

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: P903309

Luminaire Tested: DFN2DIP-PN4F0-080D090US830-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P903309  
REPORT IS A COMBINATION OF REPORTS P901227 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-080D090US830-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

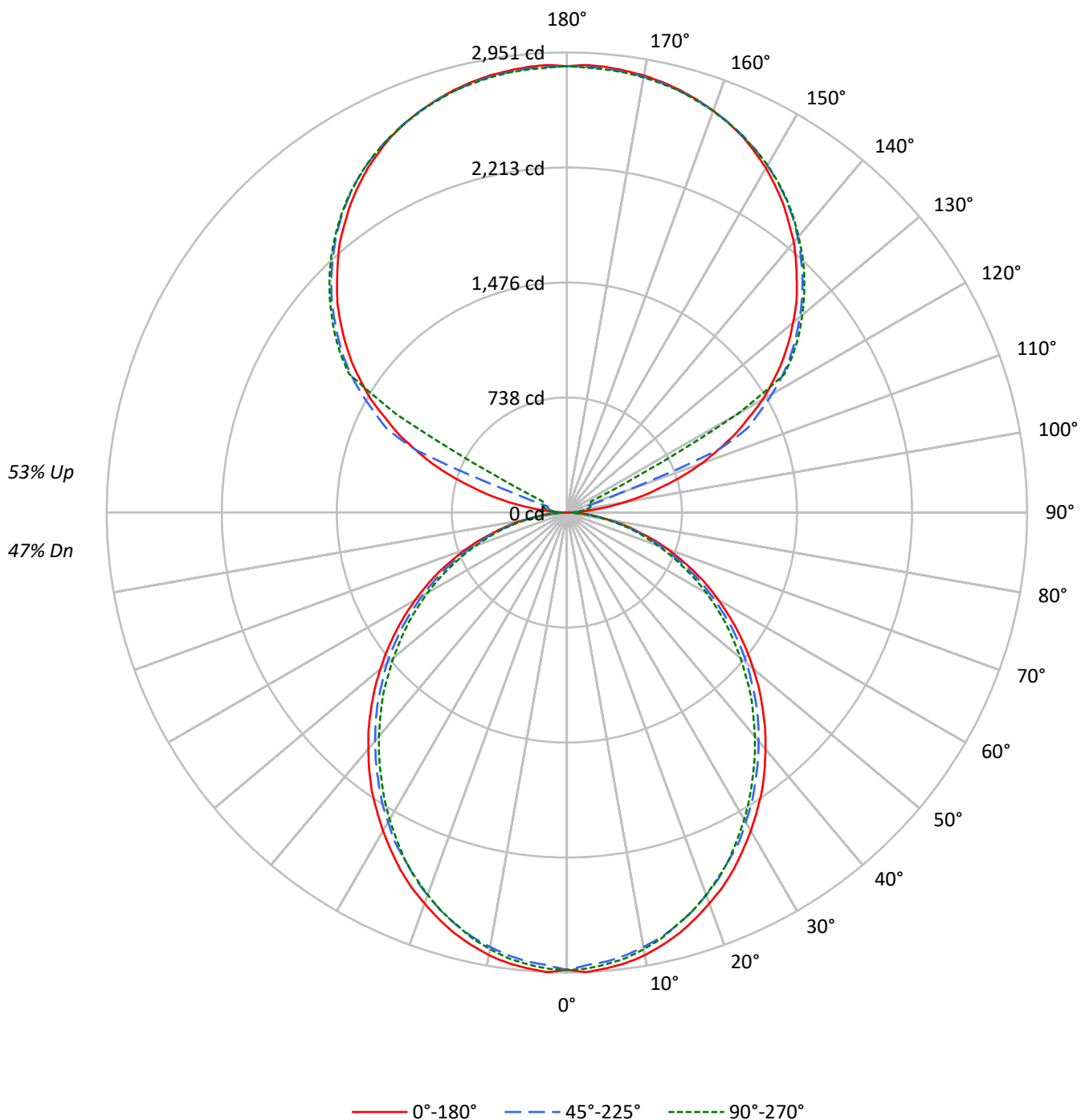
Lumens per Lamp: N/A  
Luminaire Lumens: 15863.0 lumens  
Efficiency: N/A  
Efficacy: 110.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 143.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9971  
Total Harmonic Distortion (THDi): 0.049  
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 |    |    |    |    | 0  |
| RW  | 70  | 50  | 30  | 10  | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 106 | 106 | 106 | 106 | 98 | 98 | 98 | 98 | 82 | 82 | 82 | 67 | 67 | 67 | 53 | 53 | 53 | 47 | 47 | 47 |
| 1   | 97  | 93  | 89  | 85  | 89 | 85 | 82 | 79 | 72 | 69 | 67 | 59 | 57 | 56 | 47 | 46 | 45 | 40 | 40 | 40 |
| 2   | 88  | 81  | 75  | 70  | 81 | 75 | 69 | 65 | 63 | 59 | 56 | 52 | 49 | 47 | 42 | 40 | 38 | 33 | 33 | 33 |
| 3   | 81  | 71  | 64  | 58  | 74 | 66 | 59 | 54 | 55 | 51 | 47 | 46 | 42 | 39 | 37 | 34 | 32 | 28 | 28 | 28 |
| 4   | 74  | 63  | 55  | 49  | 68 | 58 | 51 | 46 | 49 | 44 | 40 | 41 | 37 | 34 | 33 | 30 | 28 | 24 | 24 | 24 |
| 5   | 68  | 56  | 48  | 42  | 62 | 52 | 45 | 39 | 44 | 39 | 34 | 37 | 32 | 29 | 30 | 27 | 24 | 21 | 21 | 21 |
| 6   | 62  | 50  | 42  | 36  | 57 | 47 | 39 | 34 | 40 | 34 | 30 | 33 | 29 | 26 | 27 | 24 | 21 | 18 | 18 | 18 |
| 7   | 58  | 45  | 38  | 32  | 53 | 42 | 35 | 30 | 36 | 30 | 26 | 30 | 26 | 23 | 25 | 21 | 19 | 16 | 16 | 16 |
| 8   | 53  | 41  | 34  | 28  | 49 | 38 | 31 | 27 | 33 | 27 | 23 | 28 | 23 | 20 | 23 | 19 | 17 | 15 | 15 | 15 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 28 | 24 | 30 | 25 | 21 | 25 | 21 | 18 | 21 | 18 | 15 | 13 | 13 | 13 |
| 10  | 47  | 34  | 27  | 23  | 43 | 32 | 26 | 21 | 28 | 22 | 19 | 23 | 19 | 16 | 19 | 16 | 14 | 12 | 12 | 12 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2142 | 2142 | 2142 |
| 5°  | 2145 | 2112 | 2127 |
| 10° | 2128 | 2084 | 2098 |
| 15° | 2096 | 2050 | 2054 |
| 20° | 2054 | 2003 | 2008 |
| 25° | 2012 | 1946 | 1955 |
| 30° | 1959 | 1893 | 1888 |
| 35° | 1909 | 1831 | 1816 |
| 40° | 1848 | 1768 | 1749 |
| 45° | 1787 | 1705 | 1679 |
| 50° | 1720 | 1639 | 1599 |
| 55° | 1649 | 1562 | 1525 |
| 60° | 1570 | 1471 | 1441 |
| 65° | 1484 | 1377 | 1341 |
| 70° | 1373 | 1263 | 1234 |
| 75° | 1221 | 1126 | 1136 |
| 80° | 1037 | 951  | 947  |
| 85° | 750  | 649  | 634  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 1787 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 276.1   | 1.7       |
| 10°-20°   | 777.0   | 4.9       |
| 20°-30°   | 1141.8  | 7.2       |
| 30°-40°   | 1326.2  | 8.4       |
| 40°-50°   | 1324.5  | 8.3       |
| 50°-60°   | 1155.0  | 7.3       |
| 60°-70°   | 853.8   | 5.4       |
| 70°-80°   | 483.0   | 3.0       |
| 80°-90°   | 132.5   | 0.8       |
| 90°-100°  | 94.4    | 0.6       |
| 100°-110° | 351.9   | 2.2       |
| 110°-120° | 933.3   | 5.9       |
| 120°-130° | 1548.0  | 9.8       |
| 130°-140° | 1644.3  | 10.4      |
| 140°-150° | 1528.2  | 9.6       |
| 150°-160° | 1228.6  | 7.7       |
| 160°-170° | 791.7   | 5.0       |
| 170°-180° | 272.5   | 1.7       |
| 0°-30°    | 2195.0  | 13.8      |
| 0°-40°    | 3521.1  | 22.2      |
| 0°-60°    | 6000.6  | 37.8      |
| 0°-90°    | 7470.0  | 47.1      |
| 90°-120°  | 1379.6  | 8.7       |
| 90°-150°  | 6100.2  | 38.5      |
| 90°-180°  | 8393.0  | 52.9      |
| 0°-180°   | 15863.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2934 | 2934  | 2934 | 2934  | 2934 |      |
| 5°   | 2934 | 2923  | 2892 | 2914  | 2909 | 279  |
| 15°  | 2793 | 2776  | 2739 | 2751  | 2737 | 787  |
| 25°  | 2528 | 2505  | 2458 | 2463  | 2458 | 1163 |
| 35°  | 2181 | 2153  | 2108 | 2090  | 2076 | 1362 |
| 45°  | 1775 | 1755  | 1712 | 1682  | 1670 | 1370 |
| 55°  | 1343 | 1326  | 1292 | 1258  | 1244 | 1201 |
| 65°  | 906  | 889   | 860  | 835   | 821  | 896  |
| 75°  | 474  | 468   | 454  | 437   | 443  | 506  |
| 85°  | 116  | 113   | 110  | 102   | 99   | 129  |
| 90°  | 2    | 25    | 41   | 52    | 56   | 15   |
| 95°  | 135  | 66    | 81   | 91    | 89   | 159  |
| 105° | 630  | 692   | 126  | 149   | 157  | 673  |
| 115° | 1191 | 1226  | 1278 | 319   | 170  | 1173 |
| 125° | 1684 | 1711  | 1750 | 1765  | 1771 | 1502 |
| 135° | 2084 | 2117  | 2136 | 2157  | 2152 | 1610 |
| 145° | 2418 | 2415  | 2451 | 2465  | 2455 | 1512 |
| 155° | 2662 | 2644  | 2668 | 2681  | 2664 | 1227 |
| 165° | 2805 | 2792  | 2799 | 2813  | 2799 | 792  |
| 175° | 2869 | 2854  | 2859 | 2873  | 2852 | 273  |
| 180° | 2863 | 2863  | 2863 | 2863  | 2863 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2933.9 | 2933.9 | 2933.9 | 2933.9 | 2933.9 |
| 2.5°   | 2951.0 | 2937.0 | 2905.9 | 2933.9 | 2928.6 |
| 5°     | 2933.9 | 2922.9 | 2891.8 | 2914.2 | 2908.9 |
| 7.5°   | 2914.2 | 2897.5 | 2866.4 | 2889.1 | 2883.4 |
| 10°    | 2883.4 | 2863.6 | 2829.8 | 2852.2 | 2843.9 |
| 12.5°  | 2840.9 | 2824.1 | 2790.3 | 2804.3 | 2798.7 |
| 15°    | 2793.0 | 2776.3 | 2739.4 | 2750.8 | 2736.8 |
| 17.5°  | 2733.7 | 2717.0 | 2680.1 | 2694.3 | 2680.1 |
| 20°    | 2668.8 | 2652.0 | 2612.5 | 2620.9 | 2609.8 |
| 22.5°  | 2604.2 | 2578.7 | 2541.8 | 2541.8 | 2536.2 |
| 25°    | 2527.8 | 2505.4 | 2457.5 | 2462.9 | 2457.5 |
| 27.5°  | 2443.1 | 2423.4 | 2386.8 | 2378.4 | 2364.4 |
| 30°    | 2358.7 | 2335.9 | 2293.8 | 2285.4 | 2274.0 |
| 32.5°  | 2268.3 | 2251.5 | 2206.3 | 2189.2 | 2177.9 |
| 35°    | 2180.9 | 2152.8 | 2107.5 | 2090.5 | 2076.4 |
| 37.5°  | 2082.1 | 2056.6 | 2011.5 | 1991.7 | 1977.6 |
| 40°    | 1980.7 | 1957.8 | 1912.7 | 1887.5 | 1876.1 |
| 42.5°  | 1881.9 | 1859.1 | 1814.2 | 1785.7 | 1769.1 |
| 45°    | 1774.7 | 1754.9 | 1712.4 | 1681.6 | 1670.3 |
| 47.5°  | 1670.3 | 1650.5 | 1605.2 | 1574.1 | 1557.4 |
| 50°    | 1560.1 | 1546.1 | 1506.5 | 1467.0 | 1452.9 |
| 52.5°  | 1452.9 | 1433.1 | 1396.7 | 1365.6 | 1345.8 |
| 55°    | 1343.0 | 1326.0 | 1292.2 | 1258.4 | 1244.3 |
| 57.5°  | 1232.9 | 1218.9 | 1182.0 | 1148.2 | 1136.8 |
| 60°    | 1122.8 | 1111.7 | 1072.1 | 1041.0 | 1032.6 |
| 62.5°  | 1015.6 | 995.9  | 967.7  | 939.6  | 928.2  |
| 65°    | 905.8  | 888.7  | 860.5  | 835.1  | 821.0  |
| 67.5°  | 792.9  | 778.5  | 753.4  | 733.7  | 722.3  |
| 70°    | 688.4  | 677.0  | 651.7  | 631.9  | 620.8  |
| 72.5°  | 581.3  | 570.0  | 555.8  | 536.1  | 527.7  |
| 75°    | 473.8  | 468.4  | 454.1  | 437.3  | 443.0  |
| 77.5°  | 378.1  | 366.6  | 361.0  | 352.6  | 344.2  |
| 80°    | 282.3  | 279.3  | 273.6  | 265.2  | 259.5  |
| 82.5°  | 191.9  | 191.9  | 189.2  | 177.8  | 177.8  |
| 85°    | 115.6  | 112.8  | 110.2  | 101.5  | 98.8   |
| 87.5°  | 50.9   | 45.2   | 39.5   | 31.1   | 28.2   |
| 90°    | 2.0    | 24.9   | 41.3   | 51.9   | 55.8   |
| 92.5°  | 51.9   | 43.5   | 49.7   | 53.9   | 55.8   |
| 95°    | 134.6  | 66.2   | 80.7   | 91.2   | 89.1   |
| 97.5°  | 242.3  | 72.6   | 105.6  | 111.9  | 113.9  |
| 100°   | 366.7  | 82.9   | 118.1  | 134.6  | 138.7  |
| 102.5° | 503.3  | 499.4  | 122.2  | 144.9  | 151.3  |
| 105°   | 629.7  | 692.0  | 126.4  | 149.1  | 157.4  |
| 107.5° | 776.8  | 828.5  | 130.6  | 153.3  | 161.6  |
| 110°   | 917.8  | 961.1  | 362.6  | 155.4  | 163.6  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1050.4 | 1087.5 | 1052.3 | 159.4  | 165.8  |
| 115°   | 1191.1 | 1226.2 | 1278.2 | 319.1  | 169.9  |
| 117.5° | 1313.3 | 1354.7 | 1390.1 | 1093.7 | 551.0  |
| 120°   | 1450.1 | 1481.1 | 1518.5 | 1543.3 | 1263.7 |
| 122.5° | 1566.0 | 1599.2 | 1640.8 | 1653.0 | 1655.3 |
| 125°   | 1684.0 | 1711.1 | 1750.5 | 1765.0 | 1771.1 |
| 127.5° | 1791.8 | 1820.8 | 1852.1 | 1872.7 | 1874.7 |
| 130°   | 1893.4 | 1926.7 | 1949.3 | 1972.1 | 1970.2 |
| 132.5° | 1997.0 | 2024.0 | 2046.6 | 2065.4 | 2063.4 |
| 135°   | 2084.1 | 2117.2 | 2135.7 | 2156.6 | 2152.5 |
| 137.5° | 2175.1 | 2199.9 | 2220.8 | 2241.5 | 2235.3 |
| 140°   | 2264.1 | 2280.9 | 2303.5 | 2322.1 | 2311.9 |
| 142.5° | 2338.9 | 2353.4 | 2380.2 | 2396.7 | 2386.4 |
| 145°   | 2417.6 | 2415.4 | 2450.6 | 2465.1 | 2454.8 |
| 147.5° | 2485.8 | 2479.6 | 2514.8 | 2525.2 | 2517.0 |
| 150°   | 2552.2 | 2537.7 | 2570.9 | 2583.1 | 2572.9 |
| 152.5° | 2608.0 | 2591.5 | 2622.5 | 2635.1 | 2620.6 |
| 155°   | 2661.9 | 2643.5 | 2668.2 | 2680.6 | 2664.1 |
| 157.5° | 2705.5 | 2689.0 | 2707.6 | 2722.2 | 2705.5 |
| 160°   | 2742.8 | 2730.3 | 2742.8 | 2755.1 | 2740.6 |
| 162.5° | 2775.8 | 2763.4 | 2773.8 | 2788.3 | 2769.7 |
| 165°   | 2804.8 | 2792.5 | 2798.7 | 2813.2 | 2798.7 |
| 167.5° | 2827.7 | 2815.2 | 2821.5 | 2836.0 | 2817.4 |
| 170°   | 2846.4 | 2833.8 | 2838.0 | 2852.5 | 2833.8 |
| 172.5° | 2858.7 | 2846.4 | 2850.5 | 2865.0 | 2846.4 |
| 175°   | 2869.0 | 2854.5 | 2858.7 | 2873.2 | 2852.5 |
| 177.5° | 2873.2 | 2858.7 | 2860.9 | 2875.4 | 2856.8 |
| 180°   | 2862.9 | 2862.9 | 2862.9 | 2862.9 | 2862.9 |

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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 | 9.65             | 10.49 | 10.63 | 11.48 | 12.79 | 9.21           | 10.05 | 10.19 | 11.04 | 12.35 |
|                 | 3H   | 11.31            | 12.06 | 12.30 | 13.06 | 14.40 | 10.83          | 11.58 | 11.82 | 12.58 | 13.91 |
|                 | 4H   | 11.90            | 12.61 | 12.90 | 13.62 | 14.96 | 11.41          | 12.12 | 12.42 | 13.13 | 14.47 |
|                 | 6H   | 12.30            | 12.95 | 13.32 | 13.97 | 15.32 | 11.81          | 12.46 | 12.82 | 13.47 | 14.83 |
|                 | 8H   | 12.41            | 13.03 | 13.43 | 14.06 | 15.41 | 11.91          | 12.53 | 12.93 | 13.56 | 14.91 |
|                 | 12H  | 12.45            | 13.05 | 13.48 | 14.07 | 15.44 | 11.95          | 12.55 | 12.98 | 13.57 | 14.94 |
| 4H              | 2H   | 10.11            | 10.82 | 11.12 | 11.82 | 13.17 | 9.76           | 10.47 | 10.77 | 11.47 | 12.81 |
|                 | 3H   | 11.97            | 12.57 | 13.00 | 13.60 | 14.96 | 11.57          | 12.16 | 12.59 | 13.20 | 14.56 |
|                 | 4H   | 12.69            | 13.23 | 13.72 | 14.26 | 15.64 | 12.27          | 12.81 | 13.30 | 13.84 | 15.22 |
|                 | 6H   | 13.21            | 13.67 | 14.25 | 14.72 | 16.10 | 12.78          | 13.25 | 13.82 | 14.30 | 15.67 |
|                 | 8H   | 13.36            | 13.79 | 14.40 | 14.84 | 16.23 | 12.93          | 13.36 | 13.97 | 14.41 | 15.80 |
|                 | 12H  | 13.43            | 13.82 | 14.49 | 14.88 | 16.28 | 12.99          | 13.38 | 14.05 | 14.44 | 15.84 |
| 8H              | 4H   | 12.89            | 13.32 | 13.92 | 14.36 | 15.75 | 12.51          | 12.95 | 13.55 | 13.99 | 15.38 |
|                 | 6H   | 13.52            | 13.88 | 14.58 | 14.96 | 16.35 | 13.14          | 13.50 | 14.21 | 14.59 | 15.98 |
|                 | 8H   | 13.74            | 14.06 | 14.81 | 15.13 | 16.53 | 13.36          | 13.67 | 14.43 | 14.74 | 16.15 |
|                 | 12H  | 13.87            | 14.15 | 14.95 | 15.22 | 16.66 | 13.47          | 13.75 | 14.55 | 14.82 | 16.26 |
| 12H             | 4H   | 12.87            | 13.26 | 13.93 | 14.32 | 15.72 | 12.51          | 12.90 | 13.57 | 13.96 | 15.35 |
|                 | 6H   | 13.55            | 13.87 | 14.62 | 14.94 | 16.34 | 13.18          | 13.50 | 14.25 | 14.57 | 15.98 |
|                 | 8H   | 13.79            | 14.07 | 14.87 | 15.14 | 16.58 | 13.42          | 13.70 | 14.49 | 14.76 | 16.21 |