

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: P928350

Luminaire Tested: DFN2DIP-HX4F0-090D040US927-RLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P928350  
REPORT IS A COMBINATION OF REPORTS P900830 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D040US927-RLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

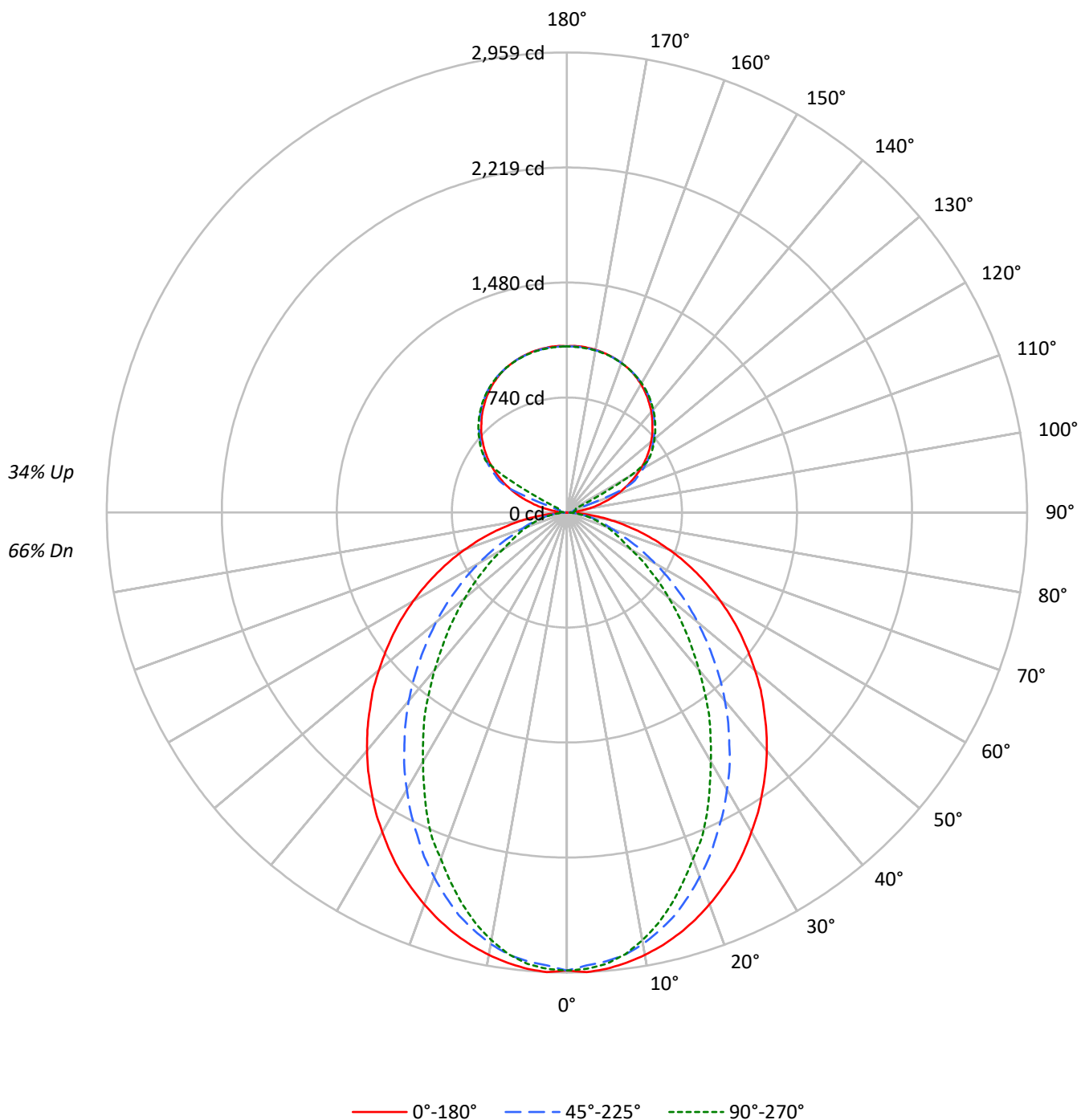
Lumens per Lamp: N/A  
Luminaire Lumens: 9195.1 lumens  
Efficiency: N/A  
Efficacy: 77.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 118.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9821  
Total Harmonic Distortion (THDi): 0.08  
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   | 111 | 111 | 111 | 111 | 104 | 104 | 104 | 104 | 92 | 92 | 92 | 81 | 81 | 81 | 71 | 71 | 71 |
| 1   | 102 | 98  | 94  | 91  | 96  | 92  | 89  | 86  | 82 | 79 | 77 | 72 | 71 | 69 | 64 | 62 | 61 |
| 2   | 93  | 86  | 80  | 75  | 88  | 81  | 76  | 72  | 73 | 68 | 65 | 64 | 61 | 59 | 57 | 54 | 52 |
| 3   | 86  | 76  | 69  | 63  | 80  | 72  | 66  | 61  | 65 | 60 | 55 | 57 | 54 | 50 | 51 | 48 | 45 |
| 4   | 79  | 68  | 60  | 54  | 74  | 65  | 58  | 52  | 58 | 52 | 48 | 52 | 47 | 44 | 46 | 42 | 40 |
| 5   | 73  | 61  | 53  | 47  | 68  | 58  | 51  | 45  | 52 | 46 | 42 | 47 | 42 | 38 | 42 | 38 | 35 |
| 6   | 67  | 55  | 47  | 41  | 63  | 52  | 45  | 40  | 47 | 41 | 37 | 43 | 38 | 34 | 38 | 34 | 31 |
| 7   | 62  | 50  | 42  | 37  | 59  | 48  | 40  | 35  | 43 | 37 | 33 | 39 | 34 | 30 | 35 | 31 | 28 |
| 8   | 58  | 46  | 38  | 33  | 55  | 44  | 37  | 32  | 40 | 34 | 29 | 36 | 31 | 27 | 32 | 28 | 25 |
| 9   | 54  | 42  | 35  | 29  | 51  | 40  | 33  | 29  | 37 | 31 | 27 | 33 | 28 | 25 | 30 | 26 | 23 |
| 10  | 51  | 39  | 32  | 27  | 48  | 37  | 30  | 26  | 34 | 28 | 24 | 31 | 26 | 23 | 28 | 24 | 21 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2191 | 2191 | 2191 |
| 5°  | 2194 | 2156 | 2170 |
| 10° | 2173 | 2114 | 2099 |
| 15° | 2143 | 2044 | 1990 |
| 20° | 2104 | 1948 | 1856 |
| 25° | 2063 | 1840 | 1727 |
| 30° | 2009 | 1730 | 1563 |
| 35° | 1956 | 1611 | 1419 |
| 40° | 1902 | 1488 | 1254 |
| 45° | 1839 | 1351 | 1104 |
| 50° | 1774 | 1214 | 958  |
| 55° | 1706 | 1066 | 817  |
| 60° | 1628 | 912  | 673  |
| 65° | 1538 | 756  | 606  |
| 70° | 1428 | 610  | 548  |
| 75° | 1291 | 538  | 499  |
| 80° | 1092 | 452  | 433  |
| 85° | 763  | 303  | 326  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1839 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 276.1  | 3.0       |
| 10°-20°   | 758.0  | 8.2       |
| 20°-30°   | 1064.1 | 11.6      |
| 30°-40°   | 1160.0 | 12.6      |
| 40°-50°   | 1066.2 | 11.6      |
| 50°-60°   | 837.3  | 9.1       |
| 60°-70°   | 545.0  | 5.9       |
| 70°-80°   | 280.5  | 3.1       |
| 80°-90°   | 73.5   | 0.8       |
| 90°-100°  | 35.2   | 0.4       |
| 100°-110° | 131.4  | 1.4       |
| 110°-120° | 348.6  | 3.8       |
| 120°-130° | 578.1  | 6.3       |
| 130°-140° | 614.1  | 6.7       |
| 140°-150° | 570.7  | 6.2       |
| 150°-160° | 458.8  | 5.0       |
| 160°-170° | 295.7  | 3.2       |
| 170°-180° | 101.8  | 1.1       |
| 0°-30°    | 2098.2 | 22.8      |
| 0°-40°    | 3258.2 | 35.4      |
| 0°-60°    | 5161.6 | 56.1      |
| 0°-90°    | 6060.7 | 65.9      |
| 90°-120°  | 515.2  | 5.6       |
| 90°-150°  | 2278.1 | 24.8      |
| 90°-180°  | 3134.0 | 34.1      |
| 0°-180°   | 9195.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2946 | 2946  | 2946 | 2946  | 2946 |      |
| 5°   | 2946 | 2933  | 2898 | 2922  | 2914 | 279  |
| 15°  | 2802 | 2773  | 2682 | 2631  | 2605 | 790  |
| 25°  | 2544 | 2458  | 2282 | 2173  | 2133 | 1170 |
| 35°  | 2192 | 2056  | 1821 | 1653  | 1594 | 1372 |
| 45°  | 1792 | 1613  | 1333 | 1144  | 1080 | 1384 |
| 55°  | 1362 | 1154  | 866  | 707   | 656  | 1217 |
| 65°  | 920  | 704   | 464  | 373   | 365  | 912  |
| 75°  | 490  | 304   | 213  | 195   | 192  | 519  |
| 85°  | 114  | 58    | 51   | 51    | 51   | 131  |
| 90°  | 1    | 9     | 15   | 19    | 21   | 9    |
| 95°  | 50   | 25    | 30   | 34    | 33   | 59   |
| 105° | 235  | 258   | 47   | 56    | 59   | 251  |
| 115° | 445  | 458   | 477  | 119   | 64   | 438  |
| 125° | 629  | 639   | 654  | 659   | 662  | 561  |
| 135° | 778  | 791   | 798  | 805   | 804  | 601  |
| 145° | 903  | 902   | 915  | 921   | 917  | 565  |
| 155° | 994  | 987   | 996  | 1001  | 995  | 458  |
| 165° | 1048 | 1043  | 1045 | 1051  | 1045 | 296  |
| 175° | 1071 | 1066  | 1068 | 1073  | 1065 | 102  |
| 180° | 1069 | 1069  | 1069 | 1069  | 1069 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2946.0 | 2946.0 | 2946.0 | 2946.0 | 2946.0 |
| 2.5°   | 2959.3 | 2946.0 | 2916.5 | 2943.5 | 2938.1 |
| 5°     | 2946.0 | 2932.7 | 2897.9 | 2921.9 | 2914.0 |
| 7.5°   | 2921.9 | 2906.1 | 2868.8 | 2879.2 | 2865.9 |
| 10°    | 2890.0 | 2871.3 | 2818.2 | 2809.9 | 2794.1 |
| 12.5°  | 2850.1 | 2826.1 | 2753.9 | 2738.1 | 2708.6 |
| 15°    | 2802.0 | 2772.6 | 2682.1 | 2631.4 | 2604.9 |
| 17.5°  | 2746.0 | 2703.3 | 2591.3 | 2532.7 | 2490.0 |
| 20°    | 2682.1 | 2628.6 | 2495.4 | 2428.9 | 2370.1 |
| 22.5°  | 2612.8 | 2551.4 | 2396.7 | 2306.1 | 2266.3 |
| 25°    | 2543.5 | 2458.1 | 2282.1 | 2172.9 | 2132.8 |
| 27.5°  | 2460.9 | 2370.1 | 2175.5 | 2050.2 | 1988.8 |
| 30°    | 2372.9 | 2271.4 | 2058.1 | 1922.3 | 1850.2 |
| 32.5°  | 2287.5 | 2164.7 | 1946.3 | 1786.3 | 1719.5 |
| 35°    | 2191.6 | 2055.6 | 1821.0 | 1653.1 | 1594.2 |
| 37.5°  | 2098.2 | 1951.5 | 1703.7 | 1519.5 | 1453.1 |
| 40°    | 1999.6 | 1839.7 | 1580.9 | 1391.7 | 1322.4 |
| 42.5°  | 1898.3 | 1727.7 | 1458.4 | 1261.0 | 1194.5 |
| 45°    | 1791.7 | 1612.9 | 1333.1 | 1143.6 | 1079.7 |
| 47.5°  | 1690.4 | 1501.2 | 1213.2 | 1023.7 | 965.1  |
| 50°    | 1578.4 | 1389.1 | 1095.8 | 911.7  | 855.9  |
| 52.5°  | 1468.9 | 1268.9 | 983.8  | 807.8  | 757.2  |
| 55°    | 1362.2 | 1154.3 | 866.4  | 706.6  | 655.9  |
| 57.5°  | 1253.1 | 1039.8 | 762.6  | 613.2  | 570.6  |
| 60°    | 1141.0 | 927.7  | 653.2  | 517.3  | 474.6  |
| 62.5°  | 1031.9 | 818.6  | 559.8  | 432.0  | 410.7  |
| 65°    | 919.8  | 703.8  | 463.9  | 373.3  | 365.2  |
| 67.5°  | 813.2  | 597.1  | 373.3  | 327.8  | 319.9  |
| 70°    | 701.2  | 493.3  | 309.2  | 282.6  | 271.8  |
| 72.5°  | 594.6  | 397.1  | 258.5  | 237.3  | 232.0  |
| 75°    | 490.5  | 303.8  | 213.3  | 194.6  | 192.1  |
| 77.5°  | 386.7  | 215.8  | 168.0  | 157.3  | 151.9  |
| 80°    | 290.5  | 154.8  | 127.8  | 117.4  | 117.4  |
| 82.5°  | 202.5  | 104.1  | 88.0   | 82.6   | 82.6   |
| 85°    | 114.5  | 58.5   | 50.6   | 50.6   | 50.6   |
| 87.5°  | 42.7   | 21.2   | 21.2   | 18.7   | 18.7   |
| 90°    | 0.7    | 9.3    | 15.4   | 19.4   | 20.8   |
| 92.5°  | 19.4   | 16.2   | 18.5   | 20.1   | 20.8   |
| 95°    | 50.2   | 24.7   | 30.1   | 34.1   | 33.3   |
| 97.5°  | 90.5   | 27.1   | 39.4   | 41.8   | 42.5   |
| 100°   | 136.9  | 31.0   | 44.1   | 50.2   | 51.8   |
| 102.5° | 187.9  | 186.5  | 45.6   | 54.1   | 56.5   |
| 105°   | 235.1  | 258.4  | 47.2   | 55.7   | 58.8   |
| 107.5° | 290.1  | 309.4  | 48.8   | 57.3   | 60.4   |
| 110°   | 342.8  | 358.9  | 135.4  | 58.1   | 61.1   |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 392.3  | 406.1  | 393.0  | 59.6   | 61.9   |
| 115°   | 444.8  | 457.9  | 477.3  | 119.1  | 63.5   |
| 117.5° | 490.5  | 505.9  | 519.2  | 408.4  | 205.8  |
| 120°   | 541.6  | 553.1  | 567.1  | 576.4  | 472.0  |
| 122.5° | 584.8  | 597.2  | 612.8  | 617.4  | 618.2  |
| 125°   | 628.9  | 639.1  | 653.7  | 659.2  | 661.5  |
| 127.5° | 669.2  | 680.0  | 691.7  | 699.4  | 700.1  |
| 130°   | 707.1  | 719.5  | 727.9  | 736.5  | 735.8  |
| 132.5° | 745.7  | 755.9  | 764.4  | 771.3  | 770.6  |
| 135°   | 778.3  | 790.7  | 797.6  | 805.4  | 803.9  |
| 137.5° | 812.3  | 821.5  | 829.4  | 837.1  | 834.8  |
| 140°   | 845.5  | 851.8  | 860.3  | 867.2  | 863.4  |
| 142.5° | 873.5  | 878.9  | 888.9  | 895.0  | 891.2  |
| 145°   | 902.9  | 902.1  | 915.2  | 920.6  | 916.7  |
| 147.5° | 928.3  | 926.0  | 939.2  | 943.0  | 940.0  |
| 150°   | 953.1  | 947.7  | 960.1  | 964.7  | 960.9  |
| 152.5° | 974.0  | 967.8  | 979.4  | 984.1  | 978.7  |
| 155°   | 994.1  | 987.2  | 996.5  | 1001.1 | 994.9  |
| 157.5° | 1010.4 | 1004.2 | 1011.2 | 1016.6 | 1010.4 |
| 160°   | 1024.3 | 1019.6 | 1024.3 | 1028.9 | 1023.5 |
| 162.5° | 1036.6 | 1032.1 | 1035.9 | 1041.3 | 1034.4 |
| 165°   | 1047.5 | 1042.9 | 1045.2 | 1050.6 | 1045.2 |
| 167.5° | 1056.1 | 1051.3 | 1053.8 | 1059.1 | 1052.2 |
| 170°   | 1063.0 | 1058.3 | 1059.9 | 1065.3 | 1058.3 |
| 172.5° | 1067.6 | 1063.0 | 1064.6 | 1070.0 | 1063.0 |
| 175°   | 1071.4 | 1066.0 | 1067.6 | 1073.0 | 1065.3 |
| 177.5° | 1073.0 | 1067.6 | 1068.4 | 1073.9 | 1066.9 |
| 180°   | 1069.2 | 1069.2 | 1069.2 | 1069.2 | 1069.2 |

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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 | 11.24            | 12.22 | 12.06 | 13.05 | 14.08 | 7.22           | 8.19  | 8.03  | 9.03  | 10.05 |
|                 | 3H   | 12.93            | 13.81 | 13.76 | 14.65 | 15.71 | 8.42           | 9.29  | 9.25  | 10.13 | 11.19 |
|                 | 4H   | 13.55            | 14.37 | 14.39 | 15.22 | 16.29 | 8.88           | 9.70  | 9.72  | 10.55 | 11.62 |
|                 | 6H   | 13.98            | 14.74 | 14.84 | 15.60 | 16.68 | 9.21           | 9.97  | 10.06 | 10.82 | 11.90 |
|                 | 8H   | 14.11            | 14.83 | 14.97 | 15.71 | 16.79 | 9.30           | 10.03 | 10.17 | 10.90 | 11.98 |
|                 | 12H  | 14.18            | 14.87 | 15.05 | 15.73 | 16.84 | 9.35           | 10.04 | 10.22 | 10.91 | 12.01 |
| 4H              | 2H   | 11.28            | 12.11 | 12.13 | 12.95 | 14.02 | 7.83           | 8.66  | 8.68  | 9.50  | 10.57 |
|                 | 3H   | 13.12            | 13.81 | 13.98 | 14.69 | 15.77 | 9.20           | 9.88  | 10.06 | 10.76 | 11.85 |
|                 | 4H   | 13.82            | 14.45 | 14.69 | 15.32 | 16.43 | 9.75           | 10.37 | 10.62 | 11.25 | 12.36 |
|                 | 6H   | 14.35            | 14.88 | 15.23 | 15.79 | 16.90 | 10.18          | 10.72 | 11.07 | 11.62 | 12.73 |
|                 | 8H   | 14.52            | 15.03 | 15.42 | 15.92 | 17.05 | 10.31          | 10.81 | 11.20 | 11.71 | 12.84 |
|                 | 12H  | 14.63            | 15.08 | 15.54 | 16.00 | 17.13 | 10.39          | 10.84 | 11.30 | 11.75 | 12.88 |
| 8H              | 4H   | 13.80            | 14.30 | 14.69 | 15.20 | 16.33 | 10.04          | 10.54 | 10.93 | 11.44 | 12.57 |
|                 | 6H   | 14.37            | 14.79 | 15.29 | 15.73 | 16.85 | 10.57          | 10.98 | 11.49 | 11.92 | 13.05 |
|                 | 8H   | 14.59            | 14.96 | 15.52 | 15.89 | 17.03 | 10.76          | 11.13 | 11.69 | 12.06 | 13.20 |
|                 | 12H  | 14.74            | 15.06 | 15.67 | 15.99 | 17.18 | 10.89          | 11.21 | 11.82 | 12.14 | 13.33 |
| 12H             | 4H   | 13.76            | 14.21 | 14.67 | 15.13 | 16.26 | 10.05          | 10.51 | 10.96 | 11.42 | 12.55 |
|                 | 6H   | 14.35            | 14.72 | 15.28 | 15.65 | 16.79 | 10.62          | 10.99 | 11.55 | 11.92 | 13.06 |
|                 | 8H   | 14.58            | 14.90 | 15.51 | 15.83 | 17.02 | 10.84          | 11.16 | 11.77 | 12.08 | 13.28 |