

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: P928504

Luminaire Tested: DFN2DIP-HX4F0-040D070US930-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928504  
REPORT IS A COMBINATION OF REPORTS P900873 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-040D070US930-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

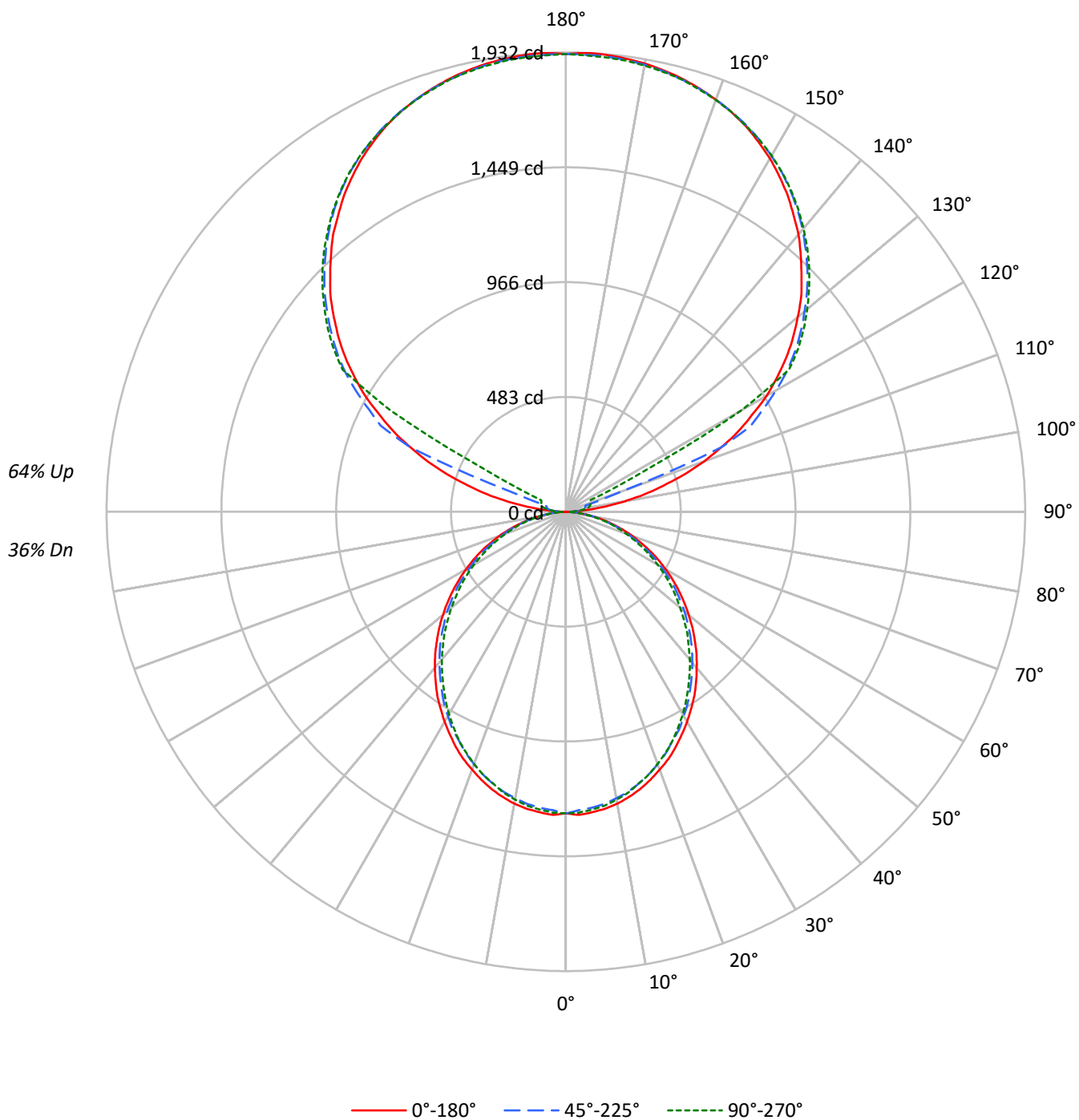
Lumens per Lamp: N/A  
Luminaire Lumens: 8875.4 lumens  
Efficiency: N/A  
Efficacy: 104.0 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 85.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9977  
Total Harmonic Distortion (THDi): 0.049  
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   | 104 | 104 | 104 | 104 | 94 | 94 | 94 | 94 | 76 | 76 | 76 | 59 | 59 | 59 | 44 | 44 | 44 |
| 1   | 95  | 90  | 87  | 83  | 86 | 82 | 79 | 76 | 66 | 64 | 62 | 52 | 50 | 49 | 39 | 38 | 37 |
| 2   | 86  | 79  | 73  | 68  | 78 | 72 | 67 | 62 | 58 | 54 | 51 | 46 | 43 | 41 | 34 | 32 | 31 |
| 3   | 79  | 69  | 62  | 57  | 71 | 63 | 57 | 52 | 51 | 47 | 43 | 40 | 37 | 35 | 30 | 28 | 26 |
| 4   | 72  | 61  | 54  | 48  | 65 | 56 | 49 | 44 | 45 | 41 | 37 | 36 | 32 | 30 | 27 | 25 | 23 |
| 5   | 66  | 55  | 47  | 41  | 59 | 50 | 43 | 38 | 41 | 35 | 32 | 32 | 28 | 26 | 24 | 22 | 20 |
| 6   | 61  | 49  | 41  | 35  | 55 | 45 | 38 | 33 | 37 | 31 | 27 | 29 | 25 | 22 | 22 | 19 | 17 |
| 7   | 56  | 44  | 36  | 31  | 51 | 40 | 33 | 29 | 33 | 28 | 24 | 26 | 23 | 20 | 20 | 17 | 15 |
| 8   | 52  | 40  | 32  | 27  | 47 | 37 | 30 | 25 | 30 | 25 | 21 | 24 | 20 | 18 | 18 | 16 | 14 |
| 9   | 48  | 36  | 29  | 24  | 44 | 33 | 27 | 22 | 28 | 23 | 19 | 22 | 18 | 16 | 17 | 14 | 12 |
| 10  | 45  | 33  | 26  | 21  | 41 | 31 | 24 | 20 | 25 | 20 | 17 | 20 | 17 | 14 | 16 | 13 | 11 |

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

|     | 0°  | 45° | 90° |
|-----|-----|-----|-----|
| 0°  | 943 | 943 | 943 |
| 5°  | 945 | 930 | 936 |
| 10° | 937 | 918 | 924 |
| 15° | 923 | 903 | 904 |
| 20° | 905 | 882 | 884 |
| 25° | 886 | 857 | 860 |
| 30° | 863 | 834 | 831 |
| 35° | 841 | 806 | 799 |
| 40° | 814 | 778 | 769 |
| 45° | 787 | 751 | 738 |
| 50° | 758 | 721 | 703 |
| 55° | 727 | 688 | 670 |
| 60° | 693 | 648 | 633 |
| 65° | 655 | 606 | 589 |
| 70° | 606 | 556 | 541 |
| 75° | 539 | 495 | 498 |
| 80° | 459 | 418 | 414 |
| 85° | 333 | 285 | 275 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 990 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 119.4  | 1.3       |
| 10°-20°   | 335.9  | 3.8       |
| 20°-30°   | 493.7  | 5.6       |
| 30°-40°   | 573.4  | 6.5       |
| 40°-50°   | 572.7  | 6.5       |
| 50°-60°   | 499.3  | 5.6       |
| 60°-70°   | 369.1  | 4.2       |
| 70°-80°   | 208.8  | 2.4       |
| 80°-90°   | 58.5   | 0.7       |
| 90°-100°  | 63.5   | 0.7       |
| 100°-110° | 236.7  | 2.7       |
| 110°-120° | 627.7  | 7.1       |
| 120°-130° | 1041.1 | 11.7      |
| 130°-140° | 1105.9 | 12.5      |
| 140°-150° | 1027.8 | 11.6      |
| 150°-160° | 826.3  | 9.3       |
| 160°-170° | 532.4  | 6.0       |
| 170°-180° | 183.3  | 2.1       |
| 0°-30°    | 949.0  | 10.7      |
| 0°-40°    | 1522.3 | 17.2      |
| 0°-60°    | 2594.3 | 29.2      |
| 0°-90°    | 3230.8 | 36.4      |
| 90°-120°  | 927.9  | 10.5      |
| 90°-150°  | 4102.6 | 46.2      |
| 90°-180°  | 5645.0 | 63.6      |
| 0°-180°   | 8875.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1268 | 1268  | 1268 | 1268  | 1268 |      |
| 5°   | 1268 | 1264  | 1250 | 1260  | 1258 | 120  |
| 15°  | 1208 | 1200  | 1184 | 1189  | 1183 | 340  |
| 25°  | 1093 | 1083  | 1062 | 1065  | 1062 | 503  |
| 35°  | 943  | 931   | 911  | 904   | 898  | 589  |
| 45°  | 767  | 759   | 740  | 727   | 722  | 592  |
| 55°  | 581  | 573   | 559  | 544   | 538  | 519  |
| 65°  | 392  | 384   | 372  | 361   | 355  | 387  |
| 75°  | 205  | 202   | 196  | 189   | 192  | 219  |
| 85°  | 50   | 49    | 48   | 44    | 43   | 56   |
| 90°  | 1    | 17    | 28   | 35    | 38   | 8    |
| 95°  | 90   | 44    | 54   | 61    | 60   | 107  |
| 105° | 424  | 465   | 85   | 100   | 106  | 453  |
| 115° | 801  | 825   | 860  | 215   | 114  | 789  |
| 125° | 1133 | 1151  | 1177 | 1187  | 1191 | 1010 |
| 135° | 1402 | 1424  | 1436 | 1450  | 1448 | 1083 |
| 145° | 1626 | 1624  | 1648 | 1658  | 1651 | 1017 |
| 155° | 1790 | 1778  | 1794 | 1803  | 1792 | 825  |
| 165° | 1886 | 1878  | 1882 | 1892  | 1882 | 533  |
| 175° | 1930 | 1920  | 1923 | 1932  | 1918 | 184  |
| 180° | 1925 | 1925  | 1925 | 1925  | 1925 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1268.5 | 1268.5 | 1268.5 | 1268.5 | 1268.5 |
| 2.5°   | 1275.9 | 1269.8 | 1256.3 | 1268.5 | 1266.2 |
| 5°     | 1268.5 | 1263.7 | 1250.2 | 1259.9 | 1257.6 |
| 7.5°   | 1259.9 | 1252.7 | 1239.2 | 1249.1 | 1246.6 |
| 10°    | 1246.6 | 1238.1 | 1223.5 | 1233.2 | 1229.5 |
| 12.5°  | 1228.2 | 1221.0 | 1206.4 | 1212.5 | 1209.9 |
| 15°    | 1207.5 | 1200.3 | 1184.4 | 1189.2 | 1183.2 |
| 17.5°  | 1181.9 | 1174.7 | 1158.8 | 1164.8 | 1158.8 |
| 20°    | 1153.8 | 1146.5 | 1129.5 | 1133.1 | 1128.4 |
| 22.5°  | 1125.8 | 1114.8 | 1098.9 | 1098.9 | 1096.5 |
| 25°    | 1092.8 | 1083.1 | 1062.4 | 1064.8 | 1062.4 |
| 27.5°  | 1056.2 | 1047.7 | 1032.0 | 1028.3 | 1022.3 |
| 30°    | 1019.7 | 1009.9 | 991.7  | 988.0  | 983.1  |
| 32.5°  | 980.7  | 973.4  | 953.9  | 946.5  | 941.6  |
| 35°    | 942.9  | 930.7  | 911.2  | 903.8  | 897.7  |
| 37.5°  | 900.2  | 889.2  | 869.6  | 861.1  | 855.0  |
| 40°    | 856.3  | 846.5  | 826.9  | 816.1  | 811.2  |
| 42.5°  | 813.6  | 803.8  | 784.4  | 772.0  | 764.8  |
| 45°    | 767.2  | 758.8  | 740.3  | 727.1  | 722.1  |
| 47.5°  | 722.1  | 713.5  | 694.1  | 680.6  | 673.4  |
| 50°    | 674.5  | 668.4  | 651.3  | 634.2  | 628.1  |
| 52.5°  | 628.1  | 619.6  | 603.8  | 590.4  | 581.8  |
| 55°    | 580.7  | 573.3  | 558.7  | 544.0  | 538.0  |
| 57.5°  | 533.0  | 527.0  | 511.0  | 496.4  | 491.5  |
| 60°    | 485.4  | 480.6  | 463.6  | 450.1  | 446.5  |
| 62.5°  | 439.1  | 430.6  | 418.4  | 406.2  | 401.3  |
| 65°    | 391.6  | 384.2  | 372.0  | 361.0  | 355.0  |
| 67.5°  | 342.8  | 336.6  | 325.8  | 317.2  | 312.3  |
| 70°    | 297.6  | 292.7  | 281.7  | 273.2  | 268.4  |
| 72.5°  | 251.3  | 246.4  | 240.3  | 231.8  | 228.1  |
| 75°    | 204.9  | 202.5  | 196.3  | 189.1  | 191.5  |
| 77.5°  | 163.4  | 158.5  | 156.1  | 152.4  | 148.8  |
| 80°    | 122.0  | 120.7  | 118.3  | 114.7  | 112.2  |
| 82.5°  | 83.0   | 83.0   | 81.8   | 76.9   | 76.9   |
| 85°    | 50.0   | 48.8   | 47.6   | 43.8   | 42.7   |
| 87.5°  | 22.0   | 19.6   | 17.1   | 13.4   | 12.1   |
| 90°    | 1.3    | 16.7   | 27.8   | 34.9   | 37.6   |
| 92.5°  | 34.9   | 29.3   | 33.4   | 36.3   | 37.6   |
| 95°    | 90.5   | 44.5   | 54.3   | 61.4   | 59.9   |
| 97.5°  | 162.9  | 48.8   | 71.0   | 75.3   | 76.6   |
| 100°   | 246.7  | 55.7   | 79.4   | 90.5   | 93.3   |
| 102.5° | 338.5  | 335.9  | 82.2   | 97.5   | 101.7  |
| 105°   | 423.6  | 465.4  | 85.0   | 100.2  | 105.9  |
| 107.5° | 522.4  | 557.2  | 87.9   | 103.1  | 108.7  |
| 110°   | 617.3  | 646.4  | 243.8  | 104.6  | 110.0  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 706.4  | 731.4  | 707.7  | 107.2  | 111.5  |
| 115°   | 801.1  | 824.7  | 859.6  | 214.6  | 114.3  |
| 117.5° | 883.3  | 911.1  | 934.9  | 735.5  | 370.6  |
| 120°   | 975.2  | 996.1  | 1021.3 | 1038.0 | 849.9  |
| 122.5° | 1053.1 | 1075.5 | 1103.5 | 1111.7 | 1113.2 |
| 125°   | 1132.6 | 1150.8 | 1177.3 | 1187.0 | 1191.1 |
| 127.5° | 1205.1 | 1224.5 | 1245.6 | 1259.5 | 1260.8 |
| 130°   | 1273.4 | 1295.7 | 1310.9 | 1326.3 | 1325.0 |
| 132.5° | 1343.0 | 1361.2 | 1376.5 | 1389.0 | 1387.7 |
| 135°   | 1401.6 | 1423.9 | 1436.4 | 1450.4 | 1447.6 |
| 137.5° | 1462.8 | 1479.6 | 1493.6 | 1507.5 | 1503.3 |
| 140°   | 1522.7 | 1533.9 | 1549.2 | 1561.7 | 1554.8 |
| 142.5° | 1572.9 | 1582.7 | 1600.7 | 1611.8 | 1604.9 |
| 145°   | 1625.9 | 1624.5 | 1648.1 | 1657.9 | 1650.9 |
| 147.5° | 1671.7 | 1667.7 | 1691.3 | 1698.2 | 1692.8 |
| 150°   | 1716.4 | 1706.7 | 1729.0 | 1737.3 | 1730.3 |
| 152.5° | 1754.0 | 1742.9 | 1763.7 | 1772.1 | 1762.4 |
| 155°   | 1790.2 | 1777.8 | 1794.5 | 1802.8 | 1791.7 |
| 157.5° | 1819.5 | 1808.4 | 1821.0 | 1830.7 | 1819.5 |
| 160°   | 1844.7 | 1836.2 | 1844.7 | 1852.9 | 1843.1 |
| 162.5° | 1866.8 | 1858.5 | 1865.5 | 1875.2 | 1862.7 |
| 165°   | 1886.3 | 1878.1 | 1882.2 | 1891.9 | 1882.2 |
| 167.5° | 1901.7 | 1893.2 | 1897.6 | 1907.3 | 1894.8 |
| 170°   | 1914.3 | 1905.9 | 1908.6 | 1918.4 | 1905.9 |
| 172.5° | 1922.6 | 1914.3 | 1917.1 | 1926.8 | 1914.3 |
| 175°   | 1929.5 | 1919.7 | 1922.6 | 1932.3 | 1918.4 |
| 177.5° | 1932.3 | 1922.6 | 1924.1 | 1933.8 | 1921.2 |
| 180°   | 1925.4 | 1925.4 | 1925.4 | 1925.4 | 1925.4 |

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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 | 5.66             | 6.41  | 6.73  | 7.48  | 8.94  | 5.23           | 5.98 | 6.30  | 7.05  | 8.50  |
|                 | 3H   | 7.32             | 7.99  | 8.39  | 9.07  | 10.54 | 6.84           | 7.52 | 7.92  | 8.59  | 10.06 |
|                 | 4H   | 7.90             | 8.54  | 8.99  | 9.62  | 11.09 | 7.43           | 8.06 | 8.51  | 9.14  | 10.62 |
|                 | 6H   | 8.29             | 8.88  | 9.39  | 9.96  | 11.45 | 7.82           | 8.41 | 8.91  | 9.49  | 10.98 |
|                 | 8H   | 8.40             | 8.95  | 9.50  | 10.05 | 11.54 | 7.92           | 8.48 | 9.02  | 9.58  | 11.06 |
|                 | 12H  | 8.44             | 8.97  | 9.54  | 10.06 | 11.57 | 7.96           | 8.49 | 9.06  | 9.58  | 11.09 |
| 4H              | 2H   | 6.11             | 6.75  | 7.20  | 7.83  | 9.31  | 5.77           | 6.41 | 6.86  | 7.48  | 8.96  |
|                 | 3H   | 7.97             | 8.50  | 9.07  | 9.61  | 11.10 | 7.58           | 8.11 | 8.68  | 9.21  | 10.70 |
|                 | 4H   | 8.68             | 9.17  | 9.78  | 10.26 | 11.77 | 8.27           | 8.76 | 9.38  | 9.86  | 11.37 |
|                 | 6H   | 9.19             | 9.61  | 10.30 | 10.73 | 12.23 | 8.78           | 9.20 | 9.89  | 10.32 | 11.82 |
|                 | 8H   | 9.34             | 9.73  | 10.45 | 10.84 | 12.36 | 8.92           | 9.32 | 10.04 | 10.43 | 11.95 |
|                 | 12H  | 9.40             | 9.76  | 10.53 | 10.88 | 12.41 | 8.98           | 9.34 | 10.11 | 10.46 | 11.99 |
| 8H              | 4H   | 8.87             | 9.26  | 9.98  | 10.37 | 11.89 | 8.51           | 8.90 | 9.62  | 10.01 | 11.53 |
|                 | 6H   | 9.50             | 9.82  | 10.63 | 10.97 | 12.49 | 9.13           | 9.46 | 10.27 | 10.61 | 12.13 |
|                 | 8H   | 9.72             | 10.00 | 10.86 | 11.13 | 12.67 | 9.35           | 9.63 | 10.49 | 10.76 | 12.30 |
|                 | 12H  | 9.84             | 10.09 | 10.99 | 11.22 | 12.79 | 9.46           | 9.71 | 10.60 | 10.84 | 12.41 |
| 12H             | 4H   | 8.85             | 9.20  | 9.98  | 10.33 | 11.85 | 8.50           | 8.85 | 9.63  | 9.97  | 11.50 |
|                 | 6H   | 9.52             | 9.81  | 10.66 | 10.94 | 12.48 | 9.17           | 9.46 | 10.31 | 10.59 | 12.13 |
|                 | 8H   | 9.76             | 10.01 | 10.91 | 11.14 | 12.71 | 9.41           | 9.65 | 10.55 | 10.78 | 12.36 |