

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: P910923

Luminaire Tested: DFN2DIP-HX4F0-060D120US850-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P910923  
REPORT IS A COMBINATION OF REPORTS P899448 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-060D120US850-RLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

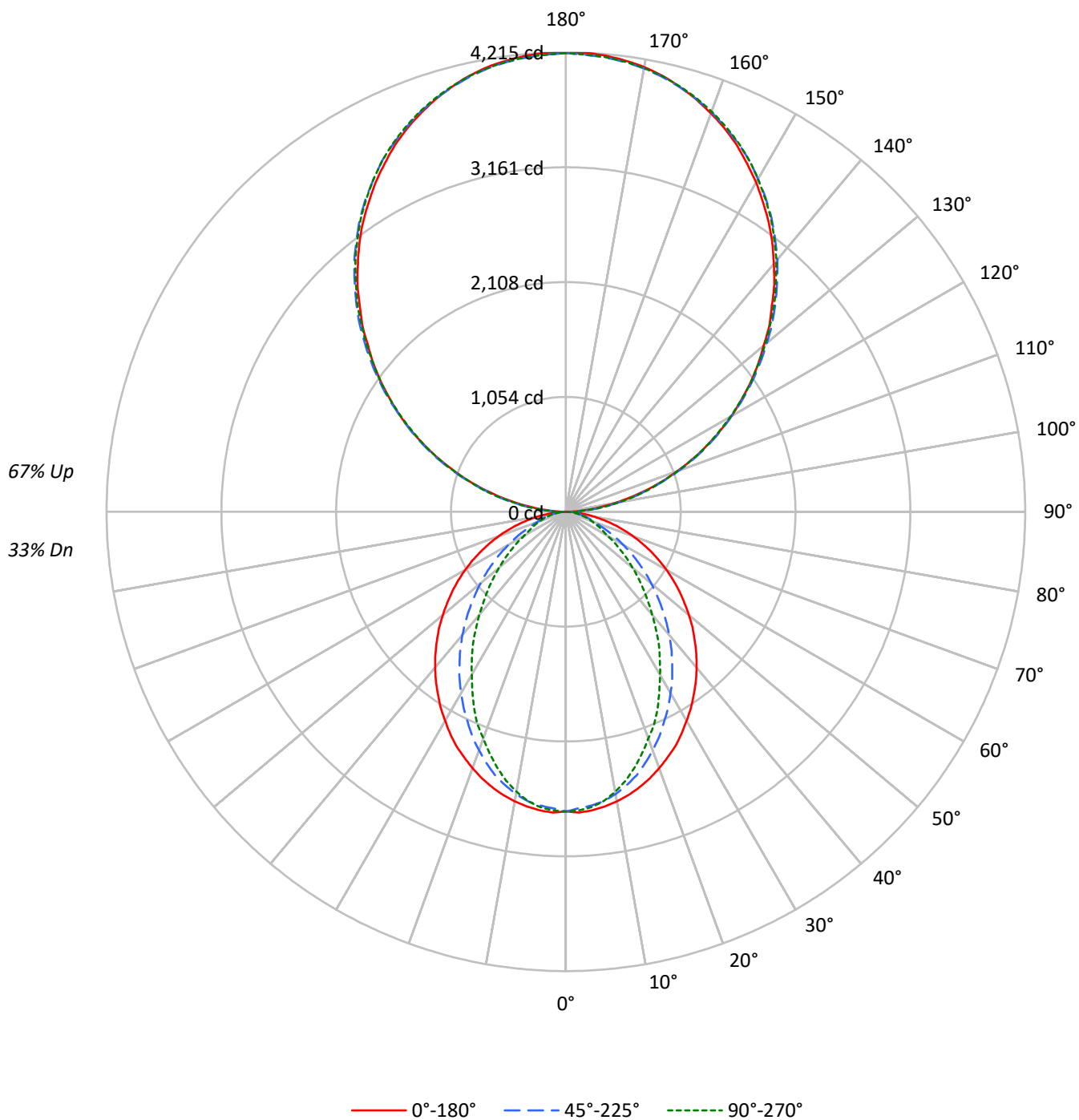
Lumens per Lamp: N/A  
Luminaire Lumens: 17433.5 lumens  
Efficiency: N/A  
Efficacy: 136.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 127.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.099  
Total Harmonic Distortion (THDi): 0.979  
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   | 103 | 103 | 103 | 103 | 93 | 93 | 93 | 93 | 74 | 74 | 74 | 56 | 56 | 56 | 40 | 40 | 40 |
| 1   | 94  | 90  | 86  | 83  | 85 | 81 | 78 | 75 | 65 | 63 | 61 | 50 | 48 | 47 | 36 | 35 | 34 |
| 2   | 86  | 79  | 73  | 68  | 77 | 71 | 67 | 62 | 57 | 54 | 51 | 44 | 42 | 40 | 32 | 31 | 29 |
| 3   | 79  | 70  | 63  | 57  | 71 | 63 | 57 | 52 | 51 | 46 | 43 | 39 | 36 | 34 | 29 | 27 | 25 |
| 4   | 72  | 62  | 54  | 49  | 65 | 56 | 50 | 45 | 45 | 41 | 37 | 35 | 32 | 29 | 26 | 24 | 22 |
| 5   | 66  | 55  | 47  | 42  | 59 | 50 | 43 | 38 | 40 | 36 | 32 | 32 | 28 | 26 | 23 | 21 | 19 |
| 6   | 61  | 49  | 42  | 36  | 55 | 45 | 38 | 33 | 36 | 32 | 28 | 29 | 25 | 23 | 21 | 19 | 17 |
| 7   | 56  | 45  | 37  | 32  | 51 | 41 | 34 | 29 | 33 | 28 | 25 | 26 | 23 | 20 | 19 | 17 | 15 |
| 8   | 52  | 40  | 33  | 28  | 47 | 37 | 30 | 26 | 30 | 25 | 22 | 24 | 20 | 18 | 18 | 16 | 14 |
| 9   | 49  | 37  | 30  | 25  | 44 | 34 | 27 | 23 | 28 | 23 | 20 | 22 | 19 | 16 | 17 | 14 | 13 |
| 10  | 45  | 34  | 27  | 22  | 41 | 31 | 25 | 21 | 25 | 21 | 18 | 20 | 17 | 15 | 15 | 13 | 11 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2045 | 2045 | 2045 |
| 5°  | 2048 | 2013 | 2025 |
| 10° | 2028 | 1973 | 1960 |
| 15° | 2000 | 1908 | 1858 |
| 20° | 1964 | 1819 | 1733 |
| 25° | 1926 | 1718 | 1612 |
| 30° | 1875 | 1615 | 1459 |
| 35° | 1826 | 1504 | 1325 |
| 40° | 1775 | 1389 | 1170 |
| 45° | 1717 | 1262 | 1031 |
| 50° | 1656 | 1133 | 894  |
| 55° | 1593 | 996  | 763  |
| 60° | 1520 | 852  | 628  |
| 65° | 1436 | 706  | 566  |
| 70° | 1333 | 569  | 512  |
| 75° | 1205 | 502  | 466  |
| 80° | 1020 | 422  | 405  |
| 85° | 713  | 282  | 304  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 3173 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 257.7   | 1.5       |
| 10°-20°   | 707.6   | 4.1       |
| 20°-30°   | 993.4   | 5.7       |
| 30°-40°   | 1082.8  | 6.2       |
| 40°-50°   | 995.2   | 5.7       |
| 50°-60°   | 781.6   | 4.5       |
| 60°-70°   | 508.8   | 2.9       |
| 70°-80°   | 261.9   | 1.5       |
| 80°-90°   | 78.8    | 0.5       |
| 90°-100°  | 260.4   | 1.5       |
| 100°-110° | 827.5   | 4.7       |
| 110°-120° | 1416.1  | 8.1       |
| 120°-130° | 1862.4  | 10.7      |
| 130°-140° | 2090.5  | 12.0      |
| 140°-150° | 2050.0  | 11.8      |
| 150°-160° | 1719.6  | 9.9       |
| 160°-170° | 1140.4  | 6.5       |
| 170°-180° | 398.6   | 2.3       |
| 0°-30°    | 1958.7  | 11.2      |
| 0°-40°    | 3041.5  | 17.4      |
| 0°-60°    | 4818.4  | 27.6      |
| 0°-90°    | 5667.9  | 32.5      |
| 90°-120°  | 2504.0  | 14.4      |
| 90°-150°  | 8506.9  | 48.8      |
| 90°-180°  | 11766.0 | 67.5      |
| 0°-180°   | 17433.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2750 | 2750  | 2750 | 2750  | 2750 |      |
| 5°   | 2750 | 2738  | 2705 | 2728  | 2720 | 261  |
| 15°  | 2616 | 2588  | 2504 | 2456  | 2432 | 737  |
| 25°  | 2374 | 2295  | 2130 | 2028  | 1991 | 1092 |
| 35°  | 2046 | 1919  | 1700 | 1543  | 1488 | 1281 |
| 45°  | 1672 | 1506  | 1244 | 1068  | 1008 | 1292 |
| 55°  | 1272 | 1078  | 809  | 660   | 612  | 1136 |
| 65°  | 859  | 657   | 433  | 349   | 341  | 851  |
| 75°  | 458  | 284   | 199  | 182   | 179  | 484  |
| 85°  | 107  | 55    | 47   | 47    | 47   | 123  |
| 90°  | 4    | 46    | 124  | 117   | 120  | 17   |
| 95°  | 185  | 221   | 227  | 227   | 221  | 206  |
| 105° | 764  | 774   | 782  | 788   | 788  | 806  |
| 115° | 1421 | 1442  | 1435 | 1431  | 1421 | 1406 |
| 125° | 2067 | 2099  | 2089 | 2077  | 2073 | 1847 |
| 135° | 2674 | 2713  | 2720 | 2717  | 2706 | 2066 |
| 145° | 3246 | 3271  | 3291 | 3295  | 3281 | 2028 |
| 155° | 3711 | 3722  | 3733 | 3751  | 3739 | 1708 |
| 165° | 4038 | 4034  | 4034 | 4059  | 4041 | 1139 |
| 175° | 4201 | 4191  | 4184 | 4209  | 4187 | 399  |
| 180° | 4209 | 4209  | 4209 | 4209  | 4209 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2750.1 | 2750.1 | 2750.1 | 2750.1 | 2750.1 |
| 2.5°   | 2762.5 | 2750.1 | 2722.6 | 2747.7 | 2742.7 |
| 5°     | 2750.1 | 2737.7 | 2705.2 | 2727.7 | 2720.3 |
| 7.5°   | 2727.7 | 2712.8 | 2678.0 | 2687.8 | 2675.4 |
| 10°    | 2697.8 | 2680.3 | 2630.8 | 2623.1 | 2608.3 |
| 12.5°  | 2660.6 | 2638.1 | 2570.8 | 2556.0 | 2528.5 |
| 15°    | 2615.7 | 2588.2 | 2503.7 | 2456.4 | 2431.6 |
| 17.5°  | 2563.5 | 2523.5 | 2419.0 | 2364.3 | 2324.5 |
| 20°    | 2503.7 | 2453.8 | 2329.5 | 2267.4 | 2212.5 |
| 22.5°  | 2439.0 | 2381.7 | 2237.3 | 2152.8 | 2115.5 |
| 25°    | 2374.4 | 2294.6 | 2130.4 | 2028.5 | 1991.0 |
| 27.5°  | 2297.3 | 2212.5 | 2030.8 | 1913.8 | 1856.6 |
| 30°    | 2215.1 | 2120.3 | 1921.2 | 1794.5 | 1727.2 |
| 32.5°  | 2135.4 | 2020.8 | 1817.0 | 1667.5 | 1605.2 |
| 35°    | 2045.9 | 1918.9 | 1700.0 | 1543.1 | 1488.2 |
| 37.5°  | 1958.7 | 1821.6 | 1590.4 | 1418.5 | 1356.4 |
| 40°    | 1866.6 | 1717.4 | 1475.7 | 1299.1 | 1234.4 |
| 42.5°  | 1772.1 | 1612.8 | 1361.4 | 1177.1 | 1115.1 |
| 45°    | 1672.5 | 1505.6 | 1244.5 | 1067.5 | 1007.9 |
| 47.5°  | 1578.0 | 1401.3 | 1132.5 | 955.6  | 901.0  |
| 50°    | 1473.4 | 1296.8 | 1022.9 | 851.0  | 799.0  |
| 52.5°  | 1371.2 | 1184.5 | 918.4  | 754.1  | 706.9  |
| 55°    | 1271.7 | 1077.6 | 808.8  | 659.6  | 612.3  |
| 57.5°  | 1169.8 | 970.6  | 711.9  | 572.5  | 532.5  |
| 60°    | 1065.2 | 866.1  | 609.7  | 483.0  | 443.0  |
| 62.5°  | 963.3  | 764.2  | 522.6  | 403.2  | 383.4  |
| 65°    | 858.7  | 657.0  | 433.1  | 348.6  | 340.9  |
| 67.5°  | 759.1  | 557.4  | 348.6  | 306.1  | 298.7  |
| 70°    | 654.5  | 460.5  | 288.6  | 263.8  | 253.7  |
| 72.5°  | 555.1  | 370.7  | 241.3  | 221.6  | 216.5  |
| 75°    | 457.9  | 283.6  | 199.1  | 181.7  | 179.3  |
| 77.5°  | 361.0  | 201.5  | 156.8  | 146.8  | 141.8  |
| 80°    | 271.2  | 144.4  | 119.3  | 109.6  | 109.6  |
| 82.5°  | 189.1  | 97.1   | 82.1   | 77.1   | 77.1   |
| 85°    | 106.9  | 54.7   | 47.2   | 47.2   | 47.2   |
| 87.5°  | 39.9   | 19.9   | 19.9   | 17.4   | 17.4   |
| 90°    | 3.8    | 45.7   | 124.3  | 116.8  | 120.5  |
| 92.5°  | 78.6   | 106.6  | 110.3  | 114.2  | 114.2  |
| 95°    | 185.2  | 220.8  | 227.1  | 227.1  | 220.8  |
| 97.5°  | 308.3  | 341.4  | 355.3  | 355.3  | 355.3  |
| 100°   | 450.5  | 479.6  | 489.7  | 489.7  | 486.0  |
| 102.5° | 600.2  | 621.7  | 635.7  | 639.6  | 635.7  |
| 105°   | 763.9  | 774.0  | 781.6  | 787.9  | 787.9  |
| 107.5° | 926.2  | 941.5  | 941.5  | 944.0  | 926.2  |
| 110°   | 1083.6 | 1103.9 | 1103.9 | 1103.9 | 1093.8 |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1253.6 | 1275.2 | 1271.4 | 1261.3 | 1253.6 |
| 115°   | 1421.1 | 1441.5 | 1435.0 | 1431.3 | 1421.1 |
| 117.5° | 1587.3 | 1615.3 | 1597.5 | 1587.3 | 1577.2 |
| 120°   | 1754.9 | 1782.7 | 1754.9 | 1754.9 | 1743.5 |
| 122.5° | 1907.1 | 1942.6 | 1924.9 | 1914.7 | 1907.1 |
| 125°   | 2067.0 | 2098.7 | 2088.6 | 2077.2 | 2073.3 |
| 127.5° | 2223.1 | 2262.4 | 2248.4 | 2233.2 | 2223.1 |
| 130°   | 2368.9 | 2414.6 | 2408.3 | 2400.7 | 2386.7 |
| 132.5° | 2532.6 | 2568.2 | 2570.7 | 2552.9 | 2542.8 |
| 135°   | 2673.5 | 2712.8 | 2720.5 | 2716.6 | 2706.5 |
| 137.5° | 2830.8 | 2862.6 | 2868.9 | 2866.3 | 2851.1 |
| 140°   | 2969.1 | 3000.8 | 3018.6 | 3018.6 | 3004.6 |
| 142.5° | 3111.3 | 3143.0 | 3153.1 | 3156.9 | 3143.0 |
| 145°   | 3245.7 | 3271.1 | 3291.4 | 3295.3 | 3281.3 |
| 147.5° | 3366.3 | 3398.0 | 3413.3 | 3419.6 | 3405.6 |
| 150°   | 3490.7 | 3512.2 | 3526.2 | 3537.6 | 3526.2 |
| 152.5° | 3601.0 | 3622.5 | 3640.4 | 3654.4 | 3640.4 |
| 155°   | 3711.4 | 3721.6 | 3733.0 | 3750.7 | 3739.3 |
| 157.5° | 3806.6 | 3814.2 | 3820.5 | 3845.9 | 3828.2 |
| 160°   | 3891.6 | 3899.2 | 3903.0 | 3924.6 | 3909.3 |
| 162.5° | 3970.2 | 3970.2 | 3974.1 | 3998.2 | 3980.4 |
| 165°   | 4037.5 | 4033.8 | 4033.8 | 4059.1 | 4041.3 |
| 167.5° | 4098.4 | 4087.0 | 4087.0 | 4112.4 | 4094.6 |
| 170°   | 4144.1 | 4133.9 | 4130.1 | 4155.5 | 4133.9 |
| 172.5° | 4175.8 | 4165.6 | 4161.9 | 4187.3 | 4165.6 |
| 175°   | 4201.2 | 4191.0 | 4183.5 | 4208.8 | 4187.3 |
| 177.5° | 4215.2 | 4205.0 | 4197.3 | 4219.0 | 4197.3 |
| 180°   | 4208.8 | 4208.8 | 4208.8 | 4208.8 | 4208.8 |

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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 | 7.73             | 8.44  | 8.83  | 9.53  | 11.03 | 3.71           | 4.41 | 4.80 | 5.50 | 7.01  |
|                 | 3H   | 9.40             | 10.03 | 10.51 | 11.13 | 12.65 | 4.89           | 5.52 | 5.99 | 6.62 | 8.14  |
|                 | 4H   | 10.00            | 10.60 | 11.12 | 11.70 | 13.23 | 5.33           | 5.93 | 6.45 | 7.03 | 8.56  |
|                 | 6H   | 10.42            | 10.97 | 11.55 | 12.08 | 13.61 | 5.65           | 6.20 | 6.77 | 7.30 | 8.84  |
|                 | 8H   | 10.54            | 11.07 | 11.67 | 12.19 | 13.72 | 5.74           | 6.26 | 6.87 | 7.38 | 8.91  |
|                 | 12H  | 10.60            | 11.10 | 11.74 | 12.21 | 13.77 | 5.78           | 6.27 | 6.91 | 7.39 | 8.94  |
| 4H              | 2H   | 7.73             | 8.33  | 8.86  | 9.44  | 10.96 | 4.29           | 4.88 | 5.41 | 5.99 | 7.51  |
|                 | 3H   | 9.55             | 10.05 | 10.68 | 11.18 | 12.72 | 5.63           | 6.12 | 6.76 | 7.25 | 8.79  |
|                 | 4H   | 10.24            | 10.70 | 11.38 | 11.82 | 13.38 | 6.17           | 6.63 | 7.31 | 7.75 | 9.30  |
|                 | 6H   | 10.75            | 11.14 | 11.89 | 12.28 | 13.83 | 6.59           | 6.98 | 7.73 | 8.12 | 9.67  |
|                 | 8H   | 10.92            | 11.29 | 12.06 | 12.42 | 13.99 | 6.71           | 7.08 | 7.85 | 8.21 | 9.78  |
|                 | 12H  | 11.01            | 11.35 | 12.17 | 12.49 | 14.06 | 6.77           | 7.10 | 7.93 | 8.25 | 9.82  |
| 8H              | 4H   | 10.20            | 10.57 | 11.34 | 11.70 | 13.26 | 6.44           | 6.81 | 7.58 | 7.94 | 9.51  |
|                 | 6H   | 10.76            | 11.06 | 11.92 | 12.24 | 13.80 | 6.96           | 7.26 | 8.12 | 8.43 | 10.00 |
|                 | 8H   | 10.98            | 11.24 | 12.15 | 12.40 | 13.98 | 7.15           | 7.41 | 8.32 | 8.57 | 10.15 |
|                 | 12H  | 11.11            | 11.35 | 12.28 | 12.50 | 14.11 | 7.27           | 7.50 | 8.44 | 8.65 | 10.27 |
| 12H             | 4H   | 10.15            | 10.48 | 11.30 | 11.62 | 13.19 | 6.44           | 6.77 | 7.60 | 7.92 | 9.49  |
|                 | 6H   | 10.74            | 11.00 | 11.91 | 12.16 | 13.74 | 7.01           | 7.27 | 8.17 | 8.43 | 10.01 |
|                 | 8H   | 10.95            | 11.19 | 12.12 | 12.34 | 13.95 | 7.21           | 7.45 | 8.38 | 8.60 | 10.21 |