

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: P920450

Luminaire Tested: DFN2DIP-SQ4F0-100D060US935-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P920450  
REPORT IS A COMBINATION OF REPORTS P900068 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-100D060US935-RLLFLL  
Description: 4 foot, Square Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

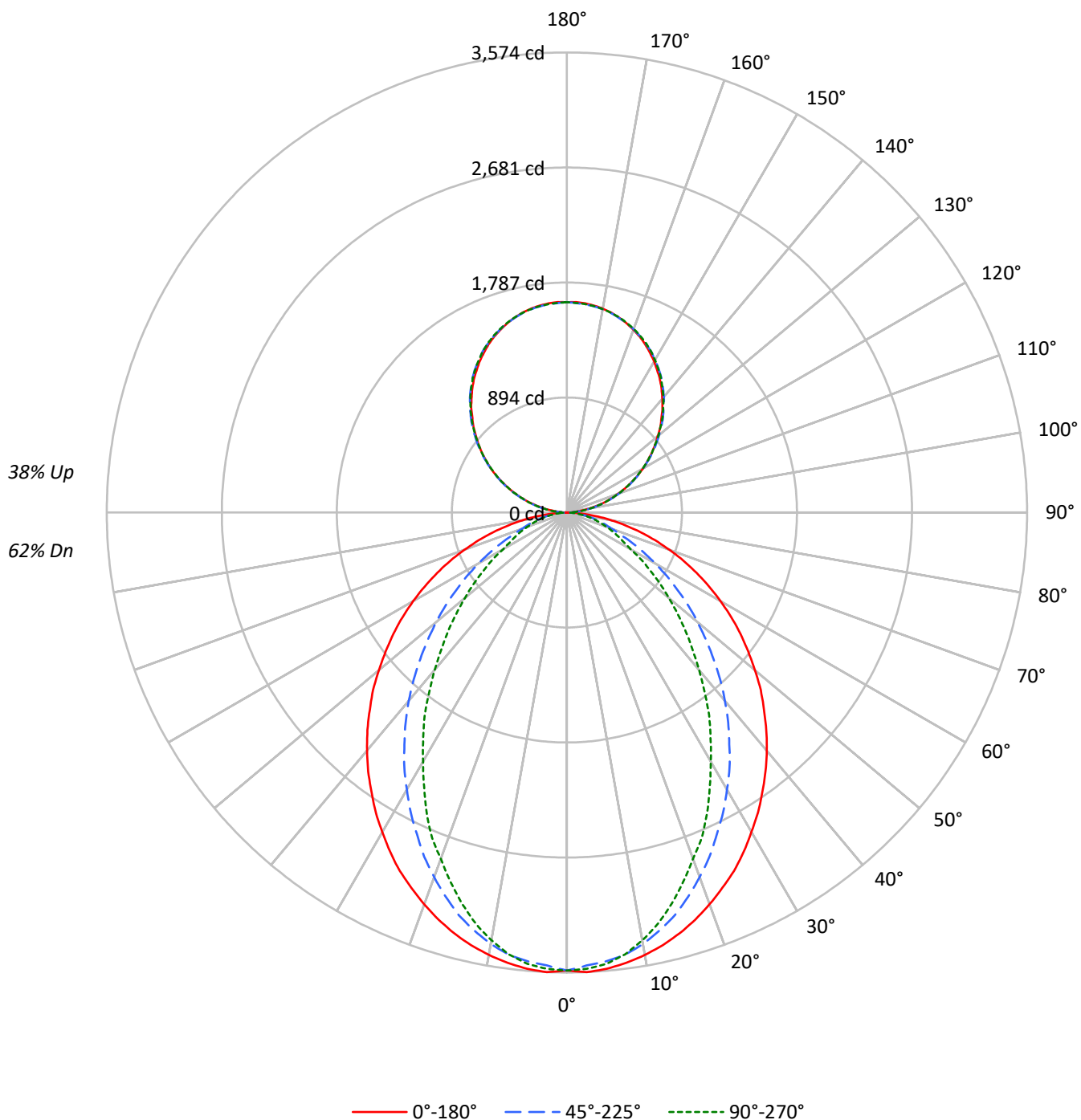
Lumens per Lamp: N/A  
Luminaire Lumens: 11890.4 lumens  
Efficiency: N/A  
Efficacy: 86.2 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 137.9  
Input Voltage (V):  
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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CATALOG NUMBER: DFN2DIP-SQ4F0-100D060US935-RLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P920450

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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   | 110 | 110 | 110 | 110 | 103 | 103 | 103 | 103 | 90 | 90 | 90 | 78 | 78 | 78 | 67 | 67 | 67 |
| 1   | 101 | 97  | 93  | 90  | 94  | 91  | 88  | 85  | 80 | 77 | 75 | 69 | 68 | 66 | 60 | 59 | 58 |
| 2   | 92  | 85  | 79  | 74  | 86  | 80  | 75  | 70  | 71 | 67 | 63 | 62 | 59 | 56 | 53 | 51 | 49 |
| 3   | 85  | 75  | 68  | 63  | 79  | 71  | 65  | 60  | 63 | 58 | 54 | 55 | 51 | 48 | 48 | 45 | 43 |
| 4   | 78  | 67  | 60  | 54  | 73  | 63  | 57  | 51  | 56 | 51 | 46 | 49 | 45 | 42 | 43 | 40 | 37 |
| 5   | 72  | 60  | 52  | 46  | 67  | 57  | 50  | 44  | 51 | 45 | 41 | 45 | 40 | 37 | 39 | 36 | 33 |
| 6   | 66  | 54  | 46  | 41  | 62  | 51  | 44  | 39  | 46 | 40 | 36 | 41 | 36 | 32 | 36 | 32 | 29 |
| 7   | 62  | 49  | 42  | 36  | 58  | 47  | 40  | 35  | 42 | 36 | 32 | 37 | 33 | 29 | 33 | 29 | 26 |
| 8   | 57  | 45  | 37  | 32  | 54  | 43  | 36  | 31  | 38 | 33 | 28 | 34 | 30 | 26 | 30 | 27 | 24 |
| 9   | 53  | 41  | 34  | 29  | 50  | 39  | 32  | 28  | 35 | 30 | 26 | 32 | 27 | 24 | 28 | 24 | 22 |
| 10  | 50  | 38  | 31  | 26  | 47  | 36  | 30  | 25  | 33 | 27 | 23 | 29 | 25 | 22 | 26 | 22 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2497 | 2497 | 2497 |
| 5°  | 2501 | 2458 | 2474 |
| 10° | 2476 | 2410 | 2394 |
| 15° | 2442 | 2331 | 2270 |
| 20° | 2397 | 2222 | 2118 |
| 25° | 2351 | 2099 | 1971 |
| 30° | 2289 | 1973 | 1784 |
| 35° | 2228 | 1838 | 1620 |
| 40° | 2166 | 1698 | 1432 |
| 45° | 2094 | 1542 | 1262 |
| 50° | 2020 | 1385 | 1095 |
| 55° | 1942 | 1217 | 935  |
| 60° | 1852 | 1042 | 770  |
| 65° | 1749 | 863  | 694  |
| 70° | 1624 | 697  | 630  |
| 75° | 1467 | 615  | 574  |
| 80° | 1239 | 518  | 501  |
| 85° | 863  | 348  | 381  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2094 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 333.5   | 2.8       |
| 10°-20°   | 915.5   | 7.7       |
| 20°-30°   | 1285.4  | 10.8      |
| 30°-40°   | 1401.2  | 11.8      |
| 40°-50°   | 1287.8  | 10.8      |
| 50°-60°   | 1011.4  | 8.5       |
| 60°-70°   | 658.3   | 5.5       |
| 70°-80°   | 338.9   | 2.8       |
| 80°-90°   | 91.2    | 0.8       |
| 90°-100°  | 101.1   | 0.9       |
| 100°-110° | 321.2   | 2.7       |
| 110°-120° | 549.7   | 4.6       |
| 120°-130° | 723.0   | 6.1       |
| 130°-140° | 811.5   | 6.8       |
| 140°-150° | 795.8   | 6.7       |
| 150°-160° | 667.5   | 5.6       |
| 160°-170° | 442.7   | 3.7       |
| 170°-180° | 154.7   | 1.3       |
| 0°-30°    | 2534.4  | 21.3      |
| 0°-40°    | 3935.6  | 33.1      |
| 0°-60°    | 6234.8  | 52.4      |
| 0°-90°    | 7323.1  | 61.6      |
| 90°-120°  | 972.0   | 8.2       |
| 90°-150°  | 3302.3  | 27.8      |
| 90°-180°  | 4567.0  | 38.4      |
| 0°-180°   | 11890.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3558 | 3558  | 3558 | 3558  | 3558 |      |
| 5°   | 3558 | 3542  | 3500 | 3530  | 3520 | 337  |
| 15°  | 3385 | 3349  | 3240 | 3178  | 3146 | 954  |
| 25°  | 3072 | 2969  | 2757 | 2625  | 2576 | 1413 |
| 35°  | 2647 | 2483  | 2200 | 1997  | 1926 | 1657 |
| 45°  | 2164 | 1948  | 1610 | 1381  | 1304 | 1671 |
| 55°  | 1646 | 1394  | 1046 | 854   | 792  | 1470 |
| 65°  | 1111 | 850   | 560  | 451   | 441  | 1102 |
| 75°  | 592  | 367   | 258  | 235   | 232  | 627  |
| 85°  | 138  | 71    | 61   | 61    | 61   | 159  |
| 90°  | 2    | 18    | 48   | 45    | 47   | 12   |
| 95°  | 72   | 86    | 88   | 88    | 86   | 80   |
| 105° | 296  | 300   | 303  | 306   | 306  | 313  |
| 115° | 552  | 560   | 557  | 556   | 552  | 546  |
| 125° | 802  | 815   | 811  | 806   | 805  | 717  |
| 135° | 1038 | 1053  | 1056 | 1055  | 1051 | 802  |
| 145° | 1260 | 1270  | 1278 | 1279  | 1274 | 787  |
| 155° | 1441 | 1445  | 1449 | 1456  | 1452 | 663  |
| 165° | 1567 | 1566  | 1566 | 1576  | 1569 | 442  |
| 175° | 1631 | 1627  | 1624 | 1634  | 1625 | 155  |
| 180° | 1634 | 1634  | 1634 | 1634  | 1634 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3558.5 | 3558.5 | 3558.5 | 3558.5 | 3558.5 |
| 2.5°   | 3574.5 | 3558.5 | 3522.9 | 3555.4 | 3548.9 |
| 5°     | 3558.5 | 3542.4 | 3500.4 | 3529.5 | 3519.8 |
| 7.5°   | 3529.5 | 3510.3 | 3465.2 | 3477.8 | 3461.8 |
| 10°    | 3490.8 | 3468.3 | 3404.0 | 3394.1 | 3375.0 |
| 12.5°  | 3442.7 | 3413.6 | 3326.5 | 3307.4 | 3271.8 |
| 15°    | 3384.6 | 3349.0 | 3239.7 | 3178.5 | 3146.4 |
| 17.5°  | 3316.9 | 3265.3 | 3130.1 | 3059.3 | 3007.7 |
| 20°    | 3239.7 | 3175.1 | 3014.2 | 2933.9 | 2862.8 |
| 22.5°  | 3156.0 | 3081.9 | 2894.9 | 2785.7 | 2737.5 |
| 25°    | 3072.3 | 2969.2 | 2756.6 | 2624.7 | 2576.2 |
| 27.5°  | 2972.5 | 2862.8 | 2627.8 | 2476.4 | 2402.3 |
| 30°    | 2866.3 | 2743.6 | 2486.0 | 2322.0 | 2234.9 |
| 32.5°  | 2763.1 | 2614.8 | 2351.0 | 2157.7 | 2077.0 |
| 35°    | 2647.2 | 2482.9 | 2199.7 | 1996.7 | 1925.6 |
| 37.5°  | 2534.5 | 2357.2 | 2057.9 | 1835.5 | 1755.1 |
| 40°    | 2415.3 | 2222.2 | 1909.6 | 1681.0 | 1597.3 |
| 42.5°  | 2292.9 | 2086.9 | 1761.7 | 1523.2 | 1442.9 |
| 45°    | 2164.1 | 1948.2 | 1610.3 | 1381.4 | 1304.2 |
| 47.5°  | 2041.9 | 1813.3 | 1465.4 | 1236.5 | 1165.8 |
| 50°    | 1906.5 | 1677.9 | 1323.6 | 1101.2 | 1033.9 |
| 52.5°  | 1774.3 | 1532.7 | 1188.3 | 975.8  | 914.6  |
| 55°    | 1645.5 | 1394.4 | 1046.5 | 853.5  | 792.3  |
| 57.5°  | 1513.6 | 1255.9 | 921.2  | 740.7  | 689.1  |
| 60°    | 1378.3 | 1120.7 | 788.9  | 624.9  | 573.3  |
| 62.5°  | 1246.4 | 988.8  | 676.1  | 521.8  | 496.1  |
| 65°    | 1111.1 | 850.1  | 560.3  | 451.0  | 441.1  |
| 67.5°  | 982.3  | 721.3  | 451.0  | 396.0  | 386.4  |
| 70°    | 847.0  | 595.9  | 373.4  | 341.3  | 328.4  |
| 72.5°  | 718.2  | 479.7  | 312.3  | 286.6  | 280.2  |
| 75°    | 592.5  | 367.0  | 257.6  | 235.1  | 232.0  |
| 77.5°  | 467.1  | 260.7  | 202.9  | 189.9  | 183.5  |
| 80°    | 350.9  | 186.9  | 154.5  | 141.8  | 141.8  |
| 82.5°  | 244.6  | 125.7  | 106.2  | 99.8   | 99.8   |
| 85°    | 138.4  | 70.7   | 61.1   | 61.1   | 61.1   |
| 87.5°  | 51.6   | 25.7   | 25.7   | 22.6   | 22.6   |
| 90°    | 1.5    | 17.7   | 48.3   | 45.3   | 46.8   |
| 92.5°  | 30.6   | 41.4   | 42.9   | 44.3   | 44.3   |
| 95°    | 71.9   | 85.7   | 88.2   | 88.2   | 85.7   |
| 97.5°  | 119.7  | 132.5  | 137.9  | 137.9  | 137.9  |
| 100°   | 174.9  | 186.1  | 190.1  | 190.1  | 188.6  |
| 102.5° | 233.0  | 241.3  | 246.8  | 248.2  | 246.8  |
| 105°   | 296.5  | 300.5  | 303.4  | 305.9  | 305.9  |
| 107.5° | 359.6  | 365.5  | 365.5  | 366.4  | 359.6  |
| 110°   | 420.7  | 428.5  | 428.5  | 428.5  | 424.6  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 486.6  | 495.0  | 493.5  | 489.6  | 486.6  |
| 115°   | 551.6  | 559.6  | 557.1  | 555.6  | 551.6  |
| 117.5° | 616.2  | 627.1  | 620.1  | 616.2  | 612.3  |
| 120°   | 681.2  | 692.1  | 681.2  | 681.2  | 676.7  |
| 122.5° | 740.3  | 754.1  | 747.2  | 743.3  | 740.3  |
| 125°   | 802.4  | 814.7  | 810.7  | 806.3  | 804.9  |
| 127.5° | 863.0  | 878.2  | 872.8  | 866.9  | 863.0  |
| 130°   | 919.6  | 937.4  | 934.9  | 931.9  | 926.5  |
| 132.5° | 983.2  | 996.9  | 997.9  | 991.0  | 987.0  |
| 135°   | 1037.8 | 1053.1 | 1056.0 | 1054.6 | 1050.6 |
| 137.5° | 1098.9 | 1111.2 | 1113.7 | 1112.7 | 1106.8 |
| 140°   | 1152.6 | 1164.9 | 1171.8 | 1171.8 | 1166.4 |
| 142.5° | 1207.7 | 1220.0 | 1224.0 | 1225.5 | 1220.0 |
| 145°   | 1260.0 | 1269.8 | 1277.7 | 1279.2 | 1273.8 |
| 147.5° | 1306.7 | 1319.0 | 1325.0 | 1327.4 | 1322.0 |
| 150°   | 1355.0 | 1363.4 | 1368.8 | 1373.2 | 1368.8 |
| 152.5° | 1397.8 | 1406.3 | 1413.2 | 1418.6 | 1413.2 |
| 155°   | 1440.7 | 1444.7 | 1449.1 | 1456.0 | 1451.6 |
| 157.5° | 1477.6 | 1480.7 | 1483.1 | 1493.0 | 1486.1 |
| 160°   | 1510.7 | 1513.6 | 1515.1 | 1523.4 | 1517.6 |
| 162.5° | 1541.2 | 1541.2 | 1542.6 | 1552.0 | 1545.1 |
| 165°   | 1567.3 | 1565.8 | 1565.8 | 1575.7 | 1568.8 |
| 167.5° | 1591.0 | 1586.6 | 1586.6 | 1596.4 | 1589.5 |
| 170°   | 1608.7 | 1604.7 | 1603.3 | 1613.1 | 1604.7 |
| 172.5° | 1621.0 | 1617.0 | 1615.6 | 1625.4 | 1617.0 |
| 175°   | 1630.8 | 1626.9 | 1623.9 | 1633.8 | 1625.4 |
| 177.5° | 1636.2 | 1632.4 | 1629.4 | 1637.7 | 1629.4 |
| 180°   | 1633.8 | 1633.8 | 1633.8 | 1633.8 | 1633.8 |

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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 | 11.36            | 12.29 | 12.21 | 13.17 | 14.26 | 7.32           | 8.25  | 8.17  | 9.13  | 10.22 |
|                 | 3H   | 13.05            | 13.88 | 13.92 | 14.77 | 15.89 | 8.51           | 9.35  | 9.38  | 10.23 | 11.36 |
|                 | 4H   | 13.66            | 14.45 | 14.55 | 15.34 | 16.48 | 8.97           | 9.76  | 9.86  | 10.65 | 11.78 |
|                 | 6H   | 14.09            | 14.82 | 14.99 | 15.72 | 16.86 | 9.30           | 10.02 | 10.19 | 10.92 | 12.07 |
|                 | 8H   | 14.22            | 14.92 | 15.13 | 15.83 | 16.98 | 9.39           | 10.08 | 10.30 | 11.00 | 12.14 |
|                 | 12H  | 14.29            | 14.95 | 15.20 | 15.86 | 17.03 | 9.44           | 10.10 | 10.35 | 11.00 | 12.18 |
| 4H              | 2H   | 11.39            | 12.18 | 12.28 | 13.07 | 14.20 | 7.93           | 8.72  | 8.82  | 9.61  | 10.74 |
|                 | 3H   | 13.23            | 13.89 | 14.13 | 14.81 | 15.96 | 9.29           | 9.94  | 10.19 | 10.87 | 12.02 |
|                 | 4H   | 13.93            | 14.53 | 14.84 | 15.44 | 16.62 | 9.84           | 10.44 | 10.75 | 11.35 | 12.53 |
|                 | 6H   | 14.46            | 14.97 | 15.38 | 15.91 | 17.09 | 10.27          | 10.78 | 11.19 | 11.72 | 12.90 |
|                 | 8H   | 14.63            | 15.11 | 15.56 | 16.05 | 17.24 | 10.40          | 10.88 | 11.33 | 11.81 | 13.00 |
|                 | 12H  | 14.74            | 15.17 | 15.69 | 16.12 | 17.32 | 10.47          | 10.90 | 11.42 | 11.85 | 13.05 |
| 8H              | 4H   | 13.91            | 14.39 | 14.84 | 15.32 | 16.51 | 10.13          | 10.61 | 11.06 | 11.55 | 12.74 |
|                 | 6H   | 14.48            | 14.88 | 15.44 | 15.85 | 17.04 | 10.65          | 11.05 | 11.61 | 12.03 | 13.22 |
|                 | 8H   | 14.70            | 15.05 | 15.67 | 16.02 | 17.23 | 10.85          | 11.20 | 11.81 | 12.17 | 13.37 |
|                 | 12H  | 14.85            | 15.16 | 15.81 | 16.12 | 17.37 | 10.97          | 11.28 | 11.94 | 12.24 | 13.50 |
| 12H             | 4H   | 13.86            | 14.29 | 14.81 | 15.25 | 16.44 | 10.14          | 10.57 | 11.09 | 11.53 | 12.72 |
|                 | 6H   | 14.46            | 14.81 | 15.42 | 15.78 | 16.98 | 10.70          | 11.06 | 11.67 | 12.02 | 13.23 |
|                 | 8H   | 14.68            | 14.99 | 15.65 | 15.95 | 17.21 | 10.92          | 11.23 | 11.89 | 12.19 | 13.45 |