

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: P909656

Luminaire Tested: DFN2DIP-SQ4F0-140D090US840-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P909656  
REPORT IS A COMBINATION OF REPORTS P900127 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-140D090US840-FLLFLL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

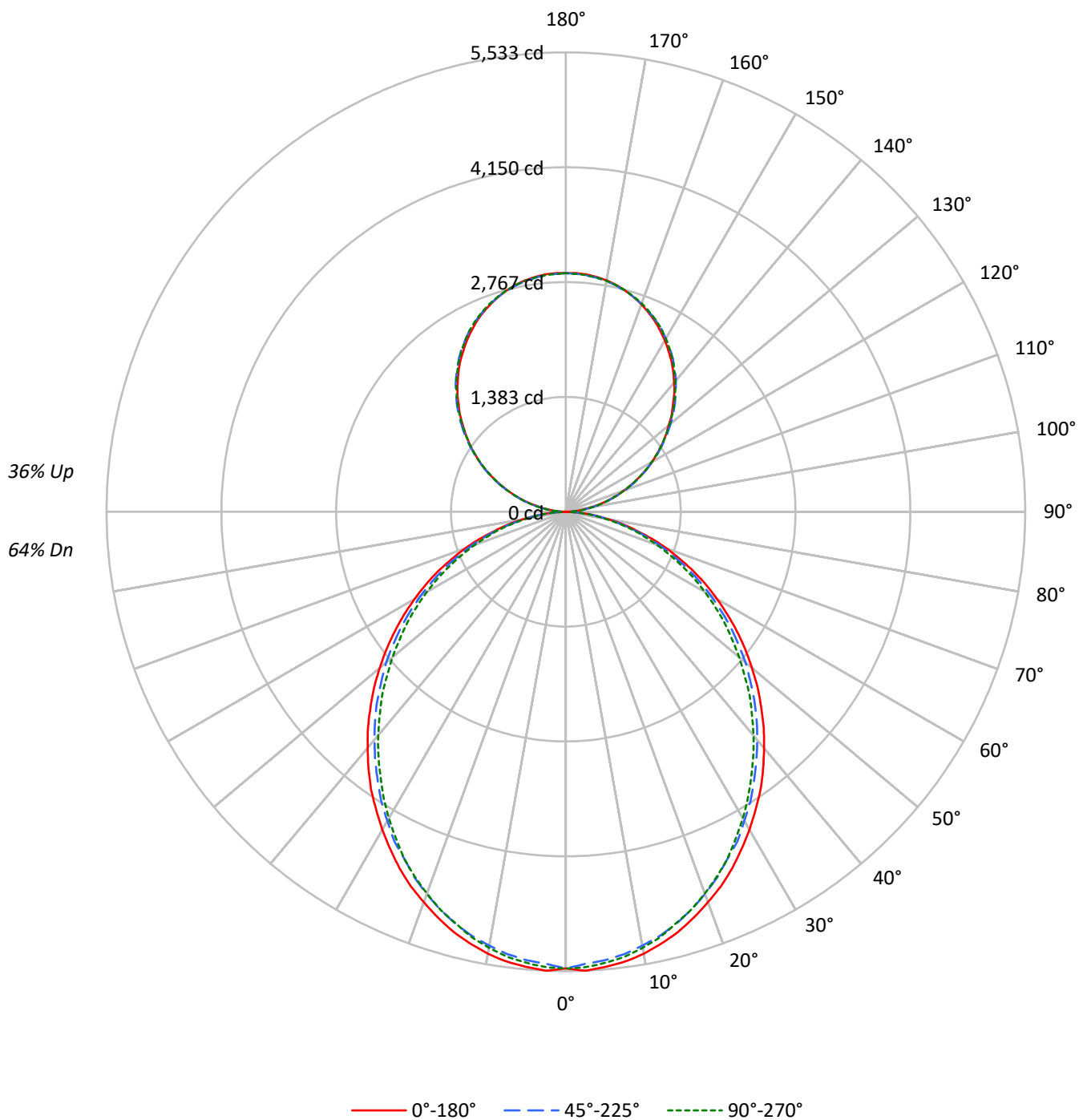
Lumens per Lamp: N/A  
Luminaire Lumens: 22040.3 lumens  
Efficiency: N/A  
Efficacy: 104.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 210.5  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9789  
Total Harmonic Distortion (THDi): 0.074  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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CATALOG NUMBER: DFN2DIP-SQ4F0-140D090US840-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P909656

CATALOG NUMBER: DFN2DIP-SQ4F0-140D090US840-FLLFL

**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 |
| RCR |     |     |     |     |     |     |     |     |    |    |    |  |    |    |    |  |    |
| 0   | 110 | 110 | 110 | 110 | 104 | 104 | 104 | 104 | 91 | 91 | 91 |  | 79 | 79 | 79 |  | 69 |
| 1   | 101 | 96  | 92  | 89  | 94  | 91  | 87  | 84  | 80 | 77 | 75 |  | 70 | 68 | 66 |  | 61 |
| 2   | 92  | 84  | 78  | 73  | 86  | 79  | 74  | 69  | 70 | 66 | 62 |  | 61 | 58 | 55 |  | 53 |
| 3   | 84  | 74  | 67  | 61  | 78  | 70  | 63  | 58  | 62 | 56 | 52 |  | 54 | 50 | 47 |  | 47 |
| 4   | 77  | 66  | 58  | 51  | 72  | 62  | 55  | 49  | 55 | 49 | 45 |  | 48 | 44 | 40 |  | 42 |
| 5   | 70  | 59  | 50  | 44  | 66  | 55  | 48  | 42  | 49 | 43 | 38 |  | 43 | 39 | 35 |  | 38 |
| 6   | 65  | 53  | 44  | 38  | 61  | 50  | 42  | 37  | 44 | 38 | 34 |  | 39 | 34 | 31 |  | 35 |
| 7   | 60  | 48  | 39  | 34  | 56  | 45  | 38  | 32  | 40 | 34 | 30 |  | 36 | 31 | 27 |  | 32 |
| 8   | 56  | 43  | 35  | 30  | 52  | 41  | 34  | 29  | 37 | 31 | 26 |  | 33 | 28 | 24 |  | 29 |
| 9   | 52  | 40  | 32  | 27  | 49  | 38  | 31  | 26  | 34 | 28 | 24 |  | 30 | 25 | 22 |  | 27 |
| 10  | 49  | 36  | 29  | 24  | 46  | 35  | 28  | 23  | 31 | 25 | 22 |  | 28 | 23 | 20 |  | 25 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3860 | 3860 | 3860 |
| 5°  | 3866 | 3807 | 3833 |
| 10° | 3835 | 3757 | 3782 |
| 15° | 3778 | 3695 | 3702 |
| 20° | 3702 | 3610 | 3620 |
| 25° | 3626 | 3508 | 3525 |
| 30° | 3531 | 3413 | 3404 |
| 35° | 3441 | 3301 | 3276 |
| 40° | 3330 | 3188 | 3155 |
| 45° | 3220 | 3075 | 3030 |
| 50° | 3099 | 2956 | 2886 |
| 55° | 2972 | 2819 | 2754 |
| 60° | 2829 | 2655 | 2602 |
| 65° | 2673 | 2487 | 2423 |
| 70° | 2475 | 2280 | 2231 |
| 75° | 2199 | 2034 | 2056 |
| 80° | 1868 | 1721 | 1718 |
| 85° | 1350 | 1177 | 1154 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3220 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 517.8   | 2.3       |
| 10°-20°   | 1456.8  | 6.6       |
| 20°-30°   | 2141.0  | 9.7       |
| 30°-40°   | 2486.6  | 11.3      |
| 40°-50°   | 2483.5  | 11.3      |
| 50°-60°   | 2165.5  | 9.8       |
| 60°-70°   | 1600.8  | 7.3       |
| 70°-80°   | 905.7   | 4.1       |
| 80°-90°   | 247.2   | 1.1       |
| 90°-100°  | 177.9   | 0.8       |
| 100°-110° | 565.2   | 2.6       |
| 110°-120° | 967.2   | 4.4       |
| 120°-130° | 1272.0  | 5.8       |
| 130°-140° | 1427.7  | 6.5       |
| 140°-150° | 1400.0  | 6.4       |
| 150°-160° | 1174.4  | 5.3       |
| 160°-170° | 778.9   | 3.5       |
| 170°-180° | 272.2   | 1.2       |
| 0°-30°    | 4115.6  | 18.7      |
| 0°-40°    | 6602.1  | 30.0      |
| 0°-60°    | 11251.2 | 51.0      |
| 0°-90°    | 14004.9 | 63.5      |
| 90°-120°  | 1710.2  | 7.8       |
| 90°-150°  | 5809.9  | 26.4      |
| 90°-180°  | 8035.0  | 36.5      |
| 0°-180°   | 22040.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5501 | 5501  | 5501 | 5501  | 5501 |      |
| 5°   | 5501 | 5480  | 5422 | 5464  | 5454 | 522  |
| 15°  | 5237 | 5206  | 5136 | 5158  | 5131 | 1475 |
| 25°  | 4740 | 4698  | 4608 | 4618  | 4608 | 2181 |
| 35°  | 4089 | 4036  | 3952 | 3920  | 3893 | 2554 |
| 45°  | 3328 | 3290  | 3211 | 3153  | 3132 | 2568 |
| 55°  | 2518 | 2486  | 2423 | 2359  | 2333 | 2251 |
| 65°  | 1698 | 1666  | 1614 | 1566  | 1539 | 1679 |
| 75°  | 888  | 878   | 851  | 820   | 831  | 948  |
| 85°  | 217  | 212   | 206  | 190   | 185  | 242  |
| 90°  | 3    | 31    | 85   | 80    | 82   | 21   |
| 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 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5501.2 | 5501.2 | 5501.2 | 5501.2 | 5501.2 |
| 2.5°   | 5533.2 | 5506.8 | 5448.4 | 5501.2 | 5491.1 |
| 5°     | 5501.2 | 5480.4 | 5422.1 | 5464.2 | 5454.1 |
| 7.5°   | 5464.2 | 5432.8 | 5374.4 | 5417.0 | 5406.3 |
| 10°    | 5406.3 | 5369.4 | 5305.9 | 5348.0 | 5332.3 |
| 12.5°  | 5326.6 | 5295.2 | 5231.8 | 5258.2 | 5247.6 |
| 15°    | 5236.9 | 5205.5 | 5136.4 | 5157.8 | 5131.3 |
| 17.5°  | 5125.8 | 5094.4 | 5025.3 | 5051.7 | 5025.3 |
| 20°    | 5004.0 | 4972.6 | 4898.5 | 4914.2 | 4893.4 |
| 22.5°  | 4882.7 | 4835.0 | 4766.0 | 4766.0 | 4755.4 |
| 25°    | 4739.6 | 4697.5 | 4607.7 | 4617.8 | 4607.7 |
| 27.5°  | 4580.8 | 4543.8 | 4475.3 | 4459.6 | 4433.2 |
| 30°    | 4422.5 | 4379.9 | 4300.7 | 4285.1 | 4263.7 |
| 32.5°  | 4253.0 | 4221.6 | 4136.8 | 4104.9 | 4083.5 |
| 35°    | 4089.1 | 4036.4 | 3951.6 | 3919.7 | 3893.2 |
| 37.5°  | 3903.9 | 3856.3 | 3771.4 | 3734.5 | 3708.0 |
| 40°    | 3713.7 | 3671.1 | 3586.2 | 3539.2 | 3517.8 |
| 42.5°  | 3528.5 | 3485.9 | 3401.6 | 3348.3 | 3316.9 |
| 45°    | 3327.5 | 3290.5 | 3210.9 | 3153.0 | 3131.7 |
| 47.5°  | 3131.7 | 3094.6 | 3009.9 | 2951.5 | 2920.1 |
| 50°    | 2925.2 | 2898.8 | 2824.7 | 2750.6 | 2724.2 |
| 52.5°  | 2724.2 | 2687.2 | 2618.7 | 2560.3 | 2523.4 |
| 55°    | 2518.3 | 2486.3 | 2422.9 | 2359.4 | 2333.1 |
| 57.5°  | 2311.7 | 2285.3 | 2216.4 | 2152.9 | 2131.5 |
| 60°    | 2105.2 | 2084.5 | 2010.3 | 1952.0 | 1936.2 |
| 62.5°  | 1904.3 | 1867.2 | 1814.4 | 1761.7 | 1740.4 |
| 65°    | 1698.3 | 1666.3 | 1613.6 | 1565.8 | 1539.4 |
| 67.5°  | 1486.7 | 1459.8 | 1412.6 | 1375.5 | 1354.2 |
| 70°    | 1290.8 | 1269.5 | 1221.8 | 1184.8 | 1164.0 |
| 72.5°  | 1089.9 | 1068.5 | 1042.2 | 1005.2 | 989.5  |
| 75°    | 888.5  | 878.4  | 851.4  | 820.0  | 830.6  |
| 77.5°  | 708.8  | 687.5  | 676.8  | 661.2  | 645.4  |
| 80°    | 529.3  | 523.6  | 513.0  | 497.3  | 486.6  |
| 82.5°  | 359.7  | 359.7  | 354.7  | 333.4  | 333.4  |
| 85°    | 216.6  | 211.6  | 206.5  | 190.3  | 185.2  |
| 87.5°  | 95.4   | 84.7   | 74.1   | 58.4   | 52.7   |
| 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  |

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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 | 13.14            | 14.14 | 13.97 | 14.99 | 16.06 | 12.70          | 13.69 | 13.53 | 14.55 | 15.61 |
|                 | 3H   | 14.81            | 15.71 | 15.66 | 16.57 | 17.67 | 14.32          | 15.22 | 15.17 | 16.08 | 17.17 |
|                 | 4H   | 15.41            | 16.26 | 16.27 | 17.13 | 18.23 | 14.92          | 15.76 | 15.78 | 16.63 | 17.74 |
|                 | 6H   | 15.82            | 16.60 | 16.69 | 17.48 | 18.60 | 15.32          | 16.10 | 16.19 | 16.98 | 18.09 |
|                 | 8H   | 15.93            | 16.68 | 16.81 | 17.57 | 18.69 | 15.43          | 16.17 | 16.31 | 17.07 | 18.18 |
|                 | 12H  | 15.99            | 16.70 | 16.87 | 17.59 | 18.73 | 15.48          | 16.19 | 16.36 | 17.08 | 18.22 |
| 4H              | 2H   | 13.62            | 14.46 | 14.48 | 15.33 | 16.44 | 13.26          | 14.11 | 14.13 | 14.98 | 16.08 |
|                 | 3H   | 15.50            | 16.21 | 16.38 | 17.11 | 18.23 | 15.09          | 15.80 | 15.97 | 16.70 | 17.82 |
|                 | 4H   | 16.22            | 16.87 | 17.11 | 17.77 | 18.91 | 15.80          | 16.44 | 16.69 | 17.34 | 18.49 |
|                 | 6H   | 16.75            | 17.31 | 17.65 | 18.23 | 19.38 | 16.32          | 16.88 | 17.22 | 17.80 | 18.94 |
|                 | 8H   | 16.91            | 17.43 | 17.81 | 18.34 | 19.50 | 16.47          | 16.99 | 17.38 | 17.91 | 19.07 |
|                 | 12H  | 16.99            | 17.46 | 17.91 | 18.39 | 19.56 | 16.54          | 17.01 | 17.46 | 17.94 | 19.11 |
| 8H              | 4H   | 16.43            | 16.95 | 17.34 | 17.87 | 19.03 | 16.06          | 16.58 | 16.96 | 17.49 | 18.65 |
|                 | 6H   | 17.07            | 17.50 | 18.01 | 18.46 | 19.62 | 16.69          | 17.12 | 17.62 | 18.08 | 19.24 |
|                 | 8H   | 17.30            | 17.68 | 18.24 | 18.63 | 19.81 | 16.91          | 17.29 | 17.85 | 18.24 | 19.41 |
|                 | 12H  | 17.44            | 17.78 | 18.39 | 18.72 | 19.94 | 17.03          | 17.36 | 17.98 | 18.31 | 19.53 |
| 12H             | 4H   | 16.42            | 16.89 | 17.35 | 17.83 | 18.99 | 16.06          | 16.53 | 16.98 | 17.46 | 18.63 |
|                 | 6H   | 17.10            | 17.49 | 18.05 | 18.44 | 19.61 | 16.73          | 17.12 | 17.68 | 18.07 | 19.24 |
|                 | 8H   | 17.36            | 17.69 | 18.30 | 18.64 | 19.86 | 16.98          | 17.31 | 17.92 | 18.26 | 19.48 |