

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: P903413

Luminaire Tested: DFN2DIP-PN4F0-110D080US830-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P903413  
REPORT IS A COMBINATION OF REPORTS P901215 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-110D080US830-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

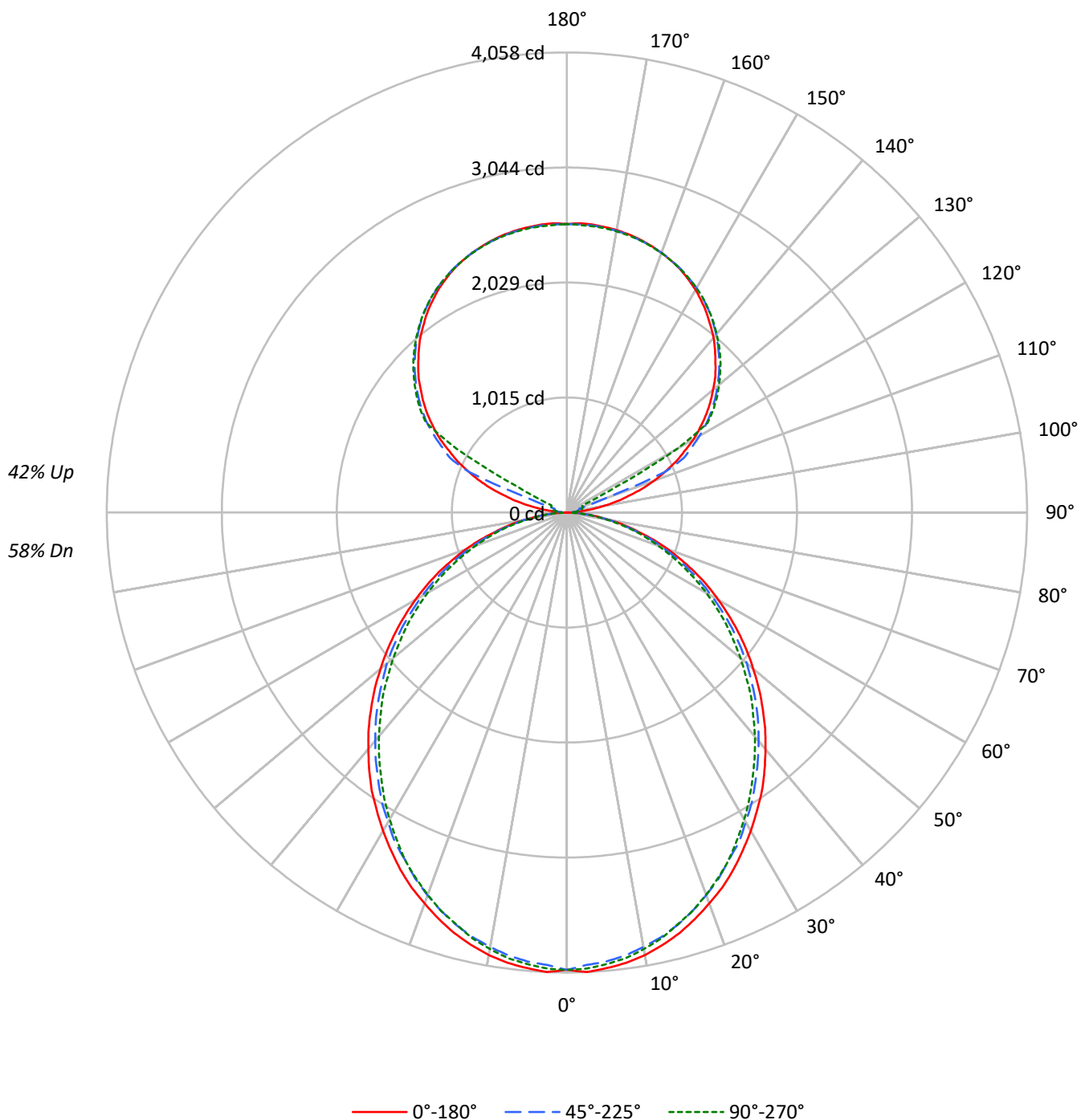
Lumens per Lamp: N/A  
Luminaire Lumens: 17729.2 lumens  
Efficiency: N/A  
Efficacy: 103.0 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 172.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.996  
Total Harmonic Distortion (THDi): 0.064  
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   | 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 | 63 | 56 | 55 | 54 |
| 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  | 57  | 60 | 54 | 50 | 51 | 47 | 44 | 44 | 41 | 38 |
| 4   | 76  | 65  | 57  | 51  | 70  | 61  | 54  | 48  | 53 | 47 | 43 | 46 | 41 | 38 | 39 | 36 | 33 |
| 5   | 70  | 58  | 50  | 43  | 65  | 54  | 47  | 41  | 47 | 42 | 37 | 41 | 37 | 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 | 26 | 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  | 33 | 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°  | 2945 | 2945 | 2945 |
| 5°  | 2950 | 2904 | 2924 |
| 10° | 2926 | 2865 | 2885 |
| 15° | 2883 | 2819 | 2824 |
| 20° | 2824 | 2754 | 2761 |
| 25° | 2767 | 2676 | 2688 |
| 30° | 2694 | 2603 | 2595 |
| 35° | 2625 | 2517 | 2498 |
| 40° | 2541 | 2431 | 2404 |
| 45° | 2457 | 2344 | 2309 |
| 50° | 2364 | 2253 | 2199 |
| 55° | 2268 | 2148 | 2097 |
| 60° | 2159 | 2023 | 1981 |
| 65° | 2040 | 1894 | 1844 |
| 70° | 1889 | 1737 | 1697 |
| 75° | 1678 | 1548 | 1562 |
| 80° | 1426 | 1308 | 1303 |
| 85° | 1031 | 893  | 871  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2457 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 379.7   | 2.1       |
| 10°-20°   | 1068.3  | 6.0       |
| 20°-30°   | 1570.0  | 8.9       |
| 30°-40°   | 1823.5  | 10.3      |
| 40°-50°   | 1821.2  | 10.3      |
| 50°-60°   | 1588.0  | 9.0       |
| 60°-70°   | 1173.9  | 6.6       |
| 70°-80°   | 664.2   | 3.7       |
| 80°-90°   | 179.8   | 1.0       |
| 90°-100°  | 83.9    | 0.5       |
| 100°-110° | 312.8   | 1.8       |
| 110°-120° | 829.6   | 4.7       |
| 120°-130° | 1376.0  | 7.8       |
| 130°-140° | 1461.6  | 8.2       |
| 140°-150° | 1358.4  | 7.7       |
| 150°-160° | 1092.1  | 6.2       |
| 160°-170° | 703.7   | 4.0       |
| 170°-180° | 242.2   | 1.4       |
| 0°-30°    | 3018.1  | 17.0      |
| 0°-40°    | 4841.6  | 27.3      |
| 0°-60°    | 8250.9  | 46.5      |
| 0°-90°    | 10268.7 | 57.9      |
| 90°-120°  | 1226.4  | 6.9       |
| 90°-150°  | 5422.4  | 30.6      |
| 90°-180°  | 7460.0  | 42.1      |
| 0°-180°   | 17729.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4034 | 4034  | 4034 | 4034  | 4034 |      |
| 5°   | 4034 | 4019  | 3976 | 4007  | 4000 | 383  |
| 15°  | 3840 | 3817  | 3767 | 3782  | 3763 | 1082 |
| 25°  | 3476 | 3445  | 3379 | 3386  | 3379 | 1599 |
| 35°  | 2999 | 2960  | 2898 | 2874  | 2855 | 1873 |
| 45°  | 2440 | 2413  | 2355 | 2312  | 2297 | 1883 |
| 55°  | 1847 | 1823  | 1777 | 1730  | 1711 | 1651 |
| 65°  | 1245 | 1222  | 1183 | 1148  | 1129 | 1231 |
| 75°  | 652  | 644   | 624  | 601   | 609  | 696  |
| 85°  | 159  | 155   | 152  | 140   | 136  | 177  |
| 90°  | 2    | 22    | 37   | 46    | 50   | 16   |
| 95°  | 120  | 59    | 72   | 81    | 79   | 142  |
| 105° | 560  | 615   | 112  | 132   | 140  | 598  |
| 115° | 1059 | 1090  | 1136 | 284   | 151  | 1042 |
| 125° | 1497 | 1521  | 1556 | 1569  | 1574 | 1335 |
| 135° | 1852 | 1882  | 1898 | 1917  | 1913 | 1431 |
| 145° | 2149 | 2147  | 2178 | 2191  | 2182 | 1344 |
| 155° | 2366 | 2350  | 2372 | 2383  | 2368 | 1090 |
| 165° | 2493 | 2482  | 2488 | 2501  | 2488 | 704  |
| 175° | 2550 | 2537  | 2541 | 2554  | 2536 | 243  |
| 180° | 2545 | 2545  | 2545 | 2545  | 2545 |      |

TEST NUMBER: P903413

CATALOG NUMBER: DFN2DIP-PN4F0-110D080US830-FLLONL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4034.3 | 4034.3 | 4034.3 | 4034.3 | 4034.3 |
| 2.5°   | 4057.6 | 4038.3 | 3995.5 | 4034.3 | 4026.8 |
| 5°     | 4034.3 | 4019.0 | 3976.2 | 4007.0 | 3999.7 |
| 7.5°   | 4007.0 | 3984.0 | 3941.2 | 3972.5 | 3964.7 |
| 10°    | 3964.7 | 3937.5 | 3891.0 | 3921.8 | 3910.3 |
| 12.5°  | 3906.3 | 3883.2 | 3836.7 | 3856.0 | 3848.2 |
| 15°    | 3840.4 | 3817.3 | 3766.7 | 3782.3 | 3763.0 |
| 17.5°  | 3758.9 | 3735.9 | 3685.2 | 3704.6 | 3685.2 |
| 20°    | 3669.6 | 3646.5 | 3592.2 | 3603.7 | 3588.5 |
| 22.5°  | 3580.7 | 3545.7 | 3495.0 | 3495.0 | 3487.2 |
| 25°    | 3475.7 | 3444.9 | 3379.0 | 3386.5 | 3379.0 |
| 27.5°  | 3359.2 | 3332.1 | 3281.8 | 3270.3 | 3251.0 |
| 30°    | 3243.2 | 3211.9 | 3153.8 | 3142.3 | 3126.7 |
| 32.5°  | 3118.9 | 3095.9 | 3033.7 | 3010.2 | 2994.6 |
| 35°    | 2998.7 | 2960.1 | 2897.8 | 2874.4 | 2855.1 |
| 37.5°  | 2862.9 | 2827.9 | 2765.8 | 2738.6 | 2719.2 |
| 40°    | 2723.4 | 2692.1 | 2630.0 | 2595.4 | 2579.7 |
| 42.5°  | 2587.6 | 2556.3 | 2494.5 | 2455.4 | 2432.4 |
| 45°    | 2440.2 | 2413.0 | 2354.6 | 2312.2 | 2296.6 |
| 47.5°  | 2296.6 | 2269.5 | 2207.2 | 2164.5 | 2141.4 |
| 50°    | 2145.1 | 2125.8 | 2071.4 | 2017.1 | 1997.8 |
| 52.5°  | 1997.8 | 1970.6 | 1920.4 | 1877.5 | 1850.4 |
| 55°    | 1846.7 | 1823.3 | 1776.8 | 1730.2 | 1710.9 |
| 57.5°  | 1695.3 | 1675.9 | 1625.3 | 1578.8 | 1563.1 |
| 60°    | 1543.8 | 1528.6 | 1474.2 | 1431.4 | 1419.9 |
| 62.5°  | 1396.5 | 1369.3 | 1330.6 | 1291.9 | 1276.3 |
| 65°    | 1245.4 | 1221.9 | 1183.3 | 1148.3 | 1129.0 |
| 67.5°  | 1090.2 | 1070.5 | 1035.9 | 1008.8 | 993.2  |
| 70°    | 946.6  | 930.9  | 896.0  | 868.8  | 853.6  |
| 72.5°  | 799.3  | 783.6  | 764.3  | 737.2  | 725.6  |
| 75°    | 651.5  | 644.1  | 624.3  | 601.3  | 609.2  |
| 77.5°  | 519.8  | 504.2  | 496.3  | 484.8  | 473.3  |
| 80°    | 388.1  | 384.0  | 376.2  | 364.7  | 356.8  |
| 82.5°  | 263.8  | 263.8  | 260.1  | 244.5  | 244.5  |
| 85°    | 158.9  | 155.1  | 151.5  | 139.5  | 135.8  |
| 87.5°  | 69.9   | 62.1   | 54.3   | 42.8   | 38.6   |
| 90°    | 1.8    | 22.1   | 36.8   | 46.1   | 49.7   |
| 92.5°  | 46.1   | 38.7   | 44.2   | 47.9   | 49.7   |
| 95°    | 119.6  | 58.8   | 71.7   | 81.2   | 79.2   |
| 97.5°  | 215.4  | 64.5   | 93.8   | 99.5   | 101.2  |
| 100°   | 326.0  | 73.7   | 105.0  | 119.6  | 123.3  |
| 102.5° | 447.4  | 443.8  | 108.7  | 128.8  | 134.5  |
| 105°   | 559.8  | 615.1  | 112.4  | 132.5  | 140.0  |
| 107.5° | 690.5  | 736.4  | 116.1  | 136.2  | 143.6  |
| 110°   | 815.9  | 854.3  | 322.3  | 138.2  | 145.4  |

TEST NUMBER: P903413

CATALOG NUMBER: DFN2DIP-PN4F0-110D080US830-FLLONL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 933.7  | 966.7  | 935.5  | 141.7  | 147.4  |
| 115°   | 1058.8 | 1090.1 | 1136.1 | 283.6  | 151.1  |
| 117.5° | 1167.4 | 1204.2 | 1235.7 | 972.1  | 489.8  |
| 120°   | 1289.0 | 1316.5 | 1349.8 | 1371.9 | 1123.2 |
| 122.5° | 1391.9 | 1421.5 | 1458.5 | 1469.4 | 1471.4 |
| 125°   | 1496.9 | 1521.0 | 1555.9 | 1568.9 | 1574.3 |
| 127.5° | 1592.7 | 1618.5 | 1646.3 | 1664.6 | 1666.4 |
| 130°   | 1683.0 | 1712.5 | 1732.7 | 1753.0 | 1751.2 |
| 132.5° | 1775.1 | 1799.1 | 1819.3 | 1835.9 | 1834.1 |
| 135°   | 1852.5 | 1882.0 | 1898.4 | 1917.0 | 1913.3 |
| 137.5° | 1933.4 | 1955.5 | 1974.1 | 1992.4 | 1987.0 |
| 140°   | 2012.5 | 2027.4 | 2047.6 | 2064.2 | 2054.9 |
| 142.5° | 2079.1 | 2091.9 | 2115.7 | 2130.4 | 2121.2 |
| 145°   | 2149.0 | 2147.0 | 2178.3 | 2191.2 | 2182.0 |
| 147.5° | 2209.6 | 2204.1 | 2235.3 | 2244.6 | 2237.3 |
| 150°   | 2268.6 | 2255.7 | 2285.2 | 2296.1 | 2287.0 |
| 152.5° | 2318.3 | 2303.6 | 2331.1 | 2342.3 | 2329.4 |
| 155°   | 2366.2 | 2349.8 | 2371.8 | 2382.7 | 2368.1 |
| 157.5° | 2404.8 | 2390.2 | 2406.8 | 2419.7 | 2404.8 |
| 160°   | 2438.1 | 2427.0 | 2438.1 | 2449.0 | 2436.1 |
| 162.5° | 2467.4 | 2456.5 | 2465.6 | 2478.5 | 2461.9 |
| 165°   | 2493.2 | 2482.3 | 2487.7 | 2500.6 | 2487.7 |
| 167.5° | 2513.5 | 2502.4 | 2508.0 | 2520.9 | 2504.3 |
| 170°   | 2530.2 | 2518.9 | 2522.7 | 2535.6 | 2518.9 |
| 172.5° | 2541.1 | 2530.2 | 2533.8 | 2546.7 | 2530.2 |
| 175°   | 2550.2 | 2537.3 | 2541.1 | 2553.9 | 2535.6 |
| 177.5° | 2553.9 | 2541.1 | 2543.0 | 2555.9 | 2539.3 |
| 180°   | 2544.8 | 2544.8 | 2544.8 | 2544.8 | 2544.8 |

TEST NUMBER: P903413

CATALOG NUMBER: DFN2DIP-PN4F0-110D080US830-FLONL

**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 | 11.73            | 12.67 | 12.62 | 13.58 | 14.73 | 11.29          | 12.23 | 12.18 | 13.14 | 14.29 |
|                 | 3H   | 13.40            | 14.24 | 14.30 | 15.16 | 16.34 | 12.92          | 13.76 | 13.81 | 14.67 | 15.85 |
|                 | 4H   | 13.99            | 14.79 | 14.91 | 15.71 | 16.90 | 13.51          | 14.30 | 14.42 | 15.22 | 16.41 |
|                 | 6H   | 14.40            | 15.13 | 15.33 | 16.06 | 17.26 | 13.91          | 14.64 | 14.83 | 15.57 | 16.77 |
|                 | 8H   | 14.51            | 15.21 | 15.44 | 16.15 | 17.35 | 14.02          | 14.71 | 14.95 | 15.66 | 16.86 |
|                 | 12H  | 14.56            | 15.23 | 15.50 | 16.16 | 17.39 | 14.06          | 14.73 | 15.00 | 15.66 | 16.89 |
| 4H              | 2H   | 12.20            | 13.00 | 13.12 | 13.92 | 15.11 | 11.85          | 12.65 | 12.77 | 13.57 | 14.76 |
|                 | 3H   | 14.08            | 14.74 | 15.01 | 15.69 | 16.90 | 13.68          | 14.34 | 14.61 | 15.29 | 16.50 |
|                 | 4H   | 14.80            | 15.40 | 15.74 | 16.35 | 17.58 | 14.38          | 14.99 | 15.32 | 15.93 | 17.16 |
|                 | 6H   | 15.32            | 15.84 | 16.27 | 16.81 | 18.04 | 14.90          | 15.42 | 15.85 | 16.39 | 17.62 |
|                 | 8H   | 15.47            | 15.96 | 16.43 | 16.93 | 18.17 | 15.05          | 15.53 | 16.00 | 16.50 | 17.74 |
|                 | 12H  | 15.55            | 15.99 | 16.53 | 16.97 | 18.22 | 15.11          | 15.55 | 16.09 | 16.53 | 17.78 |
| 8H              | 4H   | 15.00            | 15.49 | 15.96 | 16.45 | 17.70 | 14.63          | 15.12 | 15.59 | 16.08 | 17.33 |
|                 | 6H   | 15.64            | 16.04 | 16.62 | 17.05 | 18.29 | 15.26          | 15.67 | 16.24 | 16.67 | 17.91 |
|                 | 8H   | 15.86            | 16.22 | 16.85 | 17.22 | 18.47 | 15.48          | 15.84 | 16.47 | 16.83 | 18.09 |
|                 | 12H  | 16.00            | 16.31 | 16.99 | 17.30 | 18.61 | 15.60          | 15.91 | 16.59 | 16.90 | 18.21 |
| 12H             | 4H   | 14.99            | 15.43 | 15.97 | 16.41 | 17.66 | 14.63          | 15.07 | 15.60 | 16.05 | 17.30 |
|                 | 6H   | 15.67            | 16.03 | 16.66 | 17.02 | 18.28 | 15.31          | 15.66 | 16.30 | 16.66 | 17.92 |
|                 | 8H   | 15.92            | 16.23 | 16.91 | 17.22 | 18.53 | 15.55          | 15.86 | 16.54 | 16.85 | 18.15 |