

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: P921515

Luminaire Tested: DFN2DIP-HX2F0-020D020US940-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P921515  
REPORT IS A COMBINATION OF REPORTS P900671 AND P897595  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX2F0-020D020US940-FLLONL  
Description: 2 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

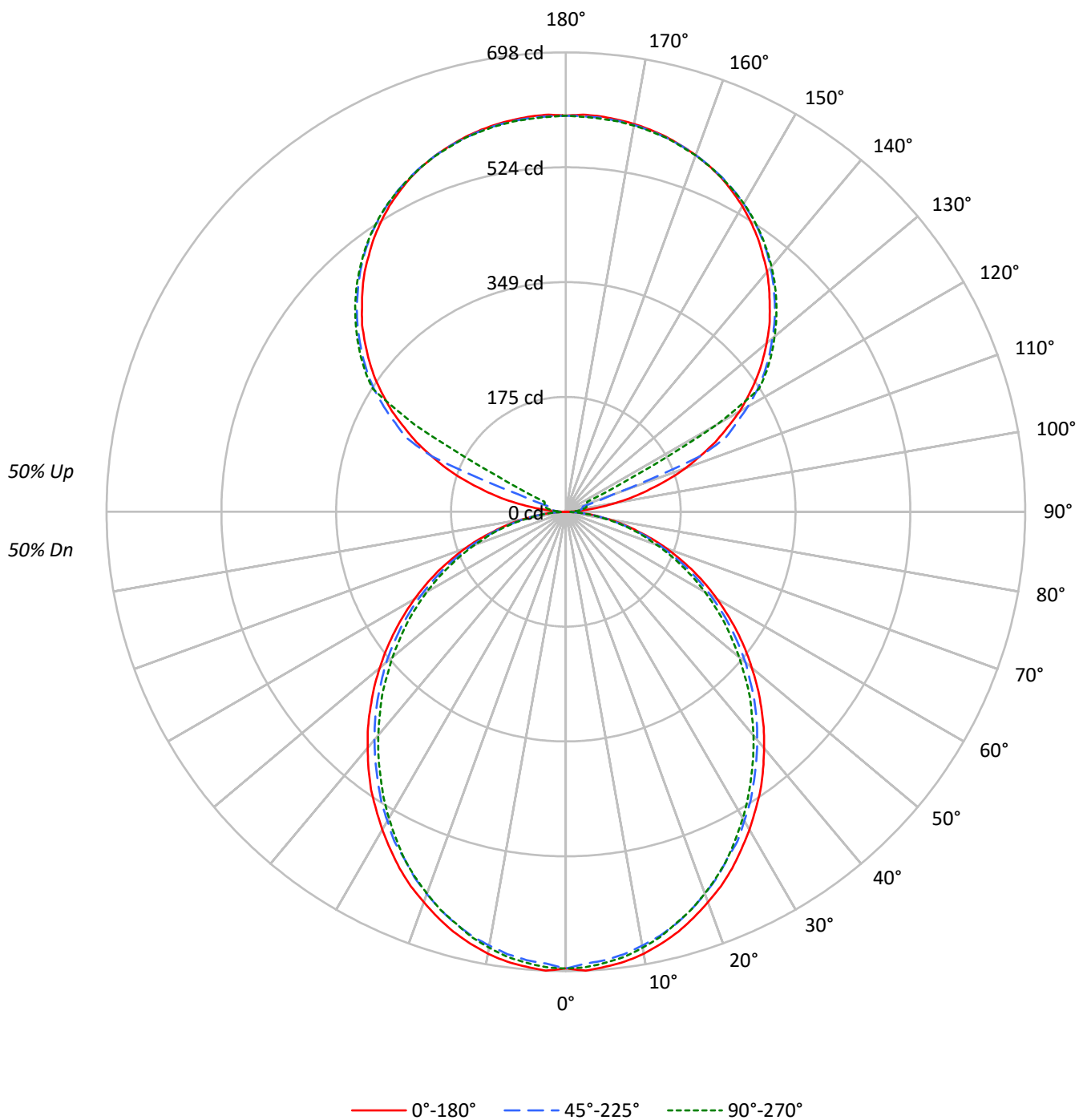
Lumens per Lamp: N/A  
Luminaire Lumens: 3531.2 lumens  
Efficiency: N/A  
Efficacy: 115.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 1.99' x L: 2.3' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 30.5  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9968  
Total Harmonic Distortion (THDi): 0.064  
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 |
| RW  | 70  | 50  | 30  | 10  | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 107 | 107 | 107 | 107 | 99 | 99 | 99 | 99 | 83 | 83 | 83 | 69 | 69 | 69 | 56 | 56 | 56 |
| 1   | 98  | 93  | 90  | 86  | 90 | 86 | 83 | 80 | 73 | 71 | 68 | 61 | 59 | 58 | 50 | 48 | 47 |
| 2   | 89  | 82  | 75  | 70  | 82 | 76 | 70 | 66 | 64 | 60 | 57 | 53 | 51 | 48 | 44 | 42 | 40 |
| 3   | 81  | 72  | 64  | 59  | 75 | 66 | 60 | 55 | 56 | 52 | 48 | 47 | 44 | 41 | 39 | 36 | 34 |
| 4   | 74  | 64  | 56  | 50  | 68 | 59 | 52 | 47 | 50 | 45 | 41 | 42 | 38 | 35 | 35 | 32 | 29 |
| 5   | 68  | 57  | 48  | 42  | 63 | 53 | 45 | 40 | 45 | 39 | 35 | 38 | 34 | 30 | 31 | 28 | 26 |
| 6   | 63  | 51  | 43  | 37  | 58 | 47 | 40 | 35 | 40 | 35 | 31 | 34 | 30 | 27 | 28 | 25 | 23 |
| 7   | 58  | 46  | 38  | 32  | 53 | 43 | 36 | 30 | 37 | 31 | 27 | 31 | 27 | 23 | 26 | 23 | 20 |
| 8   | 54  | 42  | 34  | 29  | 50 | 39 | 32 | 27 | 33 | 28 | 24 | 28 | 24 | 21 | 24 | 20 | 18 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 29 | 24 | 31 | 25 | 21 | 26 | 22 | 19 | 22 | 19 | 16 |
| 10  | 47  | 35  | 28  | 23  | 43 | 33 | 26 | 22 | 28 | 23 | 19 | 24 | 20 | 17 | 20 | 17 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1635 | 1635 | 1635 |
| 5°  | 1635 | 1608 | 1620 |
| 10° | 1619 | 1583 | 1595 |
| 15° | 1593 | 1553 | 1558 |
| 20° | 1558 | 1513 | 1520 |
| 25° | 1523 | 1466 | 1476 |
| 30° | 1481 | 1422 | 1422 |
| 35° | 1440 | 1370 | 1365 |
| 40° | 1390 | 1318 | 1309 |
| 45° | 1340 | 1266 | 1253 |
| 50° | 1286 | 1210 | 1189 |
| 55° | 1228 | 1147 | 1128 |
| 60° | 1164 | 1072 | 1059 |
| 65° | 1092 | 994  | 977  |
| 70° | 1002 | 898  | 889  |
| 75° | 878  | 784  | 803  |
| 80° | 727  | 638  | 647  |
| 85° | 493  | 400  | 402  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1340 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 65.3   | 1.8       |
| 10°-20°   | 183.8  | 5.2       |
| 20°-30°   | 270.1  | 7.6       |
| 30°-40°   | 313.7  | 8.9       |
| 40°-50°   | 313.3  | 8.9       |
| 50°-60°   | 273.2  | 7.7       |
| 60°-70°   | 201.9  | 5.7       |
| 70°-80°   | 114.2  | 3.2       |
| 80°-90°   | 31.2   | 0.9       |
| 90°-100°  | 19.8   | 0.6       |
| 100°-110° | 74.0   | 2.1       |
| 110°-120° | 196.2  | 5.6       |
| 120°-130° | 325.4  | 9.2       |
| 130°-140° | 345.7  | 9.8       |
| 140°-150° | 321.3  | 9.1       |
| 150°-160° | 258.3  | 7.3       |
| 160°-170° | 166.4  | 4.7       |
| 170°-180° | 57.3   | 1.6       |
| 0°-30°    | 519.1  | 14.7      |
| 0°-40°    | 832.8  | 23.6      |
| 0°-60°    | 1419.3 | 40.2      |
| 0°-90°    | 1766.7 | 50.0      |
| 90°-120°  | 290.0  | 8.2       |
| 90°-150°  | 1282.5 | 36.3      |
| 90°-180°  | 1765.0 | 50.0      |
| 0°-180°   | 3531.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|------|-----|-------|-----|-------|-----|------|
| 0°   | 694 | 694   | 694 | 694   | 694 |      |
| 5°   | 694 | 691   | 684 | 689   | 688 | 66   |
| 15°  | 661 | 657   | 648 | 651   | 647 | 186  |
| 25°  | 598 | 592   | 581 | 582   | 581 | 275  |
| 35°  | 516 | 509   | 498 | 494   | 491 | 322  |
| 45°  | 420 | 415   | 405 | 398   | 395 | 324  |
| 55°  | 318 | 314   | 306 | 298   | 294 | 284  |
| 65°  | 214 | 210   | 204 | 198   | 194 | 212  |
| 75°  | 112 | 111   | 107 | 103   | 105 | 120  |
| 85°  | 27  | 27    | 26  | 24    | 23  | 30   |
| 90°  | 0   | 5     | 9   | 11    | 12  | 3    |
| 95°  | 28  | 14    | 17  | 19    | 19  | 33   |
| 105° | 132 | 145   | 27  | 31    | 33  | 141  |
| 115° | 250 | 258   | 269 | 67    | 36  | 247  |
| 125° | 354 | 360   | 368 | 371   | 372 | 316  |
| 135° | 438 | 445   | 449 | 453   | 452 | 338  |
| 145° | 508 | 508   | 515 | 518   | 516 | 318  |
| 155° | 560 | 556   | 561 | 564   | 560 | 258  |
| 165° | 590 | 587   | 588 | 592   | 588 | 167  |
| 175° | 603 | 600   | 601 | 604   | 600 | 57   |
| 180° | 602 | 602   | 602 | 602   | 602 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 0°     | 693.9 | 693.9 | 693.9 | 693.9 | 693.9 |
| 2.5°   | 697.9 | 694.6 | 687.2 | 693.9 | 692.7 |
| 5°     | 693.9 | 691.3 | 683.9 | 689.3 | 688.0 |
| 7.5°   | 689.3 | 685.3 | 678.0 | 683.3 | 682.0 |
| 10°    | 682.0 | 677.3 | 669.3 | 674.6 | 672.6 |
| 12.5°  | 671.9 | 668.0 | 660.0 | 663.3 | 661.9 |
| 15°    | 660.6 | 656.7 | 647.9 | 650.6 | 647.3 |
| 17.5°  | 646.6 | 642.7 | 633.9 | 637.2 | 633.9 |
| 20°    | 631.2 | 627.2 | 617.9 | 619.9 | 617.2 |
| 22.5°  | 615.9 | 609.9 | 601.2 | 601.2 | 599.9 |
| 25°    | 597.9 | 592.5 | 581.2 | 582.5 | 581.2 |
| 27.5°  | 577.8 | 573.2 | 564.5 | 562.6 | 559.2 |
| 30°    | 557.9 | 552.5 | 542.5 | 540.6 | 537.8 |
| 32.5°  | 536.5 | 532.5 | 521.8 | 517.8 | 515.1 |
| 35°    | 515.9 | 509.2 | 498.5 | 494.5 | 491.1 |
| 37.5°  | 492.5 | 486.4 | 475.7 | 471.1 | 467.7 |
| 40°    | 468.4 | 463.1 | 452.4 | 446.5 | 443.7 |
| 42.5°  | 445.1 | 439.7 | 429.1 | 422.4 | 418.4 |
| 45°    | 419.7 | 415.1 | 405.0 | 397.7 | 395.0 |
| 47.5°  | 395.0 | 390.4 | 379.7 | 372.3 | 368.4 |
| 50°    | 369.0 | 365.7 | 356.3 | 347.0 | 343.7 |
| 52.5°  | 343.7 | 338.9 | 330.3 | 323.0 | 318.3 |
| 55°    | 317.6 | 313.6 | 305.6 | 297.7 | 294.3 |
| 57.5°  | 291.6 | 288.3 | 279.6 | 271.6 | 268.9 |
| 60°    | 265.6 | 263.0 | 253.6 | 246.2 | 244.2 |
| 62.5°  | 240.2 | 235.5 | 228.9 | 222.2 | 219.5 |
| 65°    | 214.2 | 210.2 | 203.6 | 197.5 | 194.2 |
| 67.5°  | 187.5 | 184.1 | 178.2 | 173.5 | 170.9 |
| 70°    | 162.8 | 160.2 | 154.1 | 149.5 | 146.9 |
| 72.5°  | 137.5 | 134.8 | 131.4 | 126.8 | 124.8 |
| 75°    | 112.1 | 110.8 | 107.4 | 103.4 | 104.8 |
| 77.5°  | 89.4  | 86.8  | 85.3  | 83.4  | 81.4  |
| 80°    | 66.8  | 66.1  | 64.7  | 62.7  | 61.3  |
| 82.5°  | 45.4  | 45.4  | 44.8  | 42.1  | 42.1  |
| 85°    | 27.3  | 26.7  | 26.0  | 24.0  | 23.4  |
| 87.5°  | 12.0  | 10.7  | 9.4   | 7.4   | 6.7   |
| 90°    | 0.4   | 5.3   | 8.6   | 10.9  | 11.8  |
| 92.5°  | 10.9  | 9.2   | 10.4  | 11.3  | 11.8  |
| 95°    | 28.3  | 13.9  | 16.9  | 19.2  | 18.7  |
| 97.5°  | 50.9  | 15.2  | 22.2  | 23.5  | 24.0  |
| 100°   | 77.1  | 17.4  | 24.8  | 28.3  | 29.2  |
| 102.5° | 105.8 | 105.0 | 25.7  | 30.5  | 31.8  |
| 105°   | 132.4 | 145.4 | 26.6  | 31.3  | 33.1  |
| 107.5° | 163.4 | 174.2 | 27.5  | 32.2  | 34.0  |
| 110°   | 193.0 | 202.1 | 76.2  | 32.7  | 34.4  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 220.8 | 228.6 | 221.2 | 33.5  | 34.9  |
| 115°   | 250.4 | 257.8 | 268.8 | 67.1  | 35.8  |
| 117.5° | 276.1 | 284.8 | 292.2 | 230.0 | 115.8 |
| 120°   | 304.9 | 311.4 | 319.2 | 324.5 | 265.6 |
| 122.5° | 329.2 | 336.2 | 344.9 | 347.5 | 348.0 |
| 125°   | 354.1 | 359.7 | 368.0 | 371.0 | 372.4 |
| 127.5° | 376.7 | 382.8 | 389.4 | 393.7 | 394.1 |
| 130°   | 398.1 | 405.0 | 409.8 | 414.6 | 414.2 |
| 132.5° | 419.8 | 425.5 | 430.3 | 434.2 | 433.8 |
| 135°   | 438.2 | 445.1 | 449.0 | 453.4 | 452.5 |
| 137.5° | 457.3 | 462.5 | 466.9 | 471.3 | 469.9 |
| 140°   | 476.0 | 479.6 | 484.3 | 488.2 | 486.1 |
| 142.5° | 491.7 | 494.8 | 500.4 | 503.9 | 501.7 |
| 145°   | 508.3 | 507.8 | 515.2 | 518.3 | 516.1 |
| 147.5° | 522.6 | 521.3 | 528.7 | 530.8 | 529.1 |
| 150°   | 536.5 | 533.5 | 540.5 | 543.1 | 540.9 |
| 152.5° | 548.3 | 544.8 | 551.3 | 554.0 | 550.9 |
| 155°   | 559.6 | 555.7 | 561.0 | 563.6 | 560.1 |
| 157.5° | 568.8 | 565.3 | 569.3 | 572.3 | 568.8 |
| 160°   | 576.7 | 574.0 | 576.7 | 579.3 | 576.2 |
| 162.5° | 583.5 | 580.9 | 583.2 | 586.2 | 582.3 |
| 165°   | 589.7 | 587.1 | 588.4 | 591.5 | 588.4 |
| 167.5° | 594.5 | 591.8 | 593.2 | 596.3 | 592.3 |
| 170°   | 598.4 | 595.8 | 596.6 | 599.7 | 595.8 |
| 172.5° | 601.0 | 598.4 | 599.3 | 602.4 | 598.4 |
| 175°   | 603.2 | 600.1 | 601.0 | 604.0 | 599.7 |
| 177.5° | 604.0 | 601.0 | 601.5 | 604.5 | 600.6 |
| 180°   | 601.9 | 601.9 | 601.9 | 601.9 | 601.9 |

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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 | 8.85             | 9.71  | 9.80  | 10.68 | 11.95 | 8.42           | 9.29  | 9.38  | 10.26 | 11.53 |
|                 | 3H   | 10.48            | 11.25 | 11.45 | 12.24 | 13.53 | 10.02          | 10.79 | 10.99 | 11.78 | 13.07 |
|                 | 4H   | 11.05            | 11.78 | 12.03 | 12.77 | 14.07 | 10.59          | 11.33 | 11.58 | 12.31 | 13.61 |
|                 | 6H   | 11.43            | 12.11 | 12.43 | 13.10 | 14.41 | 10.97          | 11.65 | 11.97 | 12.64 | 13.95 |
|                 | 8H   | 11.53            | 12.17 | 12.53 | 13.18 | 14.49 | 11.07          | 11.71 | 12.07 | 12.72 | 14.03 |
|                 | 12H  | 11.57            | 12.18 | 12.57 | 13.18 | 14.52 | 11.11          | 11.72 | 12.11 | 12.72 | 14.05 |
| 4H              | 2H   | 9.30             | 10.03 | 10.29 | 11.02 | 12.32 | 8.96           | 9.69  | 9.95  | 10.68 | 11.98 |
|                 | 3H   | 11.14            | 11.75 | 12.13 | 12.76 | 14.08 | 10.75          | 11.36 | 11.75 | 12.38 | 13.69 |
|                 | 4H   | 11.83            | 12.39 | 12.84 | 13.40 | 14.73 | 11.44          | 11.99 | 12.44 | 13.00 | 14.34 |
|                 | 6H   | 12.32            | 12.80 | 13.34 | 13.83 | 15.17 | 11.93          | 12.41 | 12.94 | 13.44 | 14.77 |
|                 | 8H   | 12.46            | 12.91 | 13.48 | 13.93 | 15.28 | 12.06          | 12.51 | 13.08 | 13.53 | 14.89 |
|                 | 12H  | 12.52            | 12.93 | 13.56 | 13.97 | 15.32 | 12.12          | 12.52 | 13.15 | 13.56 | 14.92 |
| 8H              | 4H   | 12.02            | 12.46 | 13.03 | 13.49 | 14.84 | 11.66          | 12.11 | 12.68 | 13.14 | 14.49 |
|                 | 6H   | 12.62            | 12.99 | 13.66 | 14.05 | 15.40 | 12.27          | 12.64 | 13.31 | 13.70 | 15.05 |
|                 | 8H   | 12.82            | 13.15 | 13.87 | 14.20 | 15.57 | 12.47          | 12.79 | 13.52 | 13.84 | 15.21 |
|                 | 12H  | 12.94            | 13.23 | 13.99 | 14.27 | 15.68 | 12.57          | 12.86 | 13.62 | 13.90 | 15.31 |
| 12H             | 4H   | 12.00            | 12.40 | 13.03 | 13.44 | 14.80 | 11.65          | 12.06 | 12.69 | 13.10 | 14.46 |
|                 | 6H   | 12.64            | 12.97 | 13.69 | 14.02 | 15.39 | 12.30          | 12.63 | 13.35 | 13.68 | 15.05 |
|                 | 8H   | 12.87            | 13.15 | 13.92 | 14.20 | 15.61 | 12.52          | 12.81 | 13.57 | 13.85 | 15.26 |