

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: P904638

Luminaire Tested: DFN2DIP-TR4F0-060D100US830-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P904638  
REPORT IS A COMBINATION OF REPORTS P900481 AND P897293  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-060D100US830-FLLFLL  
Description: 4 foot, Triangle Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

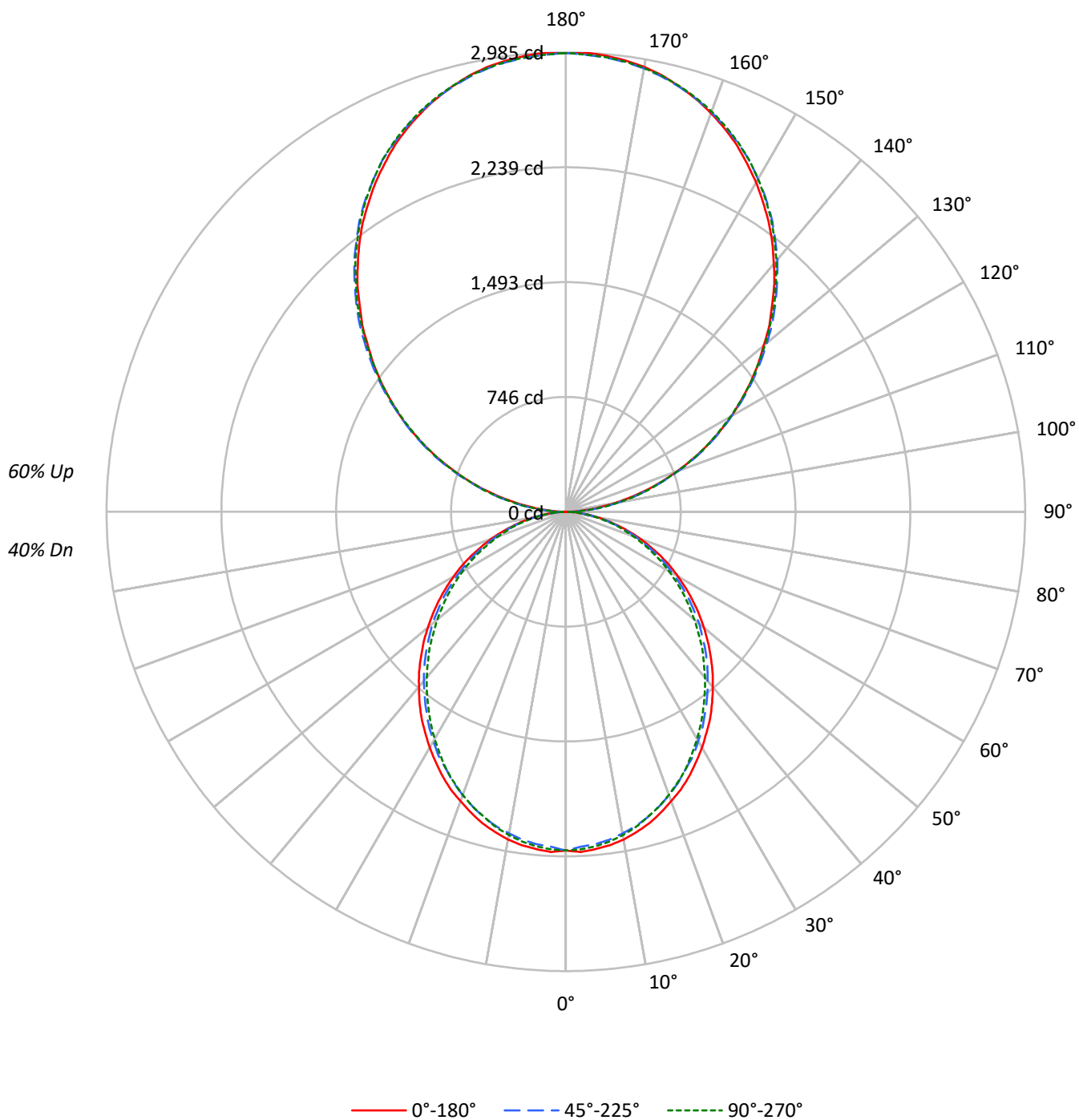
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 13940.2 lumens  
Efficiency: N/A  
Efficacy: 107.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: General Diffuse  
  
Input Watts (W): 129.7  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9781  
Total Harmonic Distortion (THDi): 0.075  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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CATALOG NUMBER: DFN2DIP-TR4F0-060D100US830-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P904638

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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   | 105 | 105 | 105 | 105 | 95 | 95 | 95 | 95 | 78 | 78 | 78 | 62 | 62 | 62 | 47 | 47 | 47 |
| 1   | 96  | 91  | 87  | 84  | 87 | 83 | 80 | 77 | 68 | 66 | 64 | 54 | 53 | 51 | 42 | 41 | 40 |
| 2   | 87  | 80  | 74  | 69  | 79 | 73 | 68 | 63 | 60 | 56 | 53 | 48 | 45 | 43 | 37 | 35 | 33 |
| 3   | 79  | 70  | 63  | 57  | 72 | 64 | 58 | 53 | 53 | 48 | 44 | 42 | 39 | 36 | 32 | 30 | 28 |
| 4   | 73  | 62  | 54  | 48  | 66 | 57 | 50 | 45 | 47 | 42 | 38 | 38 | 34 | 31 | 29 | 27 | 25 |
| 5   | 67  | 55  | 47  | 41  | 60 | 51 | 44 | 38 | 42 | 37 | 33 | 34 | 30 | 27 | 26 | 23 | 21 |
| 6   | 61  | 49  | 41  | 36  | 56 | 45 | 38 | 33 | 38 | 32 | 28 | 30 | 27 | 24 | 24 | 21 | 19 |
| 7   | 57  | 45  | 37  | 31  | 51 | 41 | 34 | 29 | 34 | 29 | 25 | 28 | 24 | 21 | 22 | 19 | 17 |
| 8   | 52  | 40  | 33  | 28  | 48 | 37 | 30 | 26 | 31 | 26 | 22 | 25 | 21 | 18 | 20 | 17 | 15 |
| 9   | 49  | 37  | 29  | 24  | 44 | 34 | 27 | 23 | 28 | 23 | 20 | 23 | 19 | 17 | 18 | 16 | 14 |
| 10  | 46  | 34  | 27  | 22  | 41 | 31 | 25 | 20 | 26 | 21 | 18 | 21 | 18 | 15 | 17 | 14 | 12 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1748 | 1748 | 1748 |
| 5°  | 1751 | 1724 | 1735 |
| 10° | 1737 | 1700 | 1712 |
| 15° | 1711 | 1673 | 1675 |
| 20° | 1677 | 1634 | 1637 |
| 25° | 1642 | 1587 | 1594 |
| 30° | 1600 | 1544 | 1538 |
| 35° | 1559 | 1493 | 1480 |
| 40° | 1508 | 1441 | 1424 |
| 45° | 1459 | 1389 | 1367 |
| 50° | 1404 | 1335 | 1302 |
| 55° | 1347 | 1272 | 1241 |
| 60° | 1282 | 1198 | 1171 |
| 65° | 1211 | 1121 | 1089 |
| 70° | 1121 | 1027 | 1001 |
| 75° | 997  | 914  | 920  |
| 80° | 847  | 770  | 764  |
| 85° | 612  | 523  | 506  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2324 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 207.1   | 1.5       |
| 10°-20°   | 582.7   | 4.2       |
| 20°-30°   | 856.4   | 6.1       |
| 30°-40°   | 994.6   | 7.1       |
| 40°-50°   | 993.4   | 7.1       |
| 50°-60°   | 866.2   | 6.2       |
| 60°-70°   | 640.3   | 4.6       |
| 70°-80°   | 362.3   | 2.6       |
| 80°-90°   | 104.1   | 0.7       |
| 90°-100°  | 184.5   | 1.3       |
| 100°-110° | 586.1   | 4.2       |
| 110°-120° | 1003.0  | 7.2       |
| 120°-130° | 1319.1  | 9.5       |
| 130°-140° | 1480.6  | 10.6      |
| 140°-150° | 1451.9  | 10.4      |
| 150°-160° | 1217.9  | 8.7       |
| 160°-170° | 807.7   | 5.8       |
| 170°-180° | 282.3   | 2.0       |
| 0°-30°    | 1646.2  | 11.8      |
| 0°-40°    | 2640.9  | 18.9      |
| 0°-60°    | 4500.5  | 32.3      |
| 0°-90°    | 5607.2  | 40.2      |
| 90°-120°  | 1773.5  | 12.7      |
| 90°-150°  | 6025.1  | 43.2      |
| 90°-180°  | 8333.0  | 59.8      |
| 0°-180°   | 13940.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2200 | 2200  | 2200 | 2200  | 2200 |      |
| 5°   | 2200 | 2192  | 2169 | 2186  | 2182 | 209  |
| 15°  | 2095 | 2082  | 2055 | 2063  | 2053 | 590  |
| 25°  | 1896 | 1879  | 1843 | 1847  | 1843 | 872  |
| 35°  | 1636 | 1615  | 1581 | 1568  | 1557 | 1021 |
| 45°  | 1331 | 1316  | 1284 | 1261  | 1253 | 1027 |
| 55°  | 1007 | 994   | 969  | 944   | 933  | 901  |
| 65°  | 679  | 667   | 646  | 626   | 616  | 672  |
| 75°  | 355  | 351   | 340  | 328   | 332  | 379  |
| 85°  | 87   | 85    | 83   | 76    | 74   | 97   |
| 90°  | 3    | 32    | 88   | 83    | 85   | 14   |
| 95°  | 131  | 156   | 161  | 161   | 156  | 146  |
| 105° | 541  | 548   | 554  | 558   | 558  | 571  |
| 115° | 1006 | 1021  | 1016 | 1014  | 1006 | 996  |
| 125° | 1464 | 1486  | 1479 | 1471  | 1468 | 1308 |
| 135° | 1894 | 1921  | 1927 | 1924  | 1917 | 1464 |
| 145° | 2299 | 2317  | 2331 | 2334  | 2324 | 1436 |
| 155° | 2629 | 2636  | 2644 | 2656  | 2648 | 1210 |
| 165° | 2860 | 2857  | 2857 | 2875  | 2862 | 807  |
| 175° | 2976 | 2968  | 2963 | 2981  | 2966 | 283  |
| 180° | 2981 | 2981  | 2981 | 2981  | 2981 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2200.5 | 2200.5 | 2200.5 | 2200.5 | 2200.5 |
| 2.5°   | 2213.3 | 2202.7 | 2179.3 | 2200.5 | 2196.4 |
| 5°     | 2200.5 | 2192.2 | 2168.8 | 2185.7 | 2181.6 |
| 7.5°   | 2185.7 | 2173.1 | 2149.8 | 2166.8 | 2162.6 |
| 10°    | 2162.6 | 2147.8 | 2122.3 | 2139.2 | 2132.9 |
| 12.5°  | 2130.7 | 2118.1 | 2092.7 | 2103.3 | 2099.0 |
| 15°    | 2094.7 | 2082.2 | 2054.6 | 2063.1 | 2052.6 |
| 17.5°  | 2050.3 | 2037.8 | 2010.2 | 2020.6 | 2010.2 |
| 20°    | 2001.6 | 1989.0 | 1959.4 | 1965.7 | 1957.4 |
| 22.5°  | 1953.1 | 1934.0 | 1906.4 | 1906.4 | 1902.1 |
| 25°    | 1895.8 | 1879.1 | 1843.0 | 1847.1 | 1843.0 |
| 27.5°  | 1832.3 | 1817.5 | 1790.1 | 1783.9 | 1773.3 |
| 30°    | 1769.1 | 1751.9 | 1720.3 | 1714.0 | 1705.4 |
| 32.5°  | 1701.2 | 1688.7 | 1654.7 | 1641.9 | 1633.4 |
| 35°    | 1635.7 | 1614.6 | 1580.6 | 1567.8 | 1557.3 |
| 37.5°  | 1561.6 | 1542.5 | 1508.6 | 1493.7 | 1483.2 |
| 40°    | 1485.4 | 1468.4 | 1434.5 | 1415.7 | 1407.1 |
| 42.5°  | 1411.4 | 1394.3 | 1360.7 | 1339.4 | 1326.7 |
| 45°    | 1331.1 | 1316.2 | 1284.3 | 1261.2 | 1252.6 |
| 47.5°  | 1252.6 | 1237.8 | 1204.0 | 1180.6 | 1168.0 |
| 50°    | 1170.1 | 1159.5 | 1129.9 | 1100.2 | 1089.7 |
| 52.5°  | 1089.7 | 1074.9 | 1047.4 | 1024.2 | 1009.4 |
| 55°    | 1007.3 | 994.5  | 969.1  | 943.8  | 933.2  |
| 57.5°  | 924.7  | 914.2  | 886.6  | 861.2  | 852.6  |
| 60°    | 842.1  | 833.8  | 804.2  | 780.8  | 774.5  |
| 62.5°  | 761.7  | 746.9  | 725.8  | 704.6  | 696.2  |
| 65°    | 679.3  | 666.6  | 645.5  | 626.3  | 615.8  |
| 67.5°  | 594.6  | 583.9  | 565.1  | 550.3  | 541.7  |
| 70°    | 516.3  | 507.8  | 488.7  | 473.9  | 465.6  |
| 72.5°  | 435.9  | 427.4  | 416.9  | 402.1  | 395.8  |
| 75°    | 355.3  | 351.4  | 340.5  | 328.0  | 332.2  |
| 77.5°  | 283.5  | 275.0  | 270.7  | 264.5  | 258.2  |
| 80°    | 211.7  | 209.4  | 205.2  | 198.9  | 194.6  |
| 82.5°  | 143.9  | 143.9  | 141.9  | 133.4  | 133.4  |
| 85°    | 86.6   | 84.6   | 82.6   | 76.1   | 74.1   |
| 87.5°  | 38.2   | 33.9   | 29.6   | 23.4   | 21.1   |
| 90°    | 2.7    | 32.3   | 88.0   | 82.7   | 85.4   |
| 92.5°  | 55.7   | 75.5   | 78.2   | 80.9   | 80.9   |
| 95°    | 131.2  | 156.4  | 160.9  | 160.9  | 156.4  |
| 97.5°  | 218.4  | 241.8  | 251.7  | 251.7  | 251.7  |
| 100°   | 319.1  | 339.7  | 346.9  | 346.9  | 344.2  |
| 102.5° | 425.1  | 440.4  | 450.3  | 452.9  | 450.3  |
| 105°   | 541.0  | 548.2  | 553.6  | 558.1  | 558.1  |
| 107.5° | 656.0  | 666.8  | 666.8  | 668.6  | 656.0  |
| 110°   | 767.5  | 781.8  | 781.8  | 781.8  | 774.7  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 887.9  | 903.1  | 900.5  | 893.2  | 887.9  |
| 115°   | 1006.5 | 1020.9 | 1016.4 | 1013.7 | 1006.5 |
| 117.5° | 1124.3 | 1144.1 | 1131.4 | 1124.3 | 1117.0 |
| 120°   | 1242.8 | 1262.6 | 1242.8 | 1242.8 | 1234.8 |
| 122.5° | 1350.7 | 1375.8 | 1363.3 | 1356.1 | 1350.7 |
| 125°   | 1464.0 | 1486.4 | 1479.2 | 1471.1 | 1468.5 |
| 127.5° | 1574.5 | 1602.3 | 1592.4 | 1581.7 | 1574.5 |
| 130°   | 1677.8 | 1710.1 | 1705.7 | 1700.3 | 1690.4 |
| 132.5° | 1793.8 | 1818.9 | 1820.7 | 1808.2 | 1800.9 |
| 135°   | 1893.5 | 1921.4 | 1926.7 | 1924.1 | 1916.8 |
| 137.5° | 2005.0 | 2027.4 | 2031.9 | 2030.1 | 2019.3 |
| 140°   | 2102.9 | 2125.3 | 2138.0 | 2138.0 | 2128.1 |
| 142.5° | 2203.6 | 2226.0 | 2233.2 | 2235.9 | 2226.0 |
| 145°   | 2298.8 | 2316.8 | 2331.2 | 2333.8 | 2323.9 |
| 147.5° | 2384.2 | 2406.7 | 2417.4 | 2422.0 | 2412.1 |
| 150°   | 2472.3 | 2487.6 | 2497.5 | 2505.5 | 2497.5 |
| 152.5° | 2550.4 | 2565.7 | 2578.3 | 2588.2 | 2578.3 |
| 155°   | 2628.7 | 2635.8 | 2643.9 | 2656.5 | 2648.4 |
| 157.5° | 2696.0 | 2701.4 | 2705.9 | 2723.9 | 2711.3 |
| 160°   | 2756.3 | 2761.6 | 2764.3 | 2779.6 | 2768.8 |
| 162.5° | 2812.0 | 2812.0 | 2814.6 | 2831.7 | 2819.1 |
| 165°   | 2859.6 | 2856.8 | 2856.8 | 2874.8 | 2862.3 |
| 167.5° | 2902.7 | 2894.6 | 2894.6 | 2912.6 | 2900.0 |
| 170°   | 2935.1 | 2927.9 | 2925.2 | 2943.2 | 2927.9 |
| 172.5° | 2957.5 | 2950.3 | 2947.6 | 2965.6 | 2950.3 |
| 175°   | 2975.5 | 2968.3 | 2963.0 | 2980.9 | 2965.6 |
| 177.5° | 2985.4 | 2978.2 | 2972.8 | 2988.0 | 2972.8 |
| 180°   | 2980.9 | 2980.9 | 2980.9 | 2980.9 | 2980.9 |

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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 | 8.23             | 9.01  | 9.27  | 10.05 | 11.46 | 7.80           | 8.58  | 8.83  | 9.62  | 11.02 |
|                 | 3H   | 9.88             | 10.58 | 10.93 | 11.63 | 13.06 | 9.41           | 10.11 | 10.46 | 11.16 | 12.58 |
|                 | 4H   | 10.47            | 11.13 | 11.52 | 12.18 | 13.61 | 9.99           | 10.66 | 11.05 | 11.71 | 13.14 |
|                 | 6H   | 10.86            | 11.47 | 11.93 | 12.53 | 13.97 | 10.39          | 11.00 | 11.45 | 12.05 | 13.50 |
|                 | 8H   | 10.96            | 11.54 | 12.04 | 12.62 | 14.06 | 10.49          | 11.07 | 11.56 | 12.14 | 13.58 |
|                 | 12H  | 11.01            | 11.56 | 12.09 | 12.63 | 14.09 | 10.53          | 11.08 | 11.61 | 12.15 | 13.61 |
| 4H              | 2H   | 8.68             | 9.34  | 9.75  | 10.40 | 11.83 | 8.34           | 9.00  | 9.40  | 10.05 | 11.48 |
|                 | 3H   | 10.54            | 11.09 | 11.61 | 12.17 | 13.62 | 10.15          | 10.70 | 11.22 | 11.78 | 13.22 |
|                 | 4H   | 11.25            | 11.76 | 12.33 | 12.83 | 14.29 | 10.84          | 11.35 | 11.92 | 12.42 | 13.89 |
|                 | 6H   | 11.76            | 12.19 | 12.85 | 13.29 | 14.75 | 11.35          | 11.79 | 12.44 | 12.88 | 14.34 |
|                 | 8H   | 11.91            | 12.31 | 12.99 | 13.40 | 14.88 | 11.50          | 11.90 | 12.58 | 12.99 | 14.46 |
|                 | 12H  | 11.98            | 12.34 | 13.08 | 13.45 | 14.93 | 11.55          | 11.92 | 12.66 | 13.02 | 14.50 |
| 8H              | 4H   | 11.44            | 11.85 | 12.53 | 12.93 | 14.41 | 11.08          | 11.49 | 12.17 | 12.57 | 14.05 |
|                 | 6H   | 12.07            | 12.40 | 13.18 | 13.53 | 15.00 | 11.70          | 12.04 | 12.81 | 13.17 | 14.64 |
|                 | 8H   | 12.29            | 12.58 | 13.40 | 13.69 | 15.18 | 11.92          | 12.21 | 13.03 | 13.32 | 14.82 |
|                 | 12H  | 12.41            | 12.67 | 13.53 | 13.78 | 15.31 | 12.03          | 12.29 | 13.15 | 13.40 | 14.93 |
| 12H             | 4H   | 11.42            | 11.79 | 12.53 | 12.89 | 14.37 | 11.07          | 11.44 | 12.17 | 12.54 | 14.02 |
|                 | 6H   | 12.10            | 12.39 | 13.21 | 13.50 | 14.99 | 11.74          | 12.04 | 12.86 | 13.15 | 14.64 |
|                 | 8H   | 12.33            | 12.59 | 13.45 | 13.70 | 15.23 | 11.98          | 12.24 | 13.10 | 13.34 | 14.87 |