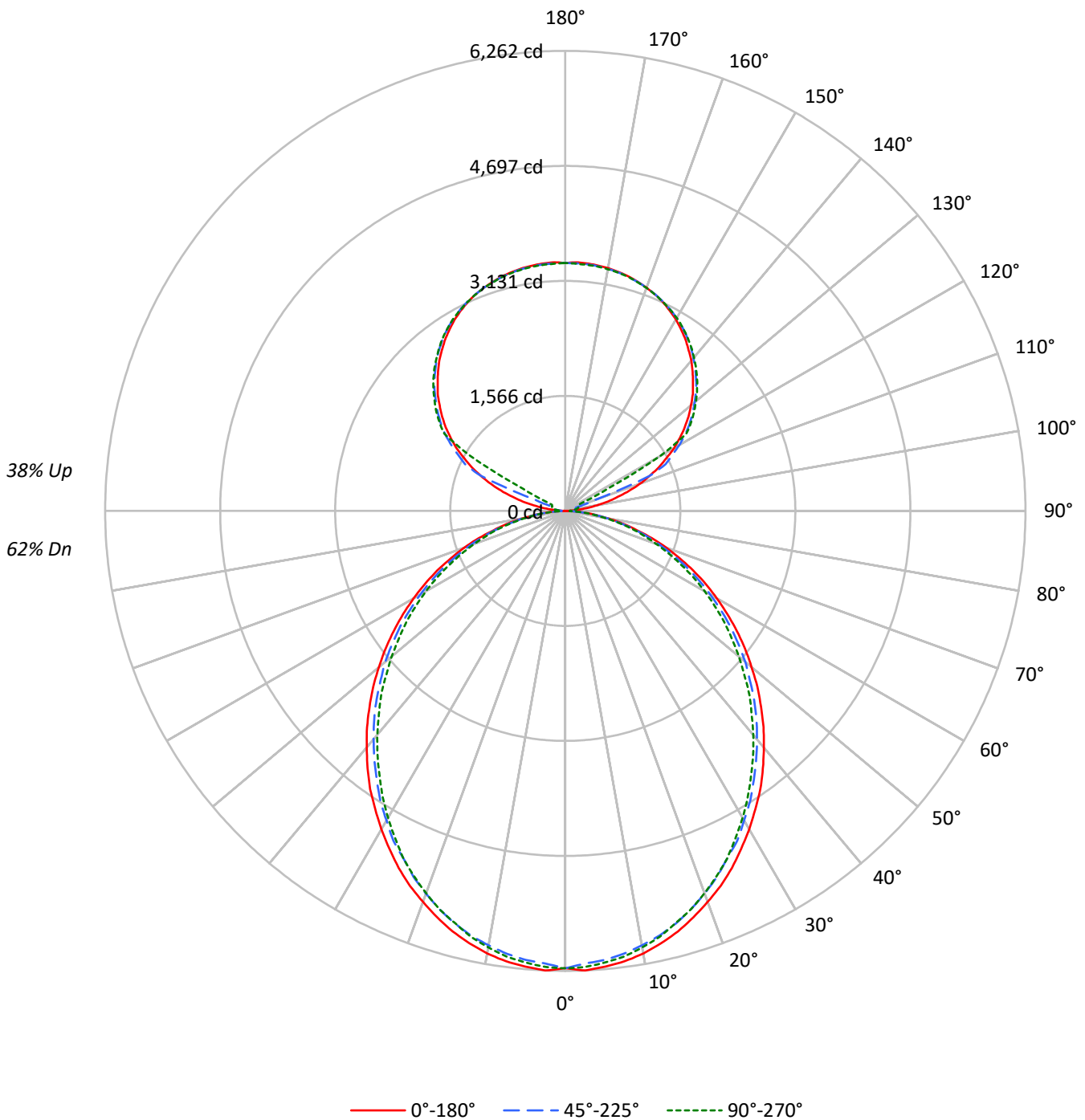
Summary

Lumens per Lamp: N/A
Luminaire Lumens: 25740.0 lumens
Efficiency: N/A
Efficacy: 106.6 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: Semi-Direct

Input Watts (W): 241.4
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 | 0 |
| RCR | | | | | | | | | | | | | | | | | | | | | |
| 0 | 110 | 110 | 110 | 110 | 103 | 103 | 103 | 103 | 90 | 90 | 90 | 78 | 78 | 78 | 67 | 67 | 67 | 67 | 67 | 67 | 62 |
| 1 | 100 | 96 | 92 | 88 | 94 | 90 | 87 | 83 | 79 | 76 | 74 | 69 | 67 | 65 | 59 | 58 | 56 | 59 | 58 | 56 | 52 |
| 2 | 91 | 84 | 78 | 72 | 85 | 79 | 73 | 69 | 69 | 65 | 61 | 60 | 57 | 54 | 52 | 50 | 48 | 52 | 50 | 48 | 43 |
| 3 | 83 | 74 | 66 | 60 | 78 | 69 | 63 | 57 | 61 | 56 | 51 | 53 | 49 | 46 | 46 | 43 | 40 | 46 | 43 | 40 | 37 |
| 4 | 76 | 65 | 57 | 51 | 71 | 61 | 54 | 49 | 54 | 48 | 44 | 47 | 43 | 39 | 41 | 38 | 35 | 41 | 38 | 35 | 32 |
| 5 | 70 | 58 | 50 | 44 | 65 | 55 | 47 | 42 | 49 | 43 | 38 | 43 | 38 | 34 | 37 | 33 | 30 | 37 | 33 | 30 | 27 |
| 6 | 65 | 52 | 44 | 38 | 60 | 49 | 42 | 36 | 44 | 38 | 33 | 39 | 34 | 30 | 34 | 30 | 27 | 34 | 30 | 27 | 24 |
| 7 | 60 | 47 | 39 | 34 | 56 | 45 | 37 | 32 | 40 | 34 | 29 | 35 | 30 | 27 | 31 | 27 | 24 | 31 | 27 | 24 | 21 |
| 8 | 56 | 43 | 35 | 30 | 52 | 41 | 34 | 29 | 36 | 30 | 26 | 32 | 27 | 24 | 28 | 24 | 21 | 28 | 24 | 21 | 19 |
| 9 | 52 | 39 | 32 | 27 | 49 | 37 | 30 | 26 | 33 | 28 | 23 | 30 | 25 | 21 | 26 | 22 | 19 | 26 | 22 | 19 | 17 |
| 10 | 49 | 36 | 29 | 24 | 45 | 34 | 28 | 23 | 31 | 25 | 21 | 27 | 23 | 19 | 24 | 20 | 18 | 24 | 20 | 18 | 16 |

AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|-----|------|------|------|
| 0° | 4368 | 4368 | 4368 |
| 5° | 4375 | 4308 | 4338 |
| 10° | 4340 | 4251 | 4280 |
| 15° | 4276 | 4182 | 4190 |
| 20° | 4190 | 4086 | 4097 |
| 25° | 4104 | 3970 | 3990 |
| 30° | 3996 | 3863 | 3853 |
| 35° | 3894 | 3736 | 3708 |
| 40° | 3769 | 3608 | 3570 |
| 45° | 3644 | 3480 | 3429 |
| 50° | 3507 | 3346 | 3266 |
| 55° | 3364 | 3190 | 3116 |
| 60° | 3202 | 3005 | 2945 |
| 65° | 3025 | 2814 | 2742 |
| 70° | 2800 | 2581 | 2525 |
| 75° | 2489 | 2302 | 2327 |
| 80° | 2114 | 1947 | 1944 |
| 85° | 1528 | 1332 | 1306 |

MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 0°
 Vertical Angle: 45°
 Luminance: 3644 cd/sqm



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ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 586.0 | 2.3 |
| 10°-20° | 1648.7 | 6.4 |
| 20°-30° | 2422.9 | 9.4 |
| 30°-40° | 2814.1 | 10.9 |
| 40°-50° | 2810.6 | 10.9 |
| 50°-60° | 2450.7 | 9.5 |
| 60°-70° | 1811.6 | 7.0 |
| 70°-80° | 1025.0 | 4.0 |
| 80°-90° | 276.5 | 1.1 |
| 90°-100° | 111.3 | 0.4 |
| 100°-110° | 414.9 | 1.6 |
| 110°-120° | 1100.3 | 4.3 |
| 120°-130° | 1824.9 | 7.1 |
| 130°-140° | 1938.4 | 7.5 |
| 140°-150° | 1801.5 | 7.0 |
| 150°-160° | 1448.4 | 5.6 |
| 160°-170° | 933.3 | 3.6 |
| 170°-180° | 321.2 | 1.2 |
| 0°-30° | 4657.5 | 18.1 |
| 0°-40° | 7471.6 | 29.0 |
| 0°-60° | 12732.9 | 49.5 |
| 0°-90° | 15845.9 | 61.6 |
| 90°-120° | 1626.4 | 6.3 |
| 90°-150° | 7191.2 | 27.9 |
| 90°-180° | 9894.0 | 38.4 |
| 0°-180° | 25740.0 | 100.0 |

CANDELA DISTRIBUTION:

| | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|------|------|-------|------|-------|------|------|
| 0° | 6226 | 6226 | 6226 | 6226 | 6226 | |
| 5° | 6226 | 6202 | 6136 | 6184 | 6172 | 591 |
| 15° | 5926 | 5891 | 5813 | 5837 | 5807 | 1669 |
| 25° | 5364 | 5316 | 5214 | 5226 | 5214 | 2468 |
| 35° | 4628 | 4568 | 4472 | 4436 | 4406 | 2890 |
| 45° | 3766 | 3724 | 3634 | 3568 | 3544 | 2906 |
| 55° | 2850 | 2814 | 2742 | 2670 | 2640 | 2548 |
| 65° | 1922 | 1886 | 1826 | 1772 | 1742 | 1900 |
| 75° | 1005 | 994 | 964 | 928 | 940 | 1073 |
| 85° | 245 | 239 | 234 | 215 | 210 | 273 |
| 90° | 2 | 29 | 49 | 61 | 66 | 24 |
| 95° | 159 | 78 | 95 | 108 | 105 | 188 |
| 105° | 742 | 816 | 149 | 176 | 186 | 793 |
| 115° | 1404 | 1446 | 1507 | 376 | 200 | 1382 |
| 125° | 1985 | 2017 | 2064 | 2081 | 2088 | 1771 |
| 135° | 2457 | 2496 | 2518 | 2542 | 2537 | 1898 |
| 145° | 2850 | 2847 | 2889 | 2906 | 2894 | 1782 |
| 155° | 3138 | 3116 | 3146 | 3160 | 3141 | 1446 |
| 165° | 3306 | 3292 | 3299 | 3316 | 3299 | 934 |
| 175° | 3382 | 3365 | 3370 | 3387 | 3363 | 322 |
| 180° | 3375 | 3375 | 3375 | 3375 | 3375 | |



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CANDELA DISTRIBUTION (FULL):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|--------|--------|--------|--------|--------|
| 0° | 6225.7 | 6225.7 | 6225.7 | 6225.7 | 6225.7 |
| 2.5° | 6261.9 | 6232.0 | 6166.0 | 6225.7 | 6214.2 |
| 5° | 6225.7 | 6202.2 | 6136.1 | 6183.8 | 6172.3 |
| 7.5° | 6183.8 | 6148.2 | 6082.1 | 6130.4 | 6118.3 |
| 10° | 6118.3 | 6076.4 | 6004.7 | 6052.3 | 6034.5 |
| 12.5° | 6028.2 | 5992.6 | 5920.8 | 5950.7 | 5938.6 |
| 15° | 5926.5 | 5891.0 | 5812.8 | 5837.0 | 5807.1 |
| 17.5° | 5800.8 | 5765.2 | 5687.1 | 5716.9 | 5687.1 |
| 20° | 5662.9 | 5627.4 | 5543.5 | 5561.3 | 5537.8 |
| 22.5° | 5525.8 | 5471.8 | 5393.6 | 5393.6 | 5381.6 |
| 25° | 5363.8 | 5316.2 | 5214.5 | 5226.0 | 5214.5 |
| 27.5° | 5184.0 | 5142.1 | 5064.6 | 5046.9 | 5017.0 |
| 30° | 5004.9 | 4956.7 | 4867.1 | 4849.3 | 4825.2 |
| 32.5° | 4813.1 | 4777.6 | 4681.6 | 4645.4 | 4621.3 |
| 35° | 4627.7 | 4568.0 | 4472.0 | 4435.8 | 4406.0 |
| 37.5° | 4418.1 | 4364.1 | 4268.2 | 4226.2 | 4196.4 |
| 40° | 4202.7 | 4154.5 | 4058.6 | 4005.2 | 3981.1 |
| 42.5° | 3993.2 | 3944.9 | 3849.6 | 3789.3 | 3753.7 |
| 45° | 3765.8 | 3723.8 | 3633.7 | 3568.2 | 3544.1 |
| 47.5° | 3544.1 | 3502.2 | 3406.3 | 3340.2 | 3304.7 |
| 50° | 3310.4 | 3280.5 | 3196.7 | 3112.8 | 3083.0 |
| 52.5° | 3083.0 | 3041.1 | 2963.6 | 2897.5 | 2855.6 |
| 55° | 2849.9 | 2813.7 | 2741.9 | 2670.1 | 2640.3 |
| 57.5° | 2616.2 | 2586.3 | 2508.2 | 2436.4 | 2412.3 |
| 60° | 2382.4 | 2358.9 | 2275.1 | 2209.0 | 2191.2 |
| 62.5° | 2155.0 | 2113.1 | 2053.4 | 1993.7 | 1969.6 |
| 65° | 1921.9 | 1885.7 | 1826.0 | 1772.1 | 1742.2 |
| 67.5° | 1682.5 | 1652.0 | 1598.7 | 1556.7 | 1532.6 |
| 70° | 1460.8 | 1436.7 | 1382.7 | 1340.8 | 1317.3 |
| 72.5° | 1233.4 | 1209.3 | 1179.5 | 1137.5 | 1119.8 |
| 75° | 1005.4 | 994.0 | 963.5 | 927.9 | 940.0 |
| 77.5° | 802.2 | 778.1 | 766.0 | 748.2 | 730.4 |
| 80° | 598.9 | 592.6 | 580.5 | 562.7 | 550.7 |
| 82.5° | 407.1 | 407.1 | 401.4 | 377.3 | 377.3 |
| 85° | 245.2 | 239.4 | 233.7 | 215.3 | 209.6 |
| 87.5° | 108.0 | 95.9 | 83.8 | 66.1 | 59.7 |
| 90° | 2.3 | 29.3 | 48.7 | 61.2 | 65.8 |
| 92.5° | 61.2 | 51.3 | 58.6 | 63.5 | 65.8 |
| 95° | 158.6 | 78.0 | 95.1 | 107.6 | 105.0 |
| 97.5° | 285.6 | 85.5 | 124.4 | 131.9 | 134.3 |
| 100° | 432.4 | 97.7 | 139.2 | 158.6 | 163.6 |
| 102.5° | 593.3 | 588.7 | 144.1 | 170.8 | 178.3 |
| 105° | 742.4 | 815.7 | 149.1 | 175.7 | 185.6 |
| 107.5° | 915.8 | 976.7 | 154.0 | 180.7 | 190.5 |
| 110° | 1081.9 | 1133.0 | 427.4 | 183.3 | 192.8 |



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CATALOG NUMBER: DFN2DIP-SQ4F0-160D100US835-FLLONL

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1238.2 | 1282.0 | 1240.6 | 187.9 | 195.5 |
| 115° | 1404.1 | 1445.6 | 1506.8 | 376.1 | 200.4 |
| 117.5° | 1548.2 | 1597.0 | 1638.7 | 1289.3 | 649.6 |
| 120° | 1709.5 | 1746.0 | 1790.1 | 1819.4 | 1489.7 |
| 122.5° | 1846.1 | 1885.2 | 1934.2 | 1948.7 | 1951.3 |
| 125° | 1985.3 | 2017.2 | 2063.6 | 2080.7 | 2087.9 |
| 127.5° | 2112.3 | 2146.5 | 2183.3 | 2207.7 | 2210.0 |
| 130° | 2232.0 | 2271.2 | 2297.9 | 2324.8 | 2322.5 |
| 132.5° | 2354.1 | 2386.0 | 2412.7 | 2434.7 | 2432.4 |
| 135° | 2456.8 | 2495.9 | 2517.7 | 2542.3 | 2537.4 |
| 137.5° | 2564.1 | 2593.4 | 2618.0 | 2642.4 | 2635.1 |
| 140° | 2669.0 | 2688.8 | 2715.4 | 2737.5 | 2725.3 |
| 142.5° | 2757.2 | 2774.3 | 2805.9 | 2825.3 | 2813.2 |
| 145° | 2850.0 | 2847.4 | 2888.9 | 2906.0 | 2893.8 |
| 147.5° | 2930.3 | 2923.1 | 2964.5 | 2976.7 | 2967.2 |
| 150° | 3008.6 | 2991.5 | 3030.7 | 3045.2 | 3033.0 |
| 152.5° | 3074.4 | 3055.0 | 3091.6 | 3106.3 | 3089.2 |
| 155° | 3138.0 | 3116.2 | 3145.5 | 3160.0 | 3140.6 |
| 157.5° | 3189.3 | 3169.9 | 3191.9 | 3209.0 | 3189.3 |
| 160° | 3233.4 | 3218.6 | 3233.4 | 3247.9 | 3230.8 |
| 162.5° | 3272.2 | 3257.7 | 3269.9 | 3287.0 | 3265.0 |
| 165° | 3306.4 | 3291.9 | 3299.2 | 3316.3 | 3299.2 |
| 167.5° | 3333.4 | 3318.6 | 3326.2 | 3343.3 | 3321.2 |
| 170° | 3355.4 | 3340.7 | 3345.6 | 3362.7 | 3340.7 |
| 172.5° | 3369.9 | 3355.4 | 3360.4 | 3377.5 | 3355.4 |
| 175° | 3382.1 | 3365.0 | 3369.9 | 3387.1 | 3362.7 |
| 177.5° | 3387.1 | 3369.9 | 3372.6 | 3389.7 | 3367.6 |
| 180° | 3374.9 | 3374.9 | 3374.9 | 3374.9 | 3374.9 |



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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 | 13.41 | 14.39 | 14.26 | 15.26 | 16.36 | 12.97 | 13.94 | 13.82 | 14.81 | 15.91 |
| | 3H | 15.08 | 15.96 | 15.95 | 16.84 | 17.96 | 14.59 | 15.47 | 15.46 | 16.35 | 17.47 |
| | 4H | 15.68 | 16.51 | 16.56 | 17.40 | 18.53 | 15.18 | 16.01 | 16.06 | 16.90 | 18.03 |
| | 6H | 16.09 | 16.85 | 16.98 | 17.75 | 18.89 | 15.59 | 16.35 | 16.48 | 17.25 | 18.39 |
| | 8H | 16.20 | 16.93 | 17.10 | 17.84 | 18.98 | 15.70 | 16.42 | 16.60 | 17.34 | 18.48 |
| | 12H | 16.25 | 16.95 | 17.16 | 17.85 | 19.02 | 15.74 | 16.44 | 16.65 | 17.34 | 18.51 |
| 4H | 2H | 13.89 | 14.71 | 14.77 | 15.60 | 16.74 | 13.53 | 14.36 | 14.42 | 15.25 | 16.38 |
| | 3H | 15.77 | 16.46 | 16.66 | 17.38 | 18.53 | 15.36 | 16.05 | 16.25 | 16.97 | 18.12 |
| | 4H | 16.49 | 17.12 | 17.40 | 18.04 | 19.21 | 16.06 | 16.70 | 16.97 | 17.61 | 18.79 |
| | 6H | 17.01 | 17.56 | 17.94 | 18.50 | 19.67 | 16.58 | 17.13 | 17.50 | 18.07 | 19.24 |
| | 8H | 17.17 | 17.68 | 18.09 | 18.61 | 19.80 | 16.73 | 17.24 | 17.66 | 18.18 | 19.36 |
| | 12H | 17.25 | 17.71 | 18.19 | 18.66 | 19.86 | 16.80 | 17.26 | 17.74 | 18.21 | 19.41 |
| 8H | 4H | 16.70 | 17.20 | 17.62 | 18.14 | 19.33 | 16.32 | 16.83 | 17.24 | 17.76 | 18.95 |
| | 6H | 17.34 | 17.76 | 18.29 | 18.73 | 19.92 | 16.95 | 17.37 | 17.90 | 18.35 | 19.54 |
| | 8H | 17.56 | 17.93 | 18.52 | 18.90 | 20.11 | 17.17 | 17.54 | 18.13 | 18.51 | 19.71 |
| | 12H | 17.70 | 18.03 | 18.66 | 18.99 | 20.24 | 17.29 | 17.62 | 18.25 | 18.58 | 19.83 |
| 12H | 4H | 16.69 | 17.15 | 17.63 | 18.10 | 19.29 | 16.32 | 16.78 | 17.26 | 17.73 | 18.92 |
| | 6H | 17.37 | 17.74 | 18.33 | 18.71 | 19.91 | 17.00 | 17.37 | 17.96 | 18.34 | 19.54 |
| | 8H | 17.62 | 17.95 | 18.58 | 18.91 | 20.16 | 17.24 | 17.57 | 18.20 | 18.53 | 19.78 |