

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: P924175

Luminaire Tested: DFN2DIP-4P4F0-060D040US950-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P924175  
REPORT IS A COMBINATION OF REPORTS P900617 AND P897523  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P4F0-060D040US950-FLLONL  
Description: 4 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

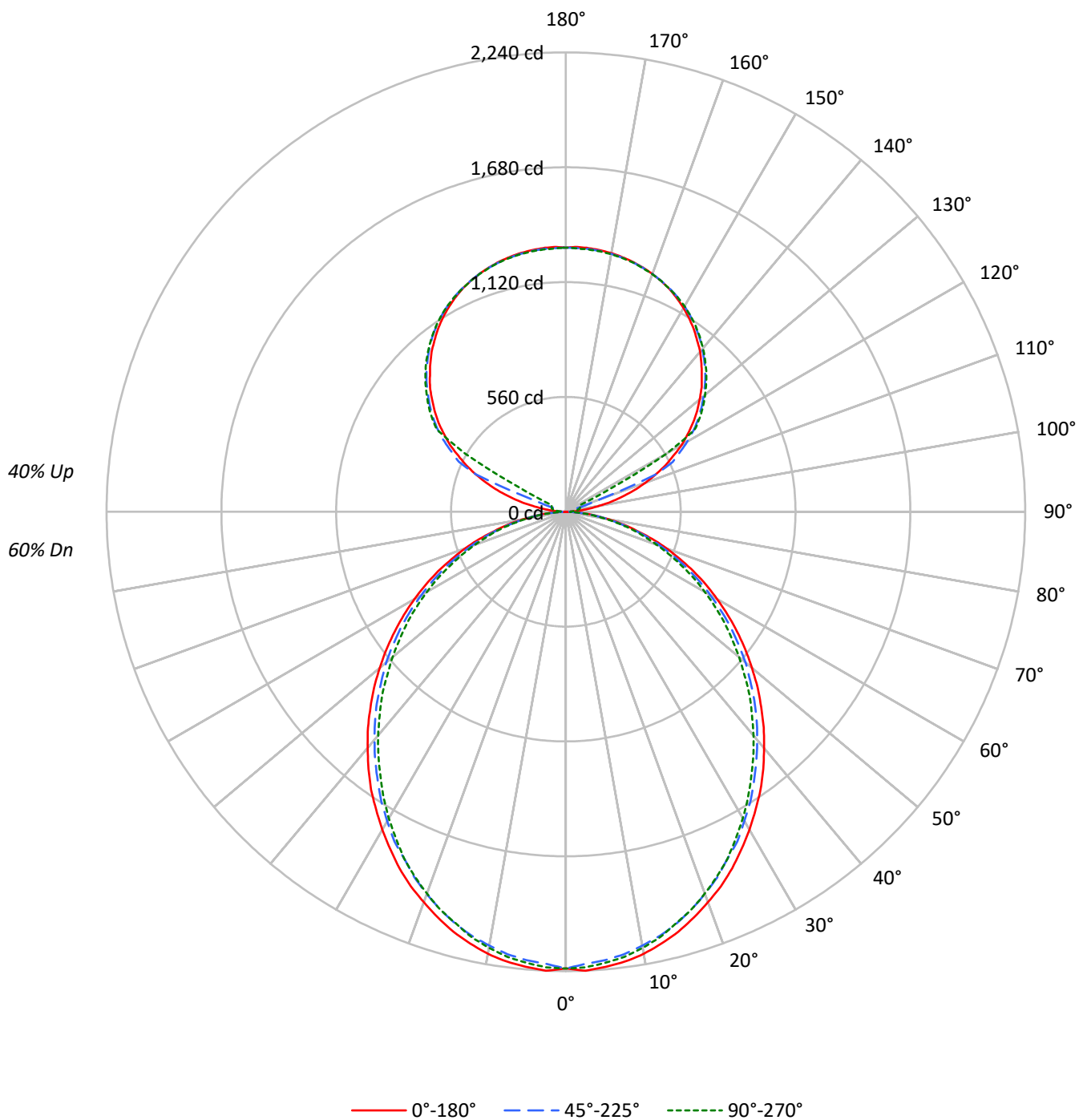
Lumens per Lamp: N/A  
Luminaire Lumens: 9444.6 lumens  
Efficiency: N/A  
Efficacy: 102.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 4.07' x L: 4.07' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 92.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9933  
Total Harmonic Distortion (THDi): 0.066  
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 | 102 | 102 | 102 | 102 | 89 | 89 | 89 | 77 | 77 | 77 | 65 | 65 | 65 |
| 1   | 100 | 96  | 92  | 88  | 93  | 90  | 86  | 83  | 78 | 75 | 73 | 67 | 66 | 64 | 58 | 56 | 55 |
| 2   | 91  | 84  | 77  | 72  | 85  | 78  | 73  | 68  | 68 | 64 | 61 | 59 | 56 | 53 | 51 | 49 | 47 |
| 3   | 83  | 73  | 66  | 60  | 77  | 69  | 62  | 57  | 60 | 55 | 51 | 52 | 48 | 45 | 45 | 42 | 40 |
| 4   | 76  | 65  | 57  | 51  | 71  | 61  | 54  | 48  | 54 | 48 | 44 | 47 | 42 | 39 | 40 | 37 | 34 |
| 5   | 70  | 58  | 50  | 44  | 65  | 55  | 47  | 42  | 48 | 42 | 38 | 42 | 37 | 34 | 36 | 33 | 30 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 42  | 36  | 43 | 37 | 33 | 38 | 33 | 30 | 33 | 29 | 26 |
| 7   | 60  | 47  | 39  | 33  | 56  | 44  | 37  | 32  | 39 | 33 | 29 | 35 | 30 | 26 | 30 | 26 | 23 |
| 8   | 55  | 43  | 35  | 30  | 52  | 40  | 33  | 28  | 36 | 30 | 26 | 32 | 27 | 23 | 28 | 24 | 21 |
| 9   | 52  | 39  | 32  | 26  | 48  | 37  | 30  | 25  | 33 | 27 | 23 | 29 | 24 | 21 | 26 | 22 | 19 |
| 10  | 48  | 36  | 29  | 24  | 45  | 34  | 27  | 23  | 30 | 25 | 21 | 27 | 22 | 19 | 24 | 20 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1445 | 1445 | 1445 |
| 5°  | 1447 | 1425 | 1435 |
| 10° | 1436 | 1406 | 1416 |
| 15° | 1415 | 1384 | 1386 |
| 20° | 1386 | 1352 | 1356 |
| 25° | 1358 | 1314 | 1320 |
| 30° | 1323 | 1279 | 1275 |
| 35° | 1289 | 1237 | 1227 |
| 40° | 1248 | 1195 | 1182 |
| 45° | 1206 | 1153 | 1135 |
| 50° | 1161 | 1108 | 1081 |
| 55° | 1114 | 1057 | 1032 |
| 60° | 1061 | 996  | 976  |
| 65° | 1003 | 933  | 909  |
| 70° | 929  | 856  | 837  |
| 75° | 826  | 765  | 772  |
| 80° | 703  | 648  | 646  |
| 85° | 510  | 445  | 436  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1206 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 209.6  | 2.2       |
| 10°-20°   | 589.8  | 6.2       |
| 20°-30°   | 866.8  | 9.2       |
| 30°-40°   | 1006.7 | 10.7      |
| 40°-50°   | 1005.5 | 10.6      |
| 50°-60°   | 876.7  | 9.3       |
| 60°-70°   | 648.1  | 6.9       |
| 70°-80°   | 366.7  | 3.9       |
| 80°-90°   | 99.1   | 1.0       |
| 90°-100°  | 42.5   | 0.4       |
| 100°-110° | 158.3  | 1.7       |
| 110°-120° | 419.9  | 4.4       |
| 120°-130° | 696.4  | 7.4       |
| 130°-140° | 739.7  | 7.8       |
| 140°-150° | 687.5  | 7.3       |
| 150°-160° | 552.7  | 5.9       |
| 160°-170° | 356.1  | 3.8       |
| 170°-180° | 122.6  | 1.3       |
| <hr/>     |        |           |
| 0°-30°    | 1666.2 | 17.6      |
| 0°-40°    | 2673.0 | 28.3      |
| 0°-60°    | 4555.2 | 48.2      |
| 0°-90°    | 5669.0 | 60.0      |
| 90°-120°  | 620.6  | 6.6       |
| 90°-150°  | 2744.1 | 29.1      |
| 90°-180°  | 3776.0 | 40.0      |
| 0°-180°   | 9444.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2227 | 2227  | 2227 | 2227  | 2227 |      |
| 5°   | 2227 | 2219  | 2195 | 2212  | 2208 | 211  |
| 15°  | 2120 | 2108  | 2080 | 2088  | 2078 | 597  |
| 25°  | 1919 | 1902  | 1866 | 1870  | 1866 | 883  |
| 35°  | 1656 | 1634  | 1600 | 1587  | 1576 | 1034 |
| 45°  | 1347 | 1332  | 1300 | 1276  | 1268 | 1040 |
| 55°  | 1020 | 1007  | 981  | 955   | 945  | 912  |
| 65°  | 688  | 675   | 653  | 634   | 623  | 680  |
| 75°  | 360  | 356   | 345  | 332   | 336  | 384  |
| 85°  | 88   | 86    | 84   | 77    | 75   | 98   |
| 90°  | 1    | 11    | 19   | 23    | 25   | 9    |
| 95°  | 60   | 30    | 36   | 41    | 40   | 72   |
| 105° | 283  | 311   | 57   | 67    | 71   | 303  |
| 115° | 536  | 552   | 575  | 144   | 76   | 527  |
| 125° | 758  | 770   | 787  | 794   | 797  | 676  |
| 135° | 938  | 952   | 961  | 970   | 968  | 724  |
| 145° | 1088 | 1087  | 1102 | 1109  | 1104 | 680  |
| 155° | 1198 | 1189  | 1200 | 1206  | 1198 | 552  |
| 165° | 1262 | 1256  | 1259 | 1266  | 1259 | 356  |
| 175° | 1291 | 1284  | 1286 | 1292  | 1283 | 123  |
| 180° | 1288 | 1288  | 1288 | 1288  | 1288 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2227.2 | 2227.2 | 2227.2 | 2227.2 | 2227.2 |
| 2.5°   | 2240.2 | 2229.5 | 2205.8 | 2227.2 | 2223.1 |
| 5°     | 2227.2 | 2218.8 | 2195.2 | 2212.2 | 2208.1 |
| 7.5°   | 2212.2 | 2199.5 | 2175.9 | 2193.2 | 2188.9 |
| 10°    | 2188.9 | 2173.9 | 2148.1 | 2165.2 | 2158.8 |
| 12.5°  | 2156.6 | 2143.8 | 2118.2 | 2128.9 | 2124.6 |
| 15°    | 2120.2 | 2107.5 | 2079.5 | 2088.2 | 2077.5 |
| 17.5°  | 2075.2 | 2062.5 | 2034.6 | 2045.2 | 2034.6 |
| 20°    | 2025.9 | 2013.2 | 1983.2 | 1989.6 | 1981.2 |
| 22.5°  | 1976.9 | 1957.5 | 1929.6 | 1929.6 | 1925.3 |
| 25°    | 1918.9 | 1901.9 | 1865.5 | 1869.6 | 1865.5 |
| 27.5°  | 1854.6 | 1839.6 | 1811.8 | 1805.5 | 1794.9 |
| 30°    | 1790.6 | 1773.2 | 1741.2 | 1734.8 | 1726.2 |
| 32.5°  | 1721.9 | 1709.2 | 1674.8 | 1661.9 | 1653.3 |
| 35°    | 1655.6 | 1634.2 | 1599.9 | 1586.9 | 1576.2 |
| 37.5°  | 1580.6 | 1561.2 | 1527.0 | 1511.9 | 1501.2 |
| 40°    | 1503.5 | 1486.2 | 1452.0 | 1432.9 | 1424.2 |
| 42.5°  | 1428.5 | 1411.3 | 1377.2 | 1355.6 | 1342.9 |
| 45°    | 1347.2 | 1332.2 | 1299.9 | 1276.5 | 1267.9 |
| 47.5°  | 1267.9 | 1252.9 | 1218.6 | 1195.0 | 1182.2 |
| 50°    | 1184.3 | 1173.6 | 1143.7 | 1113.6 | 1102.9 |
| 52.5°  | 1102.9 | 1087.9 | 1060.2 | 1036.6 | 1021.6 |
| 55°    | 1019.5 | 1006.6 | 980.9  | 955.2  | 944.6  |
| 57.5°  | 936.0  | 925.3  | 897.3  | 871.7  | 863.0  |
| 60°    | 852.3  | 843.9  | 814.0  | 790.3  | 783.9  |
| 62.5°  | 770.9  | 755.9  | 734.6  | 713.2  | 704.6  |
| 65°    | 687.5  | 674.7  | 653.3  | 633.9  | 623.2  |
| 67.5°  | 601.9  | 591.0  | 571.9  | 556.9  | 548.3  |
| 70°    | 522.6  | 514.0  | 494.6  | 479.7  | 471.3  |
| 72.5°  | 441.2  | 432.6  | 422.0  | 407.0  | 400.6  |
| 75°    | 359.7  | 355.7  | 344.7  | 332.0  | 336.3  |
| 77.5°  | 287.0  | 278.4  | 274.0  | 267.7  | 261.3  |
| 80°    | 214.3  | 212.0  | 207.7  | 201.3  | 197.0  |
| 82.5°  | 145.7  | 145.7  | 143.6  | 135.0  | 135.0  |
| 85°    | 87.7   | 85.7   | 83.6   | 77.0   | 75.0   |
| 87.5°  | 38.6   | 34.3   | 30.0   | 23.7   | 21.4   |
| 90°    | 0.9    | 11.2   | 18.6   | 23.4   | 25.1   |
| 92.5°  | 23.4   | 19.6   | 22.3   | 24.2   | 25.1   |
| 95°    | 60.5   | 29.8   | 36.3   | 41.0   | 40.1   |
| 97.5°  | 109.0  | 32.6   | 47.5   | 50.4   | 51.2   |
| 100°   | 164.9  | 37.3   | 53.1   | 60.5   | 62.4   |
| 102.5° | 226.4  | 224.7  | 55.0   | 65.2   | 68.0   |
| 105°   | 283.2  | 311.3  | 56.9   | 67.1   | 70.8   |
| 107.5° | 349.5  | 372.7  | 58.8   | 69.0   | 72.7   |
| 110°   | 412.9  | 432.4  | 163.1  | 69.9   | 73.6   |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 472.5  | 489.2  | 473.4  | 71.7   | 74.6   |
| 115°   | 535.8  | 551.6  | 575.0  | 143.5  | 76.5   |
| 117.5° | 590.8  | 609.4  | 625.3  | 492.0  | 247.8  |
| 120°   | 652.3  | 666.3  | 683.1  | 694.3  | 568.5  |
| 122.5° | 704.4  | 719.4  | 738.1  | 743.6  | 744.6  |
| 125°   | 757.6  | 769.8  | 787.4  | 794.0  | 796.8  |
| 127.5° | 806.0  | 819.1  | 833.1  | 842.5  | 843.3  |
| 130°   | 851.7  | 866.7  | 876.8  | 887.1  | 886.3  |
| 132.5° | 898.3  | 910.5  | 920.7  | 929.1  | 928.2  |
| 135°   | 937.5  | 952.5  | 960.8  | 970.1  | 968.3  |
| 137.5° | 978.4  | 989.6  | 999.0  | 1008.3 | 1005.5 |
| 140°   | 1018.5 | 1026.0 | 1036.2 | 1044.6 | 1040.0 |
| 142.5° | 1052.2 | 1058.7 | 1070.8 | 1078.1 | 1073.5 |
| 145°   | 1087.6 | 1086.6 | 1102.3 | 1108.9 | 1104.3 |
| 147.5° | 1118.2 | 1115.4 | 1131.3 | 1135.9 | 1132.3 |
| 150°   | 1148.0 | 1141.6 | 1156.5 | 1162.1 | 1157.4 |
| 152.5° | 1173.2 | 1165.8 | 1179.7 | 1185.3 | 1178.9 |
| 155°   | 1197.5 | 1189.2 | 1200.3 | 1205.9 | 1198.4 |
| 157.5° | 1217.0 | 1209.6 | 1218.1 | 1224.6 | 1217.0 |
| 160°   | 1233.8 | 1228.2 | 1233.8 | 1239.3 | 1232.9 |
| 162.5° | 1248.7 | 1243.2 | 1247.8 | 1254.3 | 1245.9 |
| 165°   | 1261.8 | 1256.2 | 1259.0 | 1265.5 | 1259.0 |
| 167.5° | 1272.1 | 1266.3 | 1269.3 | 1275.8 | 1267.4 |
| 170°   | 1280.5 | 1274.8 | 1276.6 | 1283.2 | 1274.8 |
| 172.5° | 1286.0 | 1280.5 | 1282.4 | 1288.9 | 1280.5 |
| 175°   | 1290.6 | 1284.1 | 1286.0 | 1292.5 | 1283.2 |
| 177.5° | 1292.5 | 1286.0 | 1286.9 | 1293.5 | 1285.1 |
| 180°   | 1287.9 | 1287.9 | 1287.9 | 1287.9 | 1287.9 |

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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 | 9.45             | 10.41 | 10.31 | 11.29 | 12.41 | 9.00           | 9.96  | 9.87  | 10.85 | 11.97 |
|                 | 3H   | 11.12            | 11.98 | 12.00 | 12.88 | 14.02 | 10.63          | 11.49 | 11.51 | 12.39 | 13.53 |
|                 | 4H   | 11.72            | 12.53 | 12.61 | 13.43 | 14.59 | 11.22          | 12.04 | 12.12 | 12.94 | 14.09 |
|                 | 6H   | 12.13            | 12.88 | 13.03 | 13.79 | 14.95 | 11.62          | 12.38 | 12.53 | 13.28 | 14.45 |
|                 | 8H   | 12.24            | 12.95 | 13.15 | 13.88 | 15.05 | 11.73          | 12.45 | 12.65 | 13.38 | 14.54 |
|                 | 12H  | 12.29            | 12.97 | 13.21 | 13.89 | 15.09 | 11.78          | 12.46 | 12.70 | 13.38 | 14.58 |
| 4H              | 2H   | 9.92             | 10.73 | 10.82 | 11.64 | 12.79 | 9.57           | 10.38 | 10.47 | 11.28 | 12.44 |
|                 | 3H   | 11.80            | 12.48 | 12.71 | 13.42 | 14.59 | 11.39          | 12.07 | 12.30 | 13.01 | 14.18 |
|                 | 4H   | 12.52            | 13.14 | 13.45 | 14.07 | 15.27 | 12.10          | 12.72 | 13.02 | 13.65 | 14.85 |
|                 | 6H   | 13.05            | 13.59 | 13.99 | 14.54 | 15.74 | 12.62          | 13.15 | 13.55 | 14.11 | 15.30 |
|                 | 8H   | 13.21            | 13.71 | 14.14 | 14.65 | 15.86 | 12.77          | 13.27 | 13.71 | 14.22 | 15.43 |
|                 | 12H  | 13.29            | 13.74 | 14.24 | 14.70 | 15.92 | 12.84          | 13.29 | 13.79 | 14.25 | 15.47 |
| 8H              | 4H   | 12.73            | 13.23 | 13.67 | 14.18 | 15.39 | 12.35          | 12.85 | 13.29 | 13.80 | 15.01 |
|                 | 6H   | 13.37            | 13.79 | 14.34 | 14.77 | 15.99 | 12.99          | 13.40 | 13.95 | 14.39 | 15.60 |
|                 | 8H   | 13.60            | 13.96 | 14.57 | 14.94 | 16.17 | 13.20          | 13.57 | 14.18 | 14.55 | 15.78 |
|                 | 12H  | 13.74            | 14.06 | 14.71 | 15.03 | 16.31 | 13.33          | 13.65 | 14.30 | 14.62 | 15.90 |
| 12H             | 4H   | 12.72            | 13.17 | 13.68 | 14.14 | 15.35 | 12.35          | 12.80 | 13.31 | 13.77 | 14.99 |
|                 | 6H   | 13.40            | 13.77 | 14.38 | 14.75 | 15.98 | 13.03          | 13.40 | 14.00 | 14.38 | 15.61 |
|                 | 8H   | 13.65            | 13.98 | 14.63 | 14.95 | 16.22 | 13.27          | 13.60 | 14.25 | 14.57 | 15.84 |