

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: P916016

Luminaire Tested: DFN2DIP-4P4F0-070D040US930-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P916016  
REPORT IS A COMBINATION OF REPORTS P899100 AND P895967  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P4F0-070D040US930-RLLFLL  
Description: 4 foot, 90deg - 4way Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

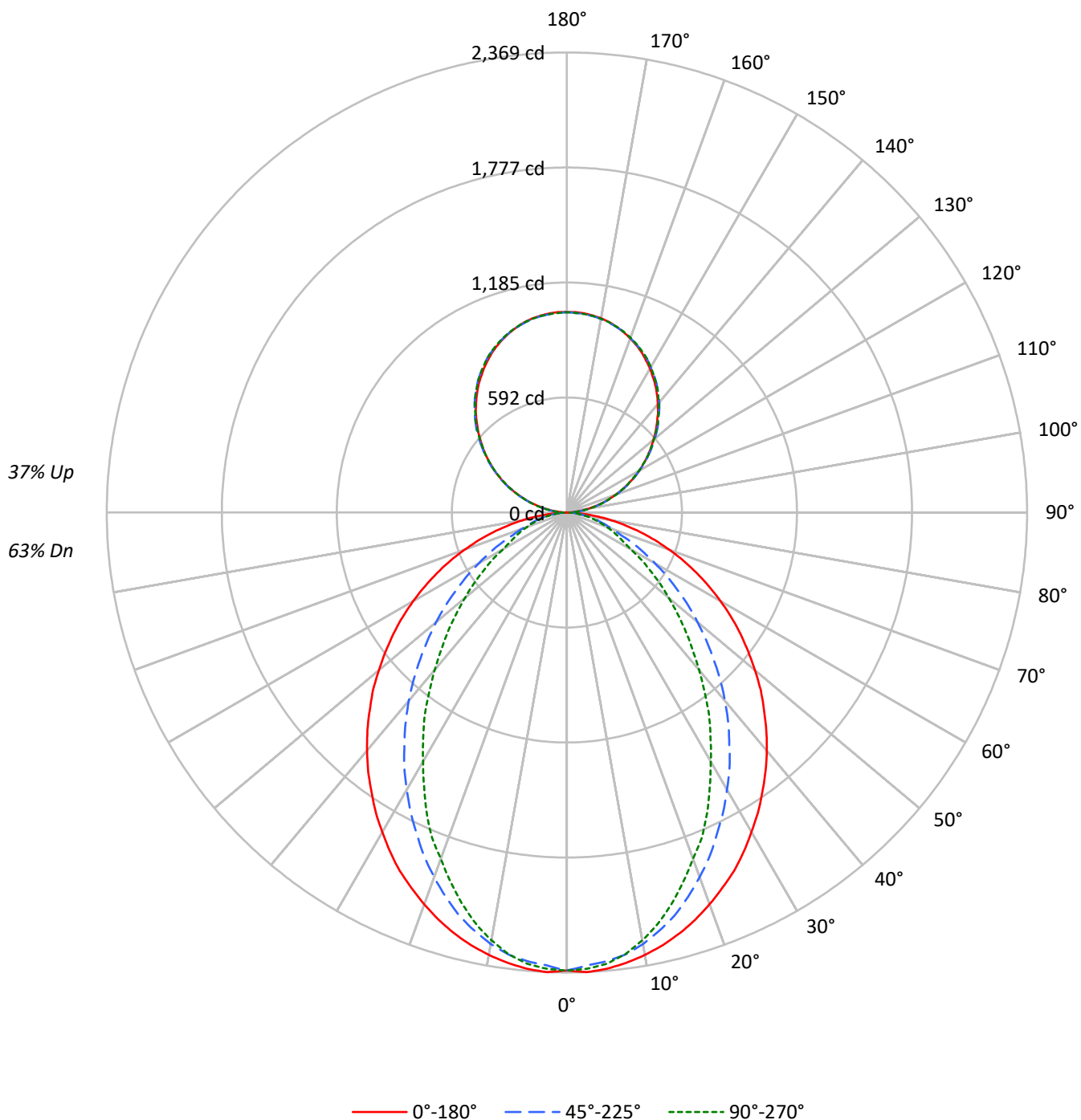
Lumens per Lamp: N/A  
Luminaire Lumens: 7737.1 lumens  
Efficiency: N/A  
Efficacy: 73.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 4.07' x L: 4.07' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 105.1  
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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### 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   | 110 | 110 | 110 | 110 | 103 | 103 | 103 | 103 | 90 | 90 | 90 | 79 | 79 | 79 | 68 | 68 | 68 |
| 1   | 101 | 97  | 93  | 90  | 95  | 91  | 88  | 85  | 80 | 78 | 76 | 70 | 68 | 67 | 61 | 60 | 58 |
| 2   | 93  | 85  | 80  | 75  | 87  | 80  | 75  | 71  | 71 | 67 | 64 | 62 | 59 | 57 | 54 | 52 | 50 |
| 3   | 85  | 76  | 69  | 63  | 79  | 71  | 65  | 60  | 63 | 58 | 54 | 56 | 52 | 49 | 49 | 46 | 43 |
| 4   | 78  | 67  | 60  | 54  | 73  | 64  | 57  | 51  | 57 | 51 | 47 | 50 | 46 | 42 | 44 | 41 | 38 |
| 5   | 72  | 61  | 53  | 47  | 67  | 57  | 50  | 45  | 51 | 45 | 41 | 45 | 41 | 37 | 40 | 36 | 33 |
| 6   | 67  | 55  | 47  | 41  | 62  | 52  | 44  | 39  | 46 | 40 | 36 | 41 | 36 | 33 | 36 | 33 | 30 |
| 7   | 62  | 50  | 42  | 36  | 58  | 47  | 40  | 35  | 42 | 36 | 32 | 38 | 33 | 29 | 33 | 30 | 27 |
| 8   | 57  | 45  | 38  | 32  | 54  | 43  | 36  | 31  | 39 | 33 | 29 | 35 | 30 | 26 | 31 | 27 | 24 |
| 9   | 54  | 42  | 34  | 29  | 50  | 40  | 33  | 28  | 36 | 30 | 26 | 32 | 27 | 24 | 29 | 25 | 22 |
| 10  | 50  | 38  | 31  | 26  | 47  | 36  | 30  | 25  | 33 | 27 | 24 | 30 | 25 | 22 | 27 | 23 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1530 | 1530 | 1530 |
| 5°  | 1533 | 1506 | 1516 |
| 10° | 1518 | 1477 | 1467 |
| 15° | 1497 | 1429 | 1392 |
| 20° | 1469 | 1362 | 1298 |
| 25° | 1441 | 1287 | 1208 |
| 30° | 1403 | 1210 | 1094 |
| 35° | 1366 | 1127 | 994  |
| 40° | 1328 | 1042 | 878  |
| 45° | 1285 | 946  | 774  |
| 50° | 1239 | 850  | 672  |
| 55° | 1192 | 748  | 574  |
| 60° | 1137 | 640  | 473  |
| 65° | 1074 | 531  | 426  |
| 70° | 998  | 429  | 387  |
| 75° | 902  | 379  | 353  |
| 80° | 763  | 320  | 308  |
| 85° | 533  | 216  | 235  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1285 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 221.1  | 2.9       |
| 10°-20°   | 606.9  | 7.8       |
| 20°-30°   | 852.0  | 11.0      |
| 30°-40°   | 928.8  | 12.0      |
| 40°-50°   | 853.6  | 11.0      |
| 50°-60°   | 670.4  | 8.7       |
| 60°-70°   | 436.4  | 5.6       |
| 70°-80°   | 224.6  | 2.9       |
| 80°-90°   | 60.3   | 0.8       |
| 90°-100°  | 63.8   | 0.8       |
| 100°-110° | 202.8  | 2.6       |
| 110°-120° | 347.0  | 4.5       |
| 120°-130° | 456.4  | 5.9       |
| 130°-140° | 512.3  | 6.6       |
| 140°-150° | 502.4  | 6.5       |
| 150°-160° | 421.4  | 5.4       |
| 160°-170° | 279.5  | 3.6       |
| 170°-180° | 97.7   | 1.3       |
| 0°-30°    | 1679.9 | 21.7      |
| 0°-40°    | 2608.7 | 33.7      |
| 0°-60°    | 4132.7 | 53.4      |
| 0°-90°    | 4853.9 | 62.7      |
| 90°-120°  | 613.6  | 7.9       |
| 90°-150°  | 2084.7 | 26.9      |
| 90°-180°  | 2883.0 | 37.3      |
| 0°-180°   | 7737.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2359 | 2359  | 2359 | 2359  | 2359 |      |
| 5°   | 2359 | 2348  | 2320 | 2340  | 2333 | 224  |
| 15°  | 2244 | 2220  | 2147 | 2107  | 2086 | 632  |
| 25°  | 2036 | 1968  | 1827 | 1740  | 1708 | 937  |
| 35°  | 1755 | 1646  | 1458 | 1324  | 1276 | 1098 |
| 45°  | 1434 | 1291  | 1067 | 916   | 864  | 1108 |
| 55°  | 1091 | 924   | 694  | 566   | 525  | 975  |
| 65°  | 736  | 564   | 371  | 299   | 292  | 730  |
| 75°  | 393  | 243   | 171  | 156   | 154  | 415  |
| 85°  | 92   | 47    | 40   | 40    | 40   | 105  |
| 90°  | 1    | 11    | 30   | 29    | 30   | 8    |
| 95°  | 45   | 54    | 56   | 56    | 54   | 51   |
| 105° | 187  | 190   | 192  | 193   | 193  | 198  |
| 115° | 348  | 353   | 352  | 351   | 348  | 344  |
| 125° | 506  | 514   | 512  | 509   | 508  | 453  |
| 135° | 655  | 665   | 667  | 666   | 663  | 506  |
| 145° | 795  | 802   | 807  | 808   | 804  | 497  |
| 155° | 910  | 912   | 915  | 919   | 916  | 419  |
| 165° | 989  | 988   | 988  | 995   | 990  | 279  |
| 175° | 1030 | 1027  | 1025 | 1031  | 1026 | 98   |
| 180° | 1031 | 1031  | 1031 | 1031  | 1031 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2358.7 | 2358.7 | 2358.7 | 2358.7 | 2358.7 |
| 2.5°   | 2369.3 | 2358.7 | 2335.2 | 2356.7 | 2352.4 |
| 5°     | 2358.7 | 2348.1 | 2320.3 | 2339.5 | 2333.1 |
| 7.5°   | 2339.5 | 2326.8 | 2296.9 | 2305.3 | 2294.7 |
| 10°    | 2313.9 | 2299.0 | 2256.3 | 2249.8 | 2237.1 |
| 12.5°  | 2281.9 | 2262.7 | 2205.0 | 2192.3 | 2168.7 |
| 15°    | 2243.5 | 2219.9 | 2147.4 | 2106.9 | 2085.6 |
| 17.5°  | 2198.6 | 2164.5 | 2074.8 | 2027.8 | 1993.6 |
| 20°    | 2147.4 | 2104.6 | 1998.0 | 1944.7 | 1897.6 |
| 22.5°  | 2092.0 | 2042.8 | 1918.9 | 1846.4 | 1814.5 |
| 25°    | 2036.5 | 1968.0 | 1827.2 | 1739.8 | 1707.6 |
| 27.5°  | 1970.3 | 1897.6 | 1741.8 | 1641.5 | 1592.4 |
| 30°    | 1899.9 | 1818.6 | 1647.8 | 1539.1 | 1481.4 |
| 32.5°  | 1831.5 | 1733.2 | 1558.4 | 1430.2 | 1376.7 |
| 35°    | 1754.7 | 1645.8 | 1458.1 | 1323.6 | 1276.4 |
| 37.5°  | 1680.0 | 1562.4 | 1364.1 | 1216.6 | 1163.4 |
| 40°    | 1600.9 | 1473.0 | 1265.8 | 1114.3 | 1058.7 |
| 42.5°  | 1519.9 | 1383.3 | 1167.7 | 1009.6 | 956.4  |
| 45°    | 1434.5 | 1291.4 | 1067.4 | 915.7  | 864.5  |
| 47.5°  | 1353.4 | 1201.9 | 971.3  | 819.6  | 772.7  |
| 50°    | 1263.7 | 1112.2 | 877.3  | 729.9  | 685.3  |
| 52.5°  | 1176.1 | 1015.9 | 787.7  | 646.8  | 606.3  |
| 55°    | 1090.7 | 924.2  | 693.7  | 565.7  | 525.2  |
| 57.5°  | 1003.3 | 832.5  | 610.6  | 491.0  | 456.8  |
| 60°    | 913.6  | 742.8  | 522.9  | 414.3  | 380.0  |
| 62.5°  | 826.1  | 655.4  | 448.2  | 345.8  | 328.8  |
| 65°    | 736.5  | 563.5  | 371.4  | 299.0  | 292.4  |
| 67.5°  | 651.1  | 478.1  | 299.0  | 262.4  | 256.2  |
| 70°    | 561.4  | 394.9  | 247.5  | 226.2  | 217.6  |
| 72.5°  | 476.1  | 318.0  | 207.0  | 190.0  | 185.7  |
| 75°    | 392.7  | 243.2  | 170.7  | 155.8  | 153.8  |
| 77.5°  | 309.6  | 172.8  | 134.5  | 125.9  | 121.6  |
| 80°    | 232.6  | 123.8  | 102.4  | 94.0   | 94.0   |
| 82.5°  | 162.2  | 83.3   | 70.4   | 66.1   | 66.1   |
| 85°    | 91.7   | 46.9   | 40.5   | 40.5   | 40.5   |
| 87.5°  | 34.2   | 17.0   | 17.0   | 14.9   | 14.9   |
| 90°    | 0.9    | 11.2   | 30.5   | 28.6   | 29.5   |
| 92.5°  | 19.2   | 26.1   | 27.1   | 28.0   | 28.0   |
| 95°    | 45.4   | 54.1   | 55.7   | 55.7   | 54.1   |
| 97.5°  | 75.6   | 83.6   | 87.1   | 87.1   | 87.1   |
| 100°   | 110.4  | 117.6  | 120.0  | 120.0  | 119.1  |
| 102.5° | 147.1  | 152.4  | 155.8  | 156.7  | 155.8  |
| 105°   | 187.2  | 189.6  | 191.5  | 193.1  | 193.1  |
| 107.5° | 227.0  | 230.7  | 230.7  | 231.3  | 227.0  |
| 110°   | 265.5  | 270.5  | 270.5  | 270.5  | 268.1  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 307.2  | 312.5  | 311.5  | 309.1  | 307.2  |
| 115°   | 348.2  | 353.3  | 351.6  | 350.7  | 348.2  |
| 117.5° | 389.0  | 395.8  | 391.5  | 389.0  | 386.5  |
| 120°   | 430.1  | 436.8  | 430.1  | 430.1  | 427.2  |
| 122.5° | 467.3  | 476.1  | 471.7  | 469.2  | 467.3  |
| 125°   | 506.5  | 514.3  | 511.8  | 509.0  | 508.1  |
| 127.5° | 544.8  | 554.4  | 551.0  | 547.2  | 544.8  |
| 130°   | 580.5  | 591.7  | 590.2  | 588.3  | 584.9  |
| 132.5° | 620.6  | 629.3  | 630.0  | 625.6  | 623.1  |
| 135°   | 655.2  | 664.8  | 666.7  | 665.7  | 663.2  |
| 137.5° | 693.7  | 701.5  | 703.0  | 702.4  | 698.7  |
| 140°   | 727.6  | 735.4  | 739.7  | 739.7  | 736.3  |
| 142.5° | 762.5  | 770.2  | 772.7  | 773.6  | 770.2  |
| 145°   | 795.4  | 801.6  | 806.6  | 807.6  | 804.1  |
| 147.5° | 824.9  | 832.7  | 836.4  | 838.0  | 834.5  |
| 150°   | 855.4  | 860.7  | 864.1  | 866.9  | 864.1  |
| 152.5° | 882.5  | 887.7  | 892.1  | 895.5  | 892.1  |
| 155°   | 909.5  | 912.0  | 914.8  | 919.2  | 916.3  |
| 157.5° | 932.9  | 934.7  | 936.2  | 942.5  | 938.1  |
| 160°   | 953.7  | 955.5  | 956.4  | 961.7  | 958.0  |
| 162.5° | 972.9  | 972.9  | 973.9  | 979.7  | 975.4  |
| 165°   | 989.4  | 988.5  | 988.5  | 994.7  | 990.3  |
| 167.5° | 1004.4 | 1001.5 | 1001.5 | 1007.8 | 1003.4 |
| 170°   | 1015.5 | 1013.0 | 1012.1 | 1018.3 | 1013.0 |
| 172.5° | 1023.3 | 1020.8 | 1019.9 | 1026.1 | 1020.8 |
| 175°   | 1029.6 | 1027.0 | 1025.2 | 1031.4 | 1026.1 |
| 177.5° | 1033.0 | 1030.5 | 1028.6 | 1033.9 | 1028.6 |
| 180°   | 1031.4 | 1031.4 | 1031.4 | 1031.4 | 1031.4 |

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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 | 9.76             | 10.70 | 10.60 | 11.57 | 12.65 | 5.72           | 6.66 | 6.56  | 7.53  | 8.61  |
|                 | 3H   | 11.45            | 12.29 | 12.31 | 13.17 | 14.27 | 6.92           | 7.76 | 7.78  | 8.63  | 9.74  |
|                 | 4H   | 12.07            | 12.86 | 12.94 | 13.74 | 14.86 | 7.37           | 8.17 | 8.25  | 9.05  | 10.17 |
|                 | 6H   | 12.50            | 13.23 | 13.39 | 14.12 | 15.25 | 7.70           | 8.44 | 8.59  | 9.32  | 10.45 |
|                 | 8H   | 12.63            | 13.33 | 13.53 | 14.23 | 15.36 | 7.80           | 8.49 | 8.69  | 9.40  | 10.53 |
|                 | 12H  | 12.70            | 13.36 | 13.60 | 14.26 | 15.42 | 7.84           | 8.51 | 8.74  | 9.41  | 10.56 |
| 4H              | 2H   | 9.79             | 10.59 | 10.67 | 11.47 | 12.58 | 6.33           | 7.13 | 7.21  | 8.01  | 9.13  |
|                 | 3H   | 11.63            | 12.30 | 12.53 | 13.21 | 14.34 | 7.69           | 8.35 | 8.58  | 9.27  | 10.40 |
|                 | 4H   | 12.34            | 12.94 | 13.24 | 13.85 | 15.01 | 8.25           | 8.85 | 9.15  | 9.76  | 10.92 |
|                 | 6H   | 12.86            | 13.38 | 13.78 | 14.31 | 15.47 | 8.67           | 9.19 | 9.59  | 10.13 | 11.29 |
|                 | 8H   | 13.04            | 13.53 | 13.96 | 14.45 | 15.63 | 8.81           | 9.29 | 9.73  | 10.22 | 11.39 |
|                 | 12H  | 13.15            | 13.58 | 14.09 | 14.53 | 15.71 | 8.88           | 9.31 | 9.82  | 10.26 | 11.44 |
| 8H              | 4H   | 12.31            | 12.80 | 13.23 | 13.72 | 14.90 | 8.54           | 9.02 | 9.46  | 9.95  | 11.12 |
|                 | 6H   | 12.89            | 13.29 | 13.83 | 14.26 | 15.43 | 9.06           | 9.46 | 10.01 | 10.43 | 11.60 |
|                 | 8H   | 13.11            | 13.46 | 14.07 | 14.42 | 15.61 | 9.26           | 9.61 | 10.21 | 10.57 | 11.76 |
|                 | 12H  | 13.26            | 13.57 | 14.22 | 14.52 | 15.76 | 9.38           | 9.69 | 10.34 | 10.65 | 11.89 |
| 12H             | 4H   | 12.27            | 12.71 | 13.21 | 13.65 | 14.83 | 8.55           | 8.99 | 9.49  | 9.93  | 11.11 |
|                 | 6H   | 12.86            | 13.22 | 13.82 | 14.18 | 15.37 | 9.11           | 9.47 | 10.07 | 10.43 | 11.62 |
|                 | 8H   | 13.09            | 13.41 | 14.05 | 14.36 | 15.60 | 9.33           | 9.64 | 10.29 | 10.60 | 11.84 |