

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: P916462

Luminaire Tested: DFN2DIP-HX4F0-110D090US930-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P916462  
REPORT IS A COMBINATION OF REPORTS P899403 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-110D090US930-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

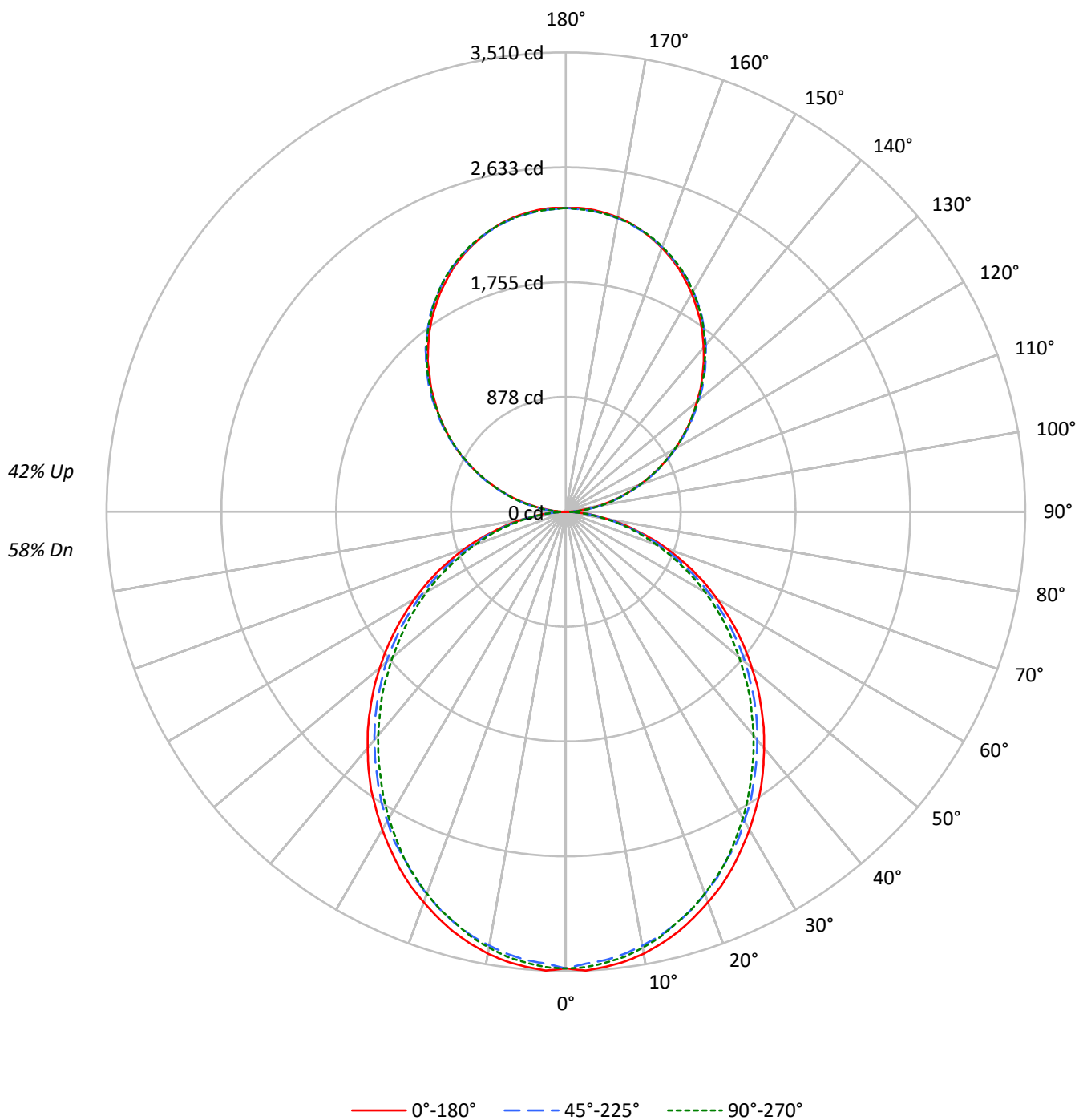
Lumens per Lamp: N/A  
Luminaire Lumens: 15372.4 lumens  
Efficiency: N/A  
Efficacy: 94.1 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 163.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9967  
Total Harmonic Distortion (THDi): 0.063  
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



TEST NUMBER: P916462

CATALOG NUMBER: DFN2DIP-HX4F0-110D090US930-FLLFL

**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   | 109 | 109 | 109 | 109 | 102 | 102 | 102 | 102 | 88 | 88 | 88 | 75 | 75 | 75 | 63 | 63 | 63 |
| 1   | 100 | 95  | 91  | 88  | 93  | 89  | 85  | 82  | 77 | 74 | 72 | 66 | 64 | 62 | 56 | 55 | 53 |
| 2   | 91  | 83  | 77  | 72  | 84  | 78  | 72  | 68  | 67 | 63 | 60 | 58 | 55 | 52 | 49 | 47 | 45 |
| 3   | 83  | 73  | 66  | 60  | 77  | 68  | 62  | 56  | 59 | 54 | 50 | 51 | 47 | 44 | 44 | 41 | 38 |
| 4   | 76  | 65  | 57  | 51  | 70  | 61  | 53  | 48  | 53 | 47 | 43 | 46 | 41 | 38 | 39 | 36 | 33 |
| 5   | 70  | 58  | 49  | 43  | 65  | 54  | 47  | 41  | 47 | 42 | 37 | 41 | 36 | 33 | 35 | 32 | 29 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 41  | 36  | 43 | 37 | 32 | 37 | 32 | 29 | 32 | 28 | 25 |
| 7   | 59  | 47  | 39  | 33  | 55  | 44  | 37  | 32  | 39 | 33 | 29 | 34 | 29 | 26 | 29 | 25 | 23 |
| 8   | 55  | 43  | 35  | 29  | 51  | 40  | 33  | 28  | 35 | 30 | 25 | 31 | 26 | 23 | 27 | 23 | 20 |
| 9   | 51  | 39  | 31  | 26  | 48  | 37  | 30  | 25  | 32 | 27 | 23 | 29 | 24 | 21 | 25 | 21 | 18 |
| 10  | 48  | 36  | 28  | 24  | 45  | 34  | 27  | 23  | 30 | 24 | 21 | 26 | 22 | 19 | 23 | 19 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2595 | 2595 | 2595 |
| 5°  | 2599 | 2559 | 2576 |
| 10° | 2578 | 2525 | 2541 |
| 15° | 2541 | 2483 | 2487 |
| 20° | 2490 | 2426 | 2431 |
| 25° | 2439 | 2357 | 2367 |
| 30° | 2375 | 2293 | 2285 |
| 35° | 2315 | 2217 | 2198 |
| 40° | 2241 | 2141 | 2116 |
| 45° | 2167 | 2065 | 2032 |
| 50° | 2086 | 1985 | 1934 |
| 55° | 2001 | 1892 | 1844 |
| 60° | 1905 | 1781 | 1741 |
| 65° | 1801 | 1668 | 1620 |
| 70° | 1668 | 1528 | 1490 |
| 75° | 1483 | 1362 | 1369 |
| 80° | 1262 | 1150 | 1139 |
| 85° | 917  | 784  | 758  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2167 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 328.4   | 2.1       |
| 10°-20°   | 924.1   | 6.0       |
| 20°-30°   | 1358.1  | 8.8       |
| 30°-40°   | 1577.3  | 10.3      |
| 40°-50°   | 1575.4  | 10.2      |
| 50°-60°   | 1373.7  | 8.9       |
| 60°-70°   | 1015.5  | 6.6       |
| 70°-80°   | 574.5   | 3.7       |
| 80°-90°   | 158.2   | 1.0       |
| 90°-100°  | 143.6   | 0.9       |
| 100°-110° | 456.3   | 3.0       |
| 110°-120° | 780.8   | 5.1       |
| 120°-130° | 1026.9  | 6.7       |
| 130°-140° | 1152.6  | 7.5       |
| 140°-150° | 1130.3  | 7.4       |
| 150°-160° | 948.2   | 6.2       |
| 160°-170° | 628.8   | 4.1       |
| 170°-180° | 219.8   | 1.4       |
| 0°-30°    | 2610.6  | 17.0      |
| 0°-40°    | 4187.9  | 27.2      |
| 0°-60°    | 7137.0  | 46.4      |
| 0°-90°    | 8885.2  | 57.8      |
| 90°-120°  | 1380.7  | 9.0       |
| 90°-150°  | 4690.5  | 30.5      |
| 90°-180°  | 6487.0  | 42.2      |
| 0°-180°   | 15372.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3490 | 3490  | 3490 | 3490  | 3490 |      |
| 5°   | 3490 | 3476  | 3439 | 3466  | 3460 | 331  |
| 15°  | 3322 | 3302  | 3258 | 3272  | 3255 | 936  |
| 25°  | 3006 | 2980  | 2923 | 2929  | 2923 | 1383 |
| 35°  | 2594 | 2560  | 2507 | 2486  | 2470 | 1620 |
| 45°  | 2111 | 2087  | 2037 | 2000  | 1987 | 1629 |
| 55°  | 1597 | 1577  | 1537 | 1497  | 1480 | 1428 |
| 65°  | 1077 | 1057  | 1024 | 993   | 977  | 1065 |
| 75°  | 564  | 557   | 540  | 520   | 527  | 602  |
| 85°  | 138  | 134   | 131  | 121   | 118  | 153  |
| 90°  | 2    | 25    | 69   | 64    | 66   | 15   |
| 95°  | 102  | 122   | 125  | 125   | 122  | 114  |
| 105° | 421  | 427   | 431  | 434   | 434  | 444  |
| 115° | 784  | 795   | 791  | 789   | 784  | 775  |
| 125° | 1140 | 1157  | 1152 | 1145  | 1143 | 1018 |
| 135° | 1474 | 1496  | 1500 | 1498  | 1492 | 1139 |
| 145° | 1790 | 1804  | 1815 | 1817  | 1809 | 1118 |
| 155° | 2046 | 2052  | 2058 | 2068  | 2062 | 942  |
| 165° | 2226 | 2224  | 2224 | 2238  | 2228 | 628  |
| 175° | 2316 | 2311  | 2307 | 2321  | 2309 | 220  |
| 180° | 2321 | 2321  | 2321 | 2321  | 2321 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3489.6 | 3489.6 | 3489.6 | 3489.6 | 3489.6 |
| 2.5°   | 3509.9 | 3493.1 | 3456.1 | 3489.6 | 3483.2 |
| 5°     | 3489.6 | 3476.4 | 3439.4 | 3466.1 | 3459.7 |
| 7.5°   | 3466.1 | 3446.2 | 3409.2 | 3436.2 | 3429.5 |
| 10°    | 3429.5 | 3405.9 | 3365.7 | 3392.4 | 3382.4 |
| 12.5°  | 3378.9 | 3358.9 | 3318.8 | 3335.5 | 3328.7 |
| 15°    | 3321.9 | 3302.0 | 3258.2 | 3271.7 | 3255.0 |
| 17.5°  | 3251.4 | 3231.5 | 3187.7 | 3204.4 | 3187.7 |
| 20°    | 3174.2 | 3154.2 | 3107.3 | 3117.2 | 3104.1 |
| 22.5°  | 3097.3 | 3067.0 | 3023.2 | 3023.2 | 3016.4 |
| 25°    | 3006.5 | 2979.8 | 2922.8 | 2929.3 | 2922.8 |
| 27.5°  | 2905.7 | 2882.2 | 2838.8 | 2828.8 | 2812.1 |
| 30°    | 2805.4 | 2778.3 | 2728.1 | 2718.1 | 2704.6 |
| 32.5°  | 2697.8 | 2677.9 | 2624.1 | 2603.8 | 2590.3 |
| 35°    | 2593.9 | 2560.4 | 2506.6 | 2486.3 | 2469.6 |
| 37.5°  | 2476.4 | 2446.1 | 2392.4 | 2368.8 | 2352.1 |
| 40°    | 2355.7 | 2328.7 | 2274.9 | 2245.0 | 2231.5 |
| 42.5°  | 2238.2 | 2211.2 | 2157.8 | 2123.9 | 2104.0 |
| 45°    | 2110.8 | 2087.2 | 2036.7 | 2000.1 | 1986.6 |
| 47.5°  | 1986.6 | 1963.1 | 1909.3 | 1872.3 | 1852.3 |
| 50°    | 1855.5 | 1838.8 | 1791.8 | 1744.8 | 1728.1 |
| 52.5°  | 1728.1 | 1704.5 | 1661.2 | 1624.1 | 1600.6 |
| 55°    | 1597.4 | 1577.1 | 1536.9 | 1496.6 | 1479.9 |
| 57.5°  | 1466.4 | 1449.7 | 1405.9 | 1365.6 | 1352.1 |
| 60°    | 1335.4 | 1322.3 | 1275.2 | 1238.2 | 1228.2 |
| 62.5°  | 1207.9 | 1184.5 | 1151.0 | 1117.5 | 1104.0 |
| 65°    | 1077.3 | 1057.0 | 1023.5 | 993.3  | 976.6  |
| 67.5°  | 943.1  | 926.0  | 896.1  | 872.6  | 859.1  |
| 70°    | 818.8  | 805.3  | 775.0  | 751.5  | 738.3  |
| 72.5°  | 691.4  | 677.8  | 661.1  | 637.6  | 627.6  |
| 75°    | 563.5  | 557.2  | 540.1  | 520.2  | 526.9  |
| 77.5°  | 449.6  | 436.1  | 429.3  | 419.4  | 409.4  |
| 80°    | 335.7  | 332.2  | 325.4  | 315.4  | 308.7  |
| 82.5°  | 228.2  | 228.2  | 225.0  | 211.5  | 211.5  |
| 85°    | 137.5  | 134.2  | 131.0  | 120.7  | 117.5  |
| 87.5°  | 60.5   | 53.7   | 47.0   | 37.0   | 33.4   |
| 90°    | 2.1    | 25.2   | 68.6   | 64.3   | 66.4   |
| 92.5°  | 43.4   | 58.8   | 60.9   | 62.9   | 62.9   |
| 95°    | 102.2  | 121.7  | 125.2  | 125.2  | 121.7  |
| 97.5°  | 170.0  | 188.2  | 195.9  | 195.9  | 195.9  |
| 100°   | 248.3  | 264.5  | 270.0  | 270.0  | 268.0  |
| 102.5° | 330.9  | 342.8  | 350.5  | 352.6  | 350.5  |
| 105°   | 421.2  | 426.7  | 431.0  | 434.5  | 434.5  |
| 107.5° | 510.7  | 519.1  | 519.1  | 520.5  | 510.7  |
| 110°   | 597.5  | 608.7  | 608.7  | 608.7  | 603.1  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 691.2  | 703.1  | 701.0  | 695.4  | 691.2  |
| 115°   | 783.6  | 794.8  | 791.2  | 789.2  | 783.6  |
| 117.5° | 875.2  | 890.6  | 880.8  | 875.2  | 869.6  |
| 120°   | 967.6  | 982.9  | 967.6  | 967.6  | 961.2  |
| 122.5° | 1051.5 | 1071.1 | 1061.4 | 1055.7 | 1051.5 |
| 125°   | 1139.7 | 1157.2 | 1151.6 | 1145.2 | 1143.2 |
| 127.5° | 1225.7 | 1247.4 | 1239.7 | 1231.3 | 1225.7 |
| 130°   | 1306.2 | 1331.4 | 1327.9 | 1323.6 | 1316.0 |
| 132.5° | 1396.4 | 1416.0 | 1417.4 | 1407.6 | 1402.1 |
| 135°   | 1474.1 | 1495.7 | 1500.0 | 1497.9 | 1492.3 |
| 137.5° | 1560.8 | 1578.3 | 1581.8 | 1580.5 | 1572.1 |
| 140°   | 1637.1 | 1654.6 | 1664.3 | 1664.3 | 1656.7 |
| 142.5° | 1715.5 | 1732.9 | 1738.5 | 1740.7 | 1732.9 |
| 145°   | 1789.7 | 1803.6 | 1814.8 | 1816.9 | 1809.2 |
| 147.5° | 1856.1 | 1873.6 | 1882.0 | 1885.5 | 1877.8 |
| 150°   | 1924.7 | 1936.6 | 1944.2 | 1950.5 | 1944.2 |
| 152.5° | 1985.5 | 1997.4 | 2007.2 | 2014.9 | 2007.2 |
| 155°   | 2046.4 | 2051.9 | 2058.3 | 2068.1 | 2061.8 |
| 157.5° | 2098.8 | 2103.1 | 2106.6 | 2120.5 | 2110.7 |
| 160°   | 2145.7 | 2149.9 | 2152.1 | 2163.9 | 2155.5 |
| 162.5° | 2189.1 | 2189.1 | 2191.2 | 2204.5 | 2194.7 |
| 165°   | 2226.2 | 2224.1 | 2224.1 | 2238.1 | 2228.3 |
| 167.5° | 2259.8 | 2253.5 | 2253.5 | 2267.4 | 2257.6 |
| 170°   | 2285.0 | 2279.3 | 2277.3 | 2291.2 | 2279.3 |
| 172.5° | 2302.4 | 2296.9 | 2294.7 | 2308.8 | 2296.9 |
| 175°   | 2316.4 | 2310.8 | 2306.6 | 2320.7 | 2308.8 |
| 177.5° | 2324.1 | 2318.5 | 2314.3 | 2326.2 | 2314.3 |
| 180°   | 2320.7 | 2320.7 | 2320.7 | 2320.7 | 2320.7 |

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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 | 11.28            | 12.21 | 12.16 | 13.12 | 14.27 | 10.84          | 11.78 | 11.73 | 12.69 | 13.84 |
|                 | 3H   | 12.94            | 13.78 | 13.84 | 14.70 | 15.88 | 12.47          | 13.31 | 13.37 | 14.23 | 15.41 |
|                 | 4H   | 13.53            | 14.33 | 14.45 | 15.25 | 16.44 | 13.06          | 13.85 | 13.97 | 14.78 | 15.97 |
|                 | 6H   | 13.94            | 14.67 | 14.86 | 15.60 | 16.80 | 13.46          | 14.19 | 14.39 | 15.12 | 16.33 |
|                 | 8H   | 14.05            | 14.74 | 14.98 | 15.69 | 16.89 | 13.57          | 14.27 | 14.50 | 15.21 | 16.42 |
|                 | 12H  | 14.10            | 14.76 | 15.04 | 15.70 | 16.93 | 13.62          | 14.28 | 14.55 | 15.22 | 16.45 |
| 4H              | 2H   | 11.75            | 12.54 | 12.67 | 13.46 | 14.65 | 11.40          | 12.20 | 12.32 | 13.12 | 14.31 |
|                 | 3H   | 13.62            | 14.28 | 14.55 | 15.24 | 16.44 | 13.23          | 13.89 | 14.16 | 14.84 | 16.05 |
|                 | 4H   | 14.34            | 14.94 | 15.28 | 15.89 | 17.12 | 13.93          | 14.54 | 14.87 | 15.49 | 16.72 |
|                 | 6H   | 14.86            | 15.38 | 15.81 | 16.35 | 17.58 | 14.45          | 14.97 | 15.40 | 15.94 | 17.17 |
|                 | 8H   | 15.01            | 15.50 | 15.97 | 16.46 | 17.71 | 14.60          | 15.09 | 15.55 | 16.05 | 17.30 |
|                 | 12H  | 15.09            | 15.53 | 16.06 | 16.51 | 17.76 | 14.67          | 15.11 | 15.64 | 16.09 | 17.34 |
| 8H              | 4H   | 14.54            | 15.03 | 15.50 | 16.00 | 17.24 | 14.18          | 14.67 | 15.14 | 15.63 | 16.88 |
|                 | 6H   | 15.18            | 15.58 | 16.16 | 16.59 | 17.83 | 14.81          | 15.22 | 15.80 | 16.23 | 17.47 |
|                 | 8H   | 15.40            | 15.76 | 16.39 | 16.75 | 18.01 | 15.03          | 15.39 | 16.02 | 16.38 | 17.64 |
|                 | 12H  | 15.54            | 15.85 | 16.53 | 16.84 | 18.15 | 15.15          | 15.46 | 16.15 | 16.45 | 17.76 |
| 12H             | 4H   | 14.53            | 14.97 | 15.51 | 15.95 | 17.20 | 14.18          | 14.62 | 15.15 | 15.60 | 16.85 |
|                 | 6H   | 15.21            | 15.57 | 16.20 | 16.56 | 17.82 | 14.86          | 15.21 | 15.85 | 16.21 | 17.47 |
|                 | 8H   | 15.45            | 15.77 | 16.45 | 16.76 | 18.07 | 15.10          | 15.41 | 16.09 | 16.40 | 17.71 |