

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: P914313

Luminaire Tested: DFN2DIP-PN4F0-110D050US927-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P914313  
REPORT IS A COMBINATION OF REPORTS P901161 AND P898053  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-110D050US927-FLLONL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

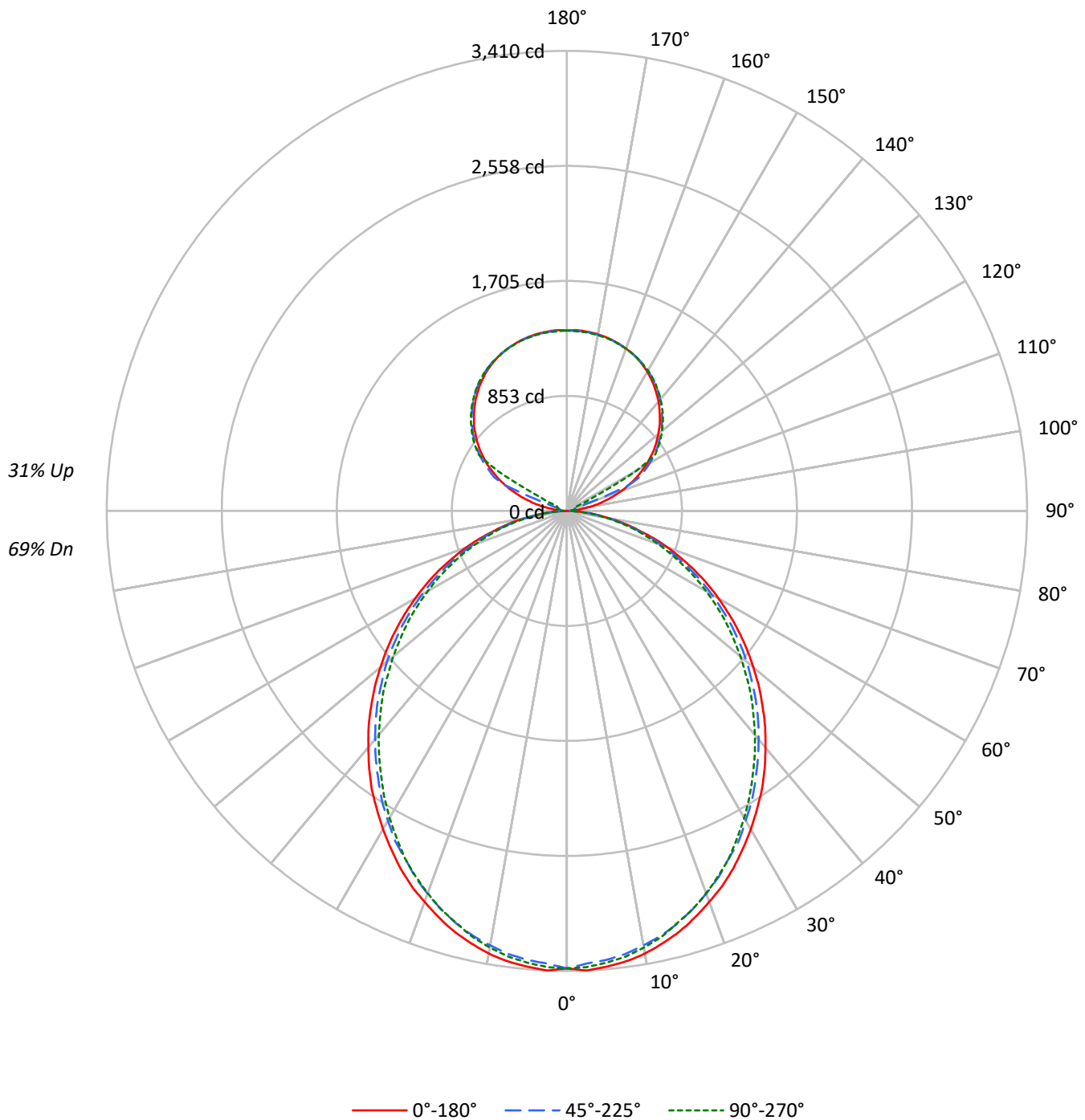
Lumens per Lamp: N/A  
Luminaire Lumens: 12548.1 lumens  
Efficiency: N/A  
Efficacy: 82.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 151.9  
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   | 112 | 112 | 112 | 112 | 105 | 105 | 105 | 105 | 94 | 94 | 94 | 83 | 83 | 83 | 73 | 73 | 73 |
| 1   | 102 | 98  | 94  | 90  | 96  | 92  | 89  | 86  | 82 | 80 | 77 | 73 | 71 | 69 | 65 | 63 | 62 |
| 2   | 93  | 85  | 79  | 74  | 87  | 81  | 75  | 70  | 72 | 68 | 64 | 64 | 61 | 58 | 57 | 55 | 52 |
| 3   | 85  | 75  | 67  | 61  | 80  | 71  | 64  | 59  | 64 | 58 | 54 | 57 | 53 | 49 | 51 | 47 | 45 |
| 4   | 78  | 66  | 58  | 52  | 73  | 63  | 56  | 50  | 57 | 51 | 46 | 51 | 46 | 42 | 45 | 42 | 38 |
| 5   | 71  | 59  | 51  | 45  | 67  | 56  | 49  | 43  | 51 | 45 | 40 | 46 | 41 | 37 | 41 | 37 | 33 |
| 6   | 66  | 53  | 45  | 39  | 62  | 51  | 43  | 38  | 46 | 40 | 35 | 41 | 36 | 32 | 37 | 33 | 30 |
| 7   | 61  | 48  | 40  | 34  | 57  | 46  | 38  | 33  | 42 | 35 | 31 | 38 | 32 | 29 | 34 | 30 | 26 |
| 8   | 57  | 44  | 36  | 30  | 53  | 42  | 35  | 29  | 38 | 32 | 27 | 35 | 29 | 26 | 31 | 27 | 24 |
| 9   | 53  | 40  | 33  | 27  | 50  | 38  | 31  | 26  | 35 | 29 | 25 | 32 | 27 | 23 | 29 | 24 | 21 |
| 10  | 50  | 37  | 30  | 25  | 47  | 35  | 29  | 24  | 32 | 26 | 22 | 29 | 24 | 21 | 27 | 22 | 19 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2475 | 2475 | 2475 |
| 5°  | 2479 | 2441 | 2457 |
| 10° | 2459 | 2408 | 2425 |
| 15° | 2423 | 2369 | 2373 |
| 20° | 2374 | 2314 | 2320 |
| 25° | 2325 | 2249 | 2259 |
| 30° | 2264 | 2188 | 2181 |
| 35° | 2207 | 2116 | 2099 |
| 40° | 2136 | 2043 | 2021 |
| 45° | 2065 | 1970 | 1941 |
| 50° | 1987 | 1894 | 1848 |
| 55° | 1906 | 1805 | 1763 |
| 60° | 1814 | 1700 | 1665 |
| 65° | 1715 | 1592 | 1550 |
| 70° | 1587 | 1459 | 1426 |
| 75° | 1411 | 1301 | 1313 |
| 80° | 1199 | 1099 | 1095 |
| 85° | 867  | 750  | 733  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2065 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 319.1   | 2.5       |
| 10°-20°   | 897.9   | 7.2       |
| 20°-30°   | 1319.6  | 10.5      |
| 30°-40°   | 1532.6  | 12.2      |
| 40°-50°   | 1530.7  | 12.2      |
| 50°-60°   | 1334.7  | 10.6      |
| 60°-70°   | 986.7   | 7.9       |
| 70°-80°   | 558.2   | 4.4       |
| 80°-90°   | 149.7   | 1.2       |
| 90°-100°  | 44.1    | 0.4       |
| 100°-110° | 164.3   | 1.3       |
| 110°-120° | 435.8   | 3.5       |
| 120°-130° | 722.8   | 5.8       |
| 130°-140° | 767.8   | 6.1       |
| 140°-150° | 713.6   | 5.7       |
| 150°-160° | 573.7   | 4.6       |
| 160°-170° | 369.7   | 2.9       |
| 170°-180° | 127.2   | 1.0       |
| 0°-30°    | 2536.6  | 20.2      |
| 0°-40°    | 4069.2  | 32.4      |
| 0°-60°    | 6934.6  | 55.3      |
| 0°-90°    | 8629.2  | 68.8      |
| 90°-120°  | 644.2   | 5.1       |
| 90°-150°  | 2848.4  | 22.7      |
| 90°-180°  | 3919.0  | 31.2      |
| 0°-180°   | 12548.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3391 | 3391  | 3391 | 3391  | 3391 |      |
| 5°   | 3391 | 3378  | 3342 | 3368  | 3362 | 322  |
| 15°  | 3228 | 3208  | 3166 | 3179  | 3163 | 909  |
| 25°  | 2921 | 2895  | 2840 | 2846  | 2840 | 1344 |
| 35°  | 2520 | 2488  | 2436 | 2416  | 2400 | 1574 |
| 45°  | 2051 | 2028  | 1979 | 1943  | 1930 | 1583 |
| 55°  | 1552 | 1532  | 1493 | 1454  | 1438 | 1388 |
| 65°  | 1047 | 1027  | 994  | 965   | 949  | 1035 |
| 75°  | 548  | 541   | 525  | 505   | 512  | 585  |
| 85°  | 134  | 130   | 127  | 117   | 114  | 149  |
| 90°  | 1    | 12    | 19   | 24    | 26   | 12   |
| 95°  | 63   | 31    | 38   | 43    | 42   | 74   |
| 105° | 294  | 323   | 59   | 70    | 74   | 314  |
| 115° | 556  | 573   | 597  | 149   | 79   | 548  |
| 125° | 786  | 799   | 817  | 824   | 827  | 701  |
| 135° | 973  | 989   | 997  | 1007  | 1005 | 752  |
| 145° | 1129 | 1128  | 1144 | 1151  | 1146 | 706  |
| 155° | 1243 | 1234  | 1246 | 1252  | 1244 | 573  |
| 165° | 1310 | 1304  | 1307 | 1314  | 1307 | 370  |
| 175° | 1340 | 1333  | 1335 | 1342  | 1332 | 127  |
| 180° | 1337 | 1337  | 1337 | 1337  | 1337 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3390.7 | 3390.7 | 3390.7 | 3390.7 | 3390.7 |
| 2.5°   | 3410.3 | 3394.1 | 3358.1 | 3390.7 | 3384.4 |
| 5°     | 3390.7 | 3377.9 | 3341.9 | 3367.8 | 3361.6 |
| 7.5°   | 3367.8 | 3348.5 | 3312.5 | 3338.8 | 3332.2 |
| 10°    | 3332.2 | 3309.3 | 3270.3 | 3296.2 | 3286.5 |
| 12.5°  | 3283.1 | 3263.7 | 3224.7 | 3240.9 | 3234.3 |
| 15°    | 3227.7 | 3208.3 | 3165.8 | 3178.9 | 3162.7 |
| 17.5°  | 3159.2 | 3139.9 | 3097.3 | 3113.6 | 3097.3 |
| 20°    | 3084.2 | 3064.8 | 3019.2 | 3028.8 | 3016.1 |
| 22.5°  | 3009.5 | 2980.0 | 2937.5 | 2937.5 | 2930.9 |
| 25°    | 2921.2 | 2895.3 | 2840.0 | 2846.2 | 2840.0 |
| 27.5°  | 2823.3 | 2800.5 | 2758.3 | 2748.6 | 2732.4 |
| 30°    | 2725.8 | 2699.5 | 2650.7 | 2641.1 | 2627.9 |
| 32.5°  | 2621.3 | 2602.0 | 2549.7 | 2530.0 | 2516.8 |
| 35°    | 2520.3 | 2487.8 | 2435.6 | 2415.8 | 2399.6 |
| 37.5°  | 2406.2 | 2376.8 | 2324.6 | 2301.7 | 2285.4 |
| 40°    | 2288.9 | 2262.6 | 2210.4 | 2181.4 | 2168.2 |
| 42.5°  | 2174.8 | 2148.5 | 2096.6 | 2063.7 | 2044.4 |
| 45°    | 2051.0 | 2028.1 | 1978.9 | 1943.4 | 1930.2 |
| 47.5°  | 1930.2 | 1907.4 | 1855.1 | 1819.2 | 1799.8 |
| 50°    | 1802.9 | 1786.7 | 1741.0 | 1695.3 | 1679.1 |
| 52.5°  | 1679.1 | 1656.2 | 1614.1 | 1578.0 | 1555.2 |
| 55°    | 1552.1 | 1532.4 | 1493.3 | 1454.2 | 1438.0 |
| 57.5°  | 1424.8 | 1408.6 | 1366.0 | 1326.9 | 1313.8 |
| 60°    | 1297.5 | 1284.8 | 1239.1 | 1203.1 | 1193.4 |
| 62.5°  | 1173.7 | 1150.9 | 1118.3 | 1085.8 | 1072.7 |
| 65°    | 1046.7 | 1027.0 | 994.5  | 965.1  | 948.9  |
| 67.5°  | 916.3  | 899.8  | 870.7  | 847.9  | 834.7  |
| 70°    | 795.6  | 782.4  | 753.0  | 730.2  | 717.4  |
| 72.5°  | 671.8  | 658.6  | 642.4  | 619.6  | 609.8  |
| 75°    | 547.6  | 541.4  | 524.7  | 505.4  | 512.0  |
| 77.5°  | 436.9  | 423.7  | 417.2  | 407.5  | 397.8  |
| 80°    | 326.2  | 322.7  | 316.2  | 306.5  | 299.9  |
| 82.5°  | 221.7  | 221.7  | 218.6  | 205.5  | 205.5  |
| 85°    | 133.6  | 130.4  | 127.3  | 117.2  | 114.2  |
| 87.5°  | 58.8   | 52.2   | 45.6   | 36.0   | 32.5   |
| 90°    | 1.0    | 11.6   | 19.3   | 24.2   | 26.1   |
| 92.5°  | 24.2   | 20.4   | 23.2   | 25.2   | 26.1   |
| 95°    | 62.8   | 30.9   | 37.7   | 42.6   | 41.6   |
| 97.5°  | 113.1  | 33.9   | 49.3   | 52.3   | 53.2   |
| 100°   | 171.3  | 38.7   | 55.1   | 62.8   | 64.8   |
| 102.5° | 235.0  | 233.1  | 57.1   | 67.7   | 70.7   |
| 105°   | 294.1  | 323.1  | 59.0   | 69.6   | 73.5   |
| 107.5° | 362.7  | 386.8  | 61.0   | 71.5   | 75.5   |
| 110°   | 428.6  | 448.8  | 169.3  | 72.6   | 76.4   |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 490.4  | 507.8  | 491.4  | 74.5   | 77.4   |
| 115°   | 556.2  | 572.6  | 596.8  | 149.0  | 79.4   |
| 117.5° | 613.2  | 632.6  | 649.1  | 510.6  | 257.3  |
| 120°   | 677.1  | 691.6  | 709.0  | 720.6  | 590.0  |
| 122.5° | 731.2  | 746.7  | 766.1  | 771.9  | 772.9  |
| 125°   | 786.3  | 799.0  | 817.4  | 824.1  | 827.0  |
| 127.5° | 836.6  | 850.2  | 864.8  | 874.4  | 875.4  |
| 130°   | 884.1  | 899.6  | 910.1  | 920.8  | 920.0  |
| 132.5° | 932.5  | 945.1  | 955.6  | 964.4  | 963.5  |
| 135°   | 973.1  | 988.6  | 997.2  | 1007.0 | 1005.0 |
| 137.5° | 1015.6 | 1027.2 | 1037.0 | 1046.6 | 1043.8 |
| 140°   | 1057.2 | 1065.0 | 1075.5 | 1084.3 | 1079.5 |
| 142.5° | 1092.1 | 1098.9 | 1111.4 | 1119.1 | 1114.3 |
| 145°   | 1128.9 | 1127.8 | 1144.2 | 1151.0 | 1146.2 |
| 147.5° | 1160.7 | 1157.8 | 1174.3 | 1179.1 | 1175.3 |
| 150°   | 1191.7 | 1184.9 | 1200.4 | 1206.2 | 1201.3 |
| 152.5° | 1217.7 | 1210.1 | 1224.6 | 1230.4 | 1223.6 |
| 155°   | 1242.9 | 1234.3 | 1245.9 | 1251.6 | 1244.0 |
| 157.5° | 1263.2 | 1255.5 | 1264.2 | 1271.1 | 1263.2 |
| 160°   | 1280.7 | 1274.9 | 1280.7 | 1286.4 | 1279.7 |
| 162.5° | 1296.1 | 1290.4 | 1295.1 | 1301.9 | 1293.2 |
| 165°   | 1309.6 | 1303.9 | 1306.8 | 1313.5 | 1306.8 |
| 167.5° | 1320.3 | 1314.5 | 1317.5 | 1324.2 | 1315.5 |
| 170°   | 1329.0 | 1323.2 | 1325.2 | 1331.9 | 1323.2 |
| 172.5° | 1334.8 | 1329.0 | 1331.0 | 1337.8 | 1329.0 |
| 175°   | 1339.7 | 1332.8 | 1334.8 | 1341.6 | 1331.9 |
| 177.5° | 1341.6 | 1334.8 | 1335.9 | 1342.6 | 1333.9 |
| 180°   | 1336.7 | 1336.7 | 1336.7 | 1336.7 | 1336.7 |

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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 | 12.00            | 13.06 | 12.78 | 13.86 | 14.84 | 11.56          | 12.62 | 12.34 | 13.42 | 14.40 |
|                 | 3H   | 13.68            | 14.63 | 14.47 | 15.44 | 16.45 | 13.20          | 14.15 | 13.99 | 14.96 | 15.96 |
|                 | 4H   | 14.28            | 15.18 | 15.09 | 16.00 | 17.01 | 13.79          | 14.69 | 14.60 | 15.51 | 16.52 |
|                 | 6H   | 14.69            | 15.52 | 15.51 | 16.35 | 17.38 | 14.20          | 15.03 | 15.02 | 15.85 | 16.88 |
|                 | 8H   | 14.80            | 15.59 | 15.63 | 16.44 | 17.47 | 14.31          | 15.10 | 15.14 | 15.94 | 16.98 |
|                 | 12H  | 14.86            | 15.61 | 15.69 | 16.45 | 17.51 | 14.36          | 15.11 | 15.19 | 15.95 | 17.01 |
| 4H              | 2H   | 12.49            | 13.39 | 13.30 | 14.20 | 15.22 | 12.14          | 13.03 | 12.95 | 13.85 | 14.87 |
|                 | 3H   | 14.37            | 15.12 | 15.20 | 15.98 | 17.01 | 13.97          | 14.72 | 14.80 | 15.57 | 16.61 |
|                 | 4H   | 15.10            | 15.78 | 15.94 | 16.63 | 17.69 | 14.68          | 15.36 | 15.52 | 16.21 | 17.27 |
|                 | 6H   | 15.63            | 16.22 | 16.48 | 17.09 | 18.16 | 15.20          | 15.79 | 16.06 | 16.67 | 17.73 |
|                 | 8H   | 15.78            | 16.34 | 16.64 | 17.21 | 18.28 | 15.36          | 15.91 | 16.21 | 16.78 | 17.85 |
|                 | 12H  | 15.87            | 16.37 | 16.75 | 17.26 | 18.34 | 15.43          | 15.93 | 16.31 | 16.82 | 17.90 |
| 8H              | 4H   | 15.31            | 15.86 | 16.17 | 16.73 | 17.81 | 14.94          | 15.49 | 15.80 | 16.36 | 17.44 |
|                 | 6H   | 15.95            | 16.41 | 16.84 | 17.32 | 18.40 | 15.58          | 16.04 | 16.46 | 16.95 | 18.02 |
|                 | 8H   | 16.18            | 16.59 | 17.07 | 17.49 | 18.58 | 15.79          | 16.20 | 16.69 | 17.11 | 18.20 |
|                 | 12H  | 16.32            | 16.68 | 17.22 | 17.58 | 18.72 | 15.92          | 16.28 | 16.82 | 17.17 | 18.32 |
| 12H             | 4H   | 15.31            | 15.80 | 16.18 | 16.69 | 17.78 | 14.94          | 15.44 | 15.82 | 16.33 | 17.41 |
|                 | 6H   | 15.99            | 16.39 | 16.88 | 17.30 | 18.39 | 15.62          | 16.03 | 16.52 | 16.93 | 18.03 |
|                 | 8H   | 16.24            | 16.60 | 17.14 | 17.49 | 18.64 | 15.87          | 16.23 | 16.77 | 17.12 | 18.27 |