

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: P923037

Luminaire Tested: DFN2DIP-SQ4F0-060D070US940-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P923037  
REPORT IS A COMBINATION OF REPORTS P901597 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-060D070US940-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

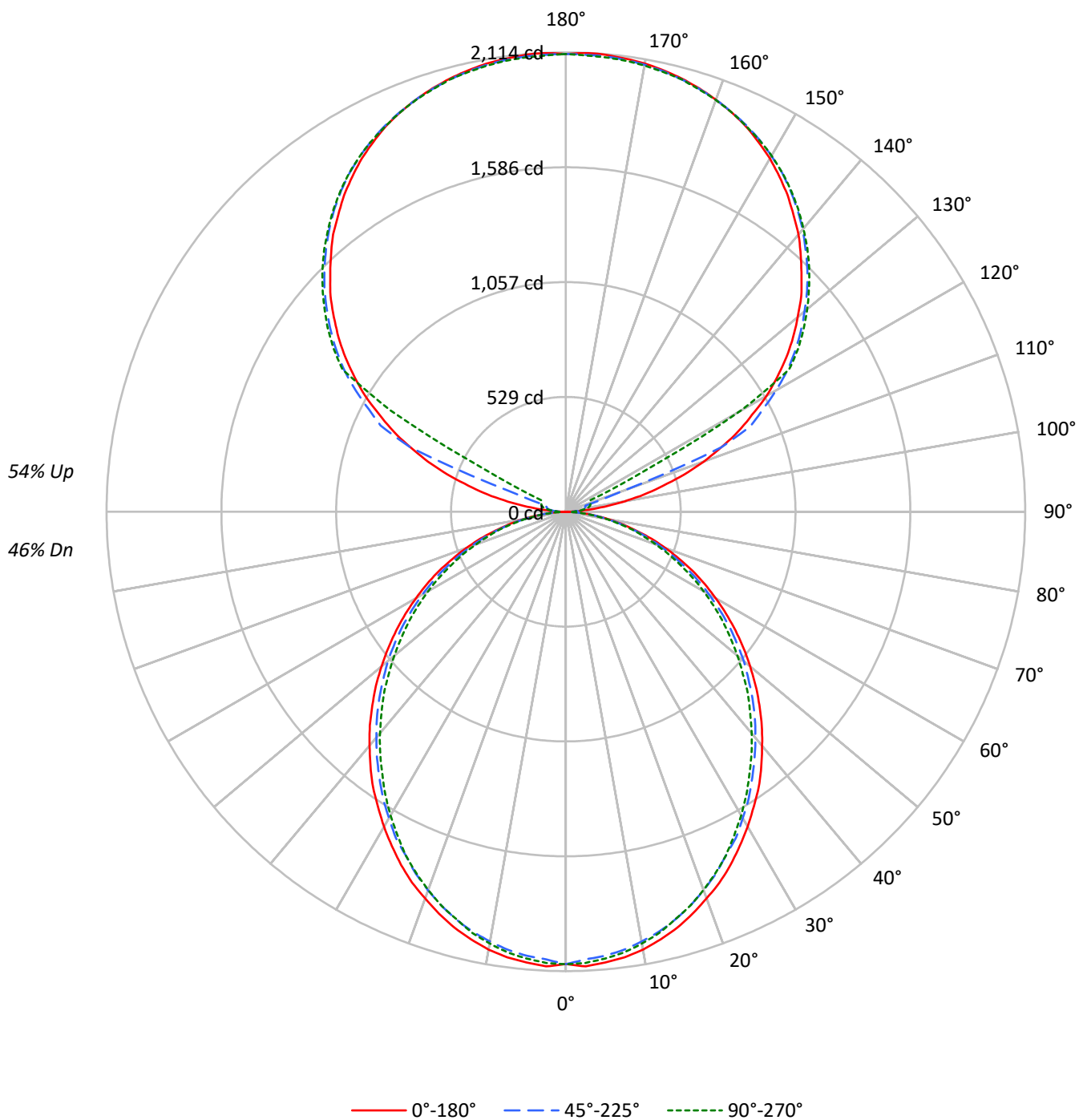
Lumens per Lamp: N/A  
Luminaire Lumens: 11476.3 lumens  
Efficiency: N/A  
Efficacy: 112.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 102.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.946  
Total Harmonic Distortion (THDi): 0.132  
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   | 106 | 106 | 106 | 106 | 98 | 98 | 98 | 98 | 81 | 81 | 81 | 66 | 66 | 66 | 53 | 53 | 53 |
| 1   | 97  | 93  | 89  | 85  | 89 | 85 | 82 | 79 | 71 | 69 | 67 | 58 | 57 | 55 | 46 | 45 | 44 |
| 2   | 88  | 81  | 75  | 70  | 81 | 74 | 69 | 65 | 62 | 59 | 55 | 51 | 48 | 46 | 41 | 39 | 37 |
| 3   | 81  | 71  | 64  | 58  | 74 | 66 | 59 | 54 | 55 | 50 | 46 | 45 | 42 | 39 | 36 | 34 | 32 |
| 4   | 74  | 63  | 55  | 49  | 67 | 58 | 51 | 46 | 49 | 44 | 40 | 40 | 37 | 33 | 32 | 30 | 27 |
| 5   | 68  | 56  | 48  | 42  | 62 | 52 | 45 | 39 | 44 | 38 | 34 | 36 | 32 | 29 | 29 | 26 | 24 |
| 6   | 62  | 50  | 42  | 36  | 57 | 46 | 39 | 34 | 39 | 34 | 30 | 33 | 29 | 25 | 26 | 23 | 21 |
| 7   | 58  | 45  | 37  | 32  | 53 | 42 | 35 | 30 | 36 | 30 | 26 | 30 | 26 | 22 | 24 | 21 | 19 |
| 8   | 53  | 41  | 33  | 28  | 49 | 38 | 31 | 26 | 33 | 27 | 23 | 27 | 23 | 20 | 22 | 19 | 17 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 28 | 24 | 30 | 24 | 21 | 25 | 21 | 18 | 21 | 17 | 15 |
| 10  | 46  | 34  | 27  | 22  | 43 | 32 | 26 | 21 | 27 | 22 | 19 | 23 | 19 | 16 | 19 | 16 | 14 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1461 | 1461 | 1461 |
| 5°  | 1463 | 1441 | 1451 |
| 10° | 1451 | 1422 | 1431 |
| 15° | 1430 | 1399 | 1401 |
| 20° | 1401 | 1366 | 1370 |
| 25° | 1372 | 1328 | 1334 |
| 30° | 1336 | 1292 | 1288 |
| 35° | 1302 | 1249 | 1240 |
| 40° | 1260 | 1207 | 1194 |
| 45° | 1219 | 1164 | 1147 |
| 50° | 1173 | 1119 | 1092 |
| 55° | 1125 | 1067 | 1042 |
| 60° | 1071 | 1005 | 985  |
| 65° | 1012 | 941  | 917  |
| 70° | 936  | 863  | 844  |
| 75° | 832  | 770  | 778  |
| 80° | 707  | 651  | 650  |
| 85° | 510  | 445  | 437  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 1219 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 195.9   | 1.7       |
| 10°-20°   | 551.3   | 4.8       |
| 20°-30°   | 810.2   | 7.1       |
| 30°-40°   | 941.0   | 8.2       |
| 40°-50°   | 939.8   | 8.2       |
| 50°-60°   | 819.5   | 7.1       |
| 60°-70°   | 605.8   | 5.3       |
| 70°-80°   | 342.7   | 3.0       |
| 80°-90°   | 94.2    | 0.8       |
| 90°-100°  | 69.5    | 0.6       |
| 100°-110° | 259.0   | 2.3       |
| 110°-120° | 686.8   | 6.0       |
| 120°-130° | 1139.1  | 9.9       |
| 130°-140° | 1209.9  | 10.5      |
| 140°-150° | 1124.5  | 9.8       |
| 150°-160° | 904.1   | 7.9       |
| 160°-170° | 582.6   | 5.1       |
| 170°-180° | 200.5   | 1.7       |
| 0°-30°    | 1557.4  | 13.6      |
| 0°-40°    | 2498.4  | 21.8      |
| 0°-60°    | 4257.8  | 37.1      |
| 0°-90°    | 5300.5  | 46.2      |
| 90°-120°  | 1015.2  | 8.8       |
| 90°-150°  | 4488.7  | 39.1      |
| 90°-180°  | 6176.0  | 53.8      |
| 0°-180°   | 11476.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2082 | 2082  | 2082 | 2082  | 2082 |      |
| 5°   | 2082 | 2074  | 2052 | 2068  | 2064 | 198  |
| 15°  | 1982 | 1970  | 1944 | 1952  | 1942 | 558  |
| 25°  | 1794 | 1778  | 1744 | 1748  | 1744 | 825  |
| 35°  | 1548 | 1528  | 1495 | 1483  | 1473 | 966  |
| 45°  | 1259 | 1245  | 1215 | 1193  | 1185 | 972  |
| 55°  | 953  | 941   | 917  | 893   | 883  | 852  |
| 65°  | 643  | 631   | 611  | 592   | 583  | 635  |
| 75°  | 336  | 332   | 322  | 310   | 314  | 359  |
| 85°  | 82   | 80    | 78   | 72    | 70   | 91   |
| 90°  | 1    | 18    | 30   | 38    | 41   | 11   |
| 95°  | 99   | 49    | 59   | 67    | 66   | 117  |
| 105° | 463  | 509   | 93   | 110   | 116  | 495  |
| 115° | 876  | 902   | 940  | 235   | 125  | 863  |
| 125° | 1239 | 1259  | 1288 | 1299  | 1303 | 1105 |
| 135° | 1534 | 1558  | 1572 | 1587  | 1584 | 1185 |
| 145° | 1779 | 1777  | 1803 | 1814  | 1806 | 1113 |
| 155° | 1959 | 1945  | 1963 | 1972  | 1960 | 903  |
| 165° | 2064 | 2055  | 2059 | 2070  | 2059 | 583  |
| 175° | 2111 | 2100  | 2104 | 2114  | 2099 | 201  |
| 180° | 2107 | 2107  | 2107 | 2107  | 2107 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2081.8 | 2081.8 | 2081.8 | 2081.8 | 2081.8 |
| 2.5°   | 2093.9 | 2083.9 | 2061.8 | 2081.8 | 2078.0 |
| 5°     | 2081.8 | 2073.9 | 2051.8 | 2067.8 | 2064.0 |
| 7.5°   | 2067.8 | 2055.9 | 2033.8 | 2050.0 | 2045.9 |
| 10°    | 2045.9 | 2031.9 | 2007.9 | 2023.8 | 2017.9 |
| 12.5°  | 2015.8 | 2003.9 | 1979.9 | 1989.9 | 1985.8 |
| 15°    | 1981.7 | 1969.9 | 1943.8 | 1951.9 | 1941.9 |
| 17.5°  | 1939.7 | 1927.9 | 1901.8 | 1911.6 | 1901.8 |
| 20°    | 1893.6 | 1881.8 | 1853.7 | 1859.7 | 1851.8 |
| 22.5°  | 1847.8 | 1829.7 | 1803.6 | 1803.6 | 1799.6 |
| 25°    | 1793.6 | 1777.7 | 1743.7 | 1747.5 | 1743.7 |
| 27.5°  | 1733.5 | 1719.5 | 1693.5 | 1687.7 | 1677.7 |
| 30°    | 1673.7 | 1657.4 | 1627.5 | 1621.6 | 1613.5 |
| 32.5°  | 1609.4 | 1597.6 | 1565.5 | 1553.4 | 1545.3 |
| 35°    | 1547.5 | 1527.5 | 1495.4 | 1483.3 | 1473.3 |
| 37.5°  | 1477.4 | 1459.3 | 1427.3 | 1413.2 | 1403.2 |
| 40°    | 1405.3 | 1389.2 | 1357.2 | 1339.3 | 1331.2 |
| 42.5°  | 1335.2 | 1319.1 | 1287.3 | 1267.1 | 1255.2 |
| 45°    | 1259.3 | 1245.2 | 1215.0 | 1193.2 | 1185.1 |
| 47.5°  | 1185.1 | 1171.1 | 1139.1 | 1117.0 | 1105.0 |
| 50°    | 1107.0 | 1097.0 | 1069.0 | 1040.9 | 1030.9 |
| 52.5°  | 1030.9 | 1016.9 | 991.0  | 968.9  | 954.9  |
| 55°    | 953.0  | 940.8  | 916.9  | 892.9  | 882.9  |
| 57.5°  | 874.9  | 864.9  | 838.7  | 814.8  | 806.6  |
| 60°    | 796.7  | 788.8  | 760.8  | 738.7  | 732.7  |
| 62.5°  | 720.6  | 706.6  | 686.6  | 666.6  | 658.6  |
| 65°    | 642.7  | 630.6  | 610.6  | 592.5  | 582.6  |
| 67.5°  | 562.6  | 552.4  | 534.6  | 520.6  | 512.5  |
| 70°    | 488.5  | 480.5  | 462.4  | 448.4  | 440.5  |
| 72.5°  | 412.4  | 404.4  | 394.4  | 380.4  | 374.4  |
| 75°    | 336.2  | 332.4  | 322.2  | 310.3  | 314.3  |
| 77.5°  | 268.2  | 260.2  | 256.1  | 250.2  | 244.2  |
| 80°    | 200.3  | 198.1  | 194.1  | 188.2  | 184.1  |
| 82.5°  | 136.2  | 136.2  | 134.2  | 126.2  | 126.2  |
| 85°    | 81.9   | 80.1   | 78.1   | 72.0   | 70.1   |
| 87.5°  | 36.1   | 32.1   | 28.0   | 22.1   | 20.0   |
| 90°    | 1.4    | 18.3   | 30.4   | 38.2   | 41.1   |
| 92.5°  | 38.2   | 32.0   | 36.6   | 39.7   | 41.1   |
| 95°    | 99.0   | 48.7   | 59.4   | 67.1   | 65.5   |
| 97.5°  | 178.3  | 53.4   | 77.7   | 82.4   | 83.8   |
| 100°   | 269.9  | 61.0   | 86.9   | 99.0   | 102.1  |
| 102.5° | 370.3  | 367.5  | 90.0   | 106.6  | 111.3  |
| 105°   | 463.4  | 509.2  | 93.0   | 109.7  | 115.8  |
| 107.5° | 571.6  | 609.7  | 96.1   | 112.8  | 119.0  |
| 110°   | 675.4  | 707.2  | 266.8  | 114.4  | 120.4  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 772.9  | 800.2  | 774.4  | 117.3  | 122.0  |
| 115°   | 876.5  | 902.3  | 940.5  | 234.8  | 125.1  |
| 117.5° | 966.4  | 996.8  | 1022.9 | 804.8  | 405.5  |
| 120°   | 1067.0 | 1089.8 | 1117.4 | 1135.7 | 929.9  |
| 122.5° | 1152.3 | 1176.7 | 1207.4 | 1216.4 | 1218.0 |
| 125°   | 1239.2 | 1259.1 | 1288.1 | 1298.8 | 1303.2 |
| 127.5° | 1318.5 | 1339.8 | 1362.8 | 1378.0 | 1379.5 |
| 130°   | 1393.2 | 1417.6 | 1434.3 | 1451.2 | 1449.7 |
| 132.5° | 1469.4 | 1489.3 | 1506.0 | 1519.7 | 1518.3 |
| 135°   | 1533.5 | 1557.9 | 1571.6 | 1586.9 | 1583.9 |
| 137.5° | 1600.4 | 1618.8 | 1634.1 | 1649.4 | 1644.8 |
| 140°   | 1666.0 | 1678.3 | 1695.0 | 1708.7 | 1701.1 |
| 142.5° | 1721.0 | 1731.7 | 1751.4 | 1763.5 | 1756.0 |
| 145°   | 1779.0 | 1777.4 | 1803.2 | 1813.9 | 1806.3 |
| 147.5° | 1829.1 | 1824.6 | 1850.5 | 1858.1 | 1852.1 |
| 150°   | 1877.9 | 1867.3 | 1891.8 | 1900.8 | 1893.2 |
| 152.5° | 1919.0 | 1906.9 | 1929.8 | 1938.9 | 1928.3 |
| 155°   | 1958.7 | 1945.1 | 1963.4 | 1972.5 | 1960.3 |
| 157.5° | 1990.7 | 1978.6 | 1992.3 | 2003.0 | 1990.7 |
| 160°   | 2018.3 | 2009.0 | 2018.3 | 2027.3 | 2016.6 |
| 162.5° | 2042.6 | 2033.5 | 2041.0 | 2051.7 | 2038.0 |
| 165°   | 2063.9 | 2054.9 | 2059.3 | 2070.0 | 2059.3 |
| 167.5° | 2080.7 | 2071.4 | 2076.2 | 2086.9 | 2073.1 |
| 170°   | 2094.4 | 2085.3 | 2088.3 | 2099.0 | 2085.3 |
| 172.5° | 2103.5 | 2094.4 | 2097.6 | 2108.2 | 2094.4 |
| 175°   | 2111.1 | 2100.4 | 2103.5 | 2114.2 | 2099.0 |
| 177.5° | 2114.2 | 2103.5 | 2105.1 | 2115.9 | 2102.0 |
| 180°   | 2106.6 | 2106.6 | 2106.6 | 2106.6 | 2106.6 |

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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 | 8.24             | 9.07  | 9.23  | 10.07 | 11.39 | 7.79           | 8.62  | 8.78  | 9.62  | 10.95 |
|                 | 3H   | 9.90             | 10.64 | 10.90 | 11.65 | 13.00 | 9.41           | 10.15 | 10.41 | 11.16 | 12.51 |
|                 | 4H   | 10.49            | 11.19 | 11.50 | 12.21 | 13.56 | 9.99           | 10.70 | 11.01 | 11.71 | 13.07 |
|                 | 6H   | 10.89            | 11.54 | 11.91 | 12.56 | 13.92 | 10.39          | 11.04 | 11.41 | 12.06 | 13.42 |
|                 | 8H   | 11.00            | 11.61 | 12.03 | 12.65 | 14.01 | 10.49          | 11.11 | 11.52 | 12.15 | 13.51 |
|                 | 12H  | 11.05            | 11.63 | 12.08 | 12.66 | 14.05 | 10.54          | 11.12 | 11.57 | 12.15 | 13.54 |
| 4H              | 2H   | 8.70             | 9.40  | 9.71  | 10.41 | 11.77 | 8.34           | 9.04  | 9.36  | 10.06 | 11.41 |
|                 | 3H   | 10.56            | 11.15 | 11.59 | 12.19 | 13.56 | 10.16          | 10.74 | 11.18 | 11.78 | 13.15 |
|                 | 4H   | 11.28            | 11.82 | 12.31 | 12.85 | 14.24 | 10.86          | 11.39 | 11.89 | 12.43 | 13.82 |
|                 | 6H   | 11.80            | 12.26 | 12.84 | 13.32 | 14.70 | 11.36          | 11.83 | 12.41 | 12.88 | 14.27 |
|                 | 8H   | 11.95            | 12.38 | 12.99 | 13.43 | 14.83 | 11.51          | 11.94 | 12.56 | 12.99 | 14.39 |
|                 | 12H  | 12.02            | 12.41 | 13.09 | 13.48 | 14.88 | 11.57          | 11.96 | 12.64 | 13.03 | 14.43 |
| 8H              | 4H   | 11.47            | 11.91 | 12.52 | 12.96 | 14.36 | 11.10          | 11.53 | 12.14 | 12.58 | 13.98 |
|                 | 6H   | 12.11            | 12.47 | 13.18 | 13.56 | 14.96 | 11.72          | 12.08 | 12.79 | 13.17 | 14.57 |
|                 | 8H   | 12.33            | 12.65 | 13.41 | 13.72 | 15.14 | 11.94          | 12.25 | 13.02 | 13.33 | 14.75 |
|                 | 12H  | 12.46            | 12.74 | 13.55 | 13.81 | 15.27 | 12.05          | 12.33 | 13.13 | 13.40 | 14.86 |
| 12H             | 4H   | 11.46            | 11.85 | 12.52 | 12.91 | 14.32 | 11.09          | 11.48 | 12.15 | 12.54 | 13.95 |
|                 | 6H   | 12.14            | 12.45 | 13.22 | 13.53 | 14.95 | 11.77          | 12.08 | 12.84 | 13.16 | 14.57 |
|                 | 8H   | 12.38            | 12.66 | 13.46 | 13.73 | 15.19 | 12.00          | 12.28 | 13.08 | 13.35 | 14.81 |