

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: P912989

Luminaire Tested: DFN2DIP-TR4F0-110D060US850-RLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P912989  
REPORT IS A COMBINATION OF REPORTS P901940 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-110D060US850-RLLONL  
Description: 4 foot, Triangle Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

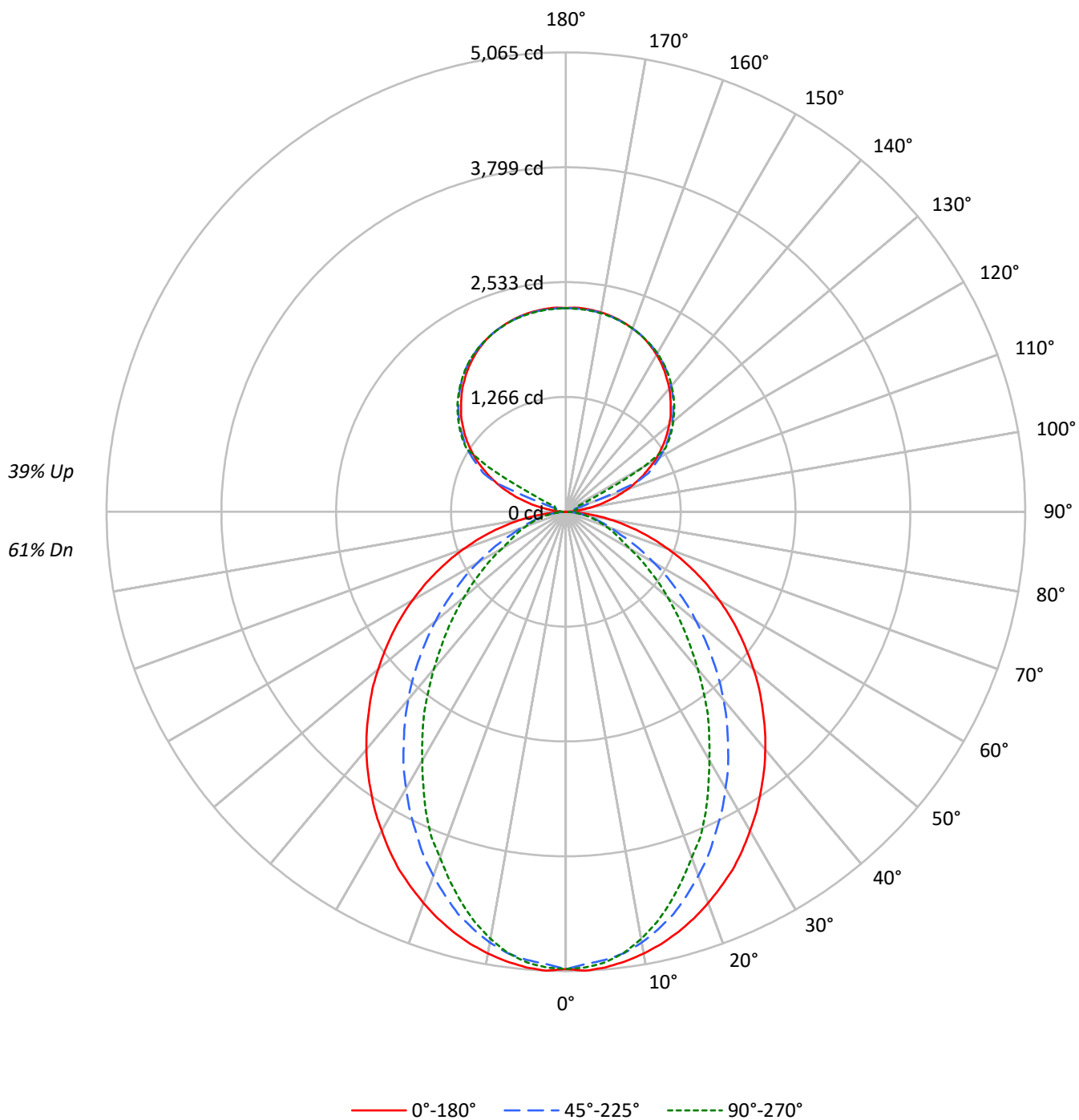
Lumens per Lamp: N/A  
Luminaire Lumens: 16956.6 lumens  
Efficiency: N/A  
Efficacy: 107.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 157.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9613  
Total Harmonic Distortion (THDi): 0.083  
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   | 110 | 110 | 110 | 110 | 103 | 103 | 103 | 103 | 90 | 90 | 90 | 77 | 77 | 77 | 66 | 66 | 66 |
| 1   | 101 | 97  | 93  | 90  | 94  | 91  | 87  | 85  | 79 | 77 | 75 | 69 | 67 | 66 | 60 | 58 | 57 |
| 2   | 92  | 85  | 79  | 74  | 86  | 80  | 75  | 70  | 70 | 66 | 63 | 61 | 58 | 56 | 53 | 51 | 49 |
| 3   | 85  | 75  | 68  | 63  | 79  | 71  | 65  | 60  | 63 | 58 | 54 | 55 | 51 | 48 | 48 | 45 | 43 |
| 4   | 78  | 67  | 59  | 54  | 73  | 63  | 56  | 51  | 56 | 51 | 46 | 49 | 45 | 42 | 43 | 40 | 37 |
| 5   | 72  | 60  | 52  | 46  | 67  | 57  | 50  | 44  | 51 | 45 | 40 | 45 | 40 | 37 | 39 | 36 | 33 |
| 6   | 66  | 54  | 46  | 41  | 62  | 51  | 44  | 39  | 46 | 40 | 36 | 41 | 36 | 32 | 36 | 32 | 29 |
| 7   | 61  | 49  | 41  | 36  | 58  | 47  | 40  | 35  | 42 | 36 | 32 | 37 | 32 | 29 | 33 | 29 | 26 |
| 8   | 57  | 45  | 37  | 32  | 54  | 43  | 36  | 31  | 38 | 33 | 28 | 34 | 29 | 26 | 30 | 26 | 24 |
| 9   | 53  | 41  | 34  | 29  | 50  | 39  | 32  | 28  | 35 | 30 | 26 | 32 | 27 | 24 | 28 | 24 | 22 |
| 10  | 50  | 38  | 31  | 26  | 47  | 36  | 30  | 25  | 33 | 27 | 23 | 29 | 25 | 21 | 26 | 22 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4005 | 4005 | 4005 |
| 5°  | 4012 | 3942 | 3967 |
| 10° | 3972 | 3864 | 3838 |
| 15° | 3917 | 3737 | 3638 |
| 20° | 3845 | 3561 | 3393 |
| 25° | 3771 | 3363 | 3157 |
| 30° | 3672 | 3161 | 2857 |
| 35° | 3574 | 2943 | 2593 |
| 40° | 3475 | 2718 | 2291 |
| 45° | 3360 | 2468 | 2017 |
| 50° | 3241 | 2216 | 1750 |
| 55° | 3116 | 1947 | 1493 |
| 60° | 2973 | 1665 | 1229 |
| 65° | 2807 | 1378 | 1105 |
| 70° | 2606 | 1111 | 1000 |
| 75° | 2354 | 980  | 910  |
| 80° | 1989 | 822  | 789  |
| 85° | 1387 | 548  | 592  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3360 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 472.5   | 2.8       |
| 10°-20°   | 1297.2  | 7.7       |
| 20°-30°   | 1821.2  | 10.7      |
| 30°-40°   | 1985.2  | 11.7      |
| 40°-50°   | 1824.6  | 10.8      |
| 50°-60°   | 1433.0  | 8.5       |
| 60°-70°   | 932.7   | 5.5       |
| 70°-80°   | 480.1   | 2.8       |
| 80°-90°   | 126.5   | 0.7       |
| 90°-100°  | 74.1    | 0.4       |
| 100°-110° | 276.0   | 1.6       |
| 110°-120° | 732.1   | 4.3       |
| 120°-130° | 1214.2  | 7.2       |
| 130°-140° | 1289.8  | 7.6       |
| 140°-150° | 1198.7  | 7.1       |
| 150°-160° | 963.8   | 5.7       |
| 160°-170° | 621.0   | 3.7       |
| 170°-180° | 213.7   | 1.3       |
| 0°-30°    | 3590.9  | 21.2      |
| 0°-40°    | 5576.1  | 32.9      |
| 0°-60°    | 8833.7  | 52.1      |
| 0°-90°    | 10373.1 | 61.2      |
| 90°-120°  | 1082.2  | 6.4       |
| 90°-150°  | 4785.0  | 28.2      |
| 90°-180°  | 6583.0  | 38.8      |
| 0°-180°   | 16956.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5042 | 5042  | 5042 | 5042  | 5042 |      |
| 5°   | 5042 | 5019  | 4960 | 5001  | 4987 | 478  |
| 15°  | 4795 | 4745  | 4590 | 4504  | 4458 | 1351 |
| 25°  | 4353 | 4207  | 3906 | 3719  | 3650 | 2002 |
| 35°  | 3751 | 3518  | 3117 | 2829  | 2728 | 2348 |
| 45°  | 3066 | 2760  | 2282 | 1957  | 1848 | 2368 |
| 55°  | 2331 | 1976  | 1483 | 1209  | 1123 | 2083 |
| 65°  | 1574 | 1204  | 794  | 639   | 625  | 1561 |
| 75°  | 839  | 520   | 365  | 333   | 329  | 888  |
| 85°  | 196  | 100   | 87   | 87    | 87   | 225  |
| 90°  | 2    | 20    | 32   | 41    | 44   | 16   |
| 95°  | 106  | 52    | 63   | 72    | 70   | 125  |
| 105° | 494  | 543   | 99   | 117   | 124  | 528  |
| 115° | 934  | 962   | 1003 | 250   | 133  | 920  |
| 125° | 1321 | 1342  | 1373 | 1384  | 1389 | 1178 |
| 135° | 1635 | 1661  | 1675 | 1692  | 1688 | 1263 |
| 145° | 1896 | 1895  | 1922 | 1934  | 1926 | 1186 |
| 155° | 2088 | 2074  | 2093 | 2103  | 2090 | 962  |
| 165° | 2200 | 2190  | 2195 | 2207  | 2195 | 622  |
| 175° | 2250 | 2239  | 2242 | 2254  | 2238 | 214  |
| 180° | 2246 | 2246  | 2246 | 2246  | 2246 |      |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5041.8 | 5041.8 | 5041.8 | 5041.8 | 5041.8 |
| 2.5°   | 5064.6 | 5041.8 | 4991.5 | 5037.5 | 5028.3 |
| 5°     | 5041.8 | 5019.1 | 4959.6 | 5000.7 | 4987.2 |
| 7.5°   | 5000.7 | 4973.5 | 4909.7 | 4927.6 | 4904.8 |
| 10°    | 4946.0 | 4914.0 | 4823.0 | 4809.0 | 4781.9 |
| 12.5°  | 4877.7 | 4836.6 | 4713.1 | 4686.0 | 4635.6 |
| 15°    | 4795.4 | 4745.1 | 4590.2 | 4503.5 | 4458.0 |
| 17.5°  | 4699.6 | 4626.5 | 4434.8 | 4334.5 | 4261.4 |
| 20°    | 4590.2 | 4498.7 | 4270.6 | 4156.9 | 4056.2 |
| 22.5°  | 4471.6 | 4366.5 | 4101.7 | 3946.8 | 3878.5 |
| 25°    | 4352.9 | 4206.8 | 3905.7 | 3718.8 | 3650.1 |
| 27.5°  | 4211.6 | 4056.2 | 3723.1 | 3508.7 | 3403.6 |
| 30°    | 4061.0 | 3887.3 | 3522.3 | 3289.8 | 3166.4 |
| 32.5°  | 3914.9 | 3704.7 | 3331.0 | 3057.1 | 2942.8 |
| 35°    | 3750.7 | 3517.9 | 3116.6 | 2829.1 | 2728.4 |
| 37.5°  | 3591.1 | 3339.8 | 2915.7 | 2600.5 | 2486.8 |
| 40°    | 3422.0 | 3148.6 | 2705.6 | 2381.7 | 2263.1 |
| 42.5°  | 3248.7 | 2956.8 | 2496.0 | 2158.1 | 2044.3 |
| 45°    | 3066.3 | 2760.3 | 2281.5 | 1957.2 | 1847.8 |
| 47.5°  | 2892.9 | 2569.1 | 2076.3 | 1751.9 | 1651.7 |
| 50°    | 2701.2 | 2377.4 | 1875.4 | 1560.3 | 1464.9 |
| 52.5°  | 2513.9 | 2171.6 | 1683.7 | 1382.6 | 1295.9 |
| 55°    | 2331.3 | 1975.6 | 1482.7 | 1209.3 | 1122.6 |
| 57.5°  | 2144.6 | 1779.5 | 1305.1 | 1049.6 | 976.4  |
| 60°    | 1952.8 | 1587.9 | 1117.8 | 885.4  | 812.3  |
| 62.5°  | 1766.0 | 1401.0 | 958.1  | 739.3  | 702.9  |
| 65°    | 1574.2 | 1204.4 | 793.9  | 639.0  | 624.9  |
| 67.5°  | 1391.8 | 1021.9 | 639.0  | 561.0  | 547.5  |
| 70°    | 1200.0 | 844.3  | 529.1  | 483.6  | 465.2  |
| 72.5°  | 1017.5 | 679.7  | 442.5  | 406.1  | 396.9  |
| 75°    | 839.4  | 519.9  | 365.0  | 333.0  | 328.7  |
| 77.5°  | 661.7  | 369.4  | 287.6  | 269.2  | 259.9  |
| 80°    | 497.2  | 264.8  | 218.8  | 201.0  | 201.0  |
| 82.5°  | 346.6  | 178.1  | 150.6  | 141.4  | 141.4  |
| 85°    | 196.1  | 100.3  | 86.6   | 86.6   | 86.6   |
| 87.5°  | 73.1   | 36.3   | 36.3   | 31.9   | 31.9   |
| 90°    | 1.6    | 19.5   | 32.4   | 40.7   | 43.8   |
| 92.5°  | 40.7   | 34.2   | 38.9   | 42.3   | 43.8   |
| 95°    | 105.6  | 51.9   | 63.3   | 71.6   | 69.9   |
| 97.5°  | 190.1  | 56.9   | 82.7   | 87.8   | 89.4   |
| 100°   | 287.7  | 65.0   | 92.6   | 105.6  | 108.8  |
| 102.5° | 394.8  | 391.7  | 95.9   | 113.7  | 118.7  |
| 105°   | 493.9  | 542.7  | 99.1   | 116.9  | 123.5  |
| 107.5° | 609.4  | 649.9  | 102.5  | 120.2  | 126.8  |
| 110°   | 720.0  | 753.9  | 284.5  | 122.0  | 128.3  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 823.9  | 853.0  | 825.4  | 125.0  | 130.1  |
| 115°   | 934.3  | 961.9  | 1002.6 | 250.3  | 133.3  |
| 117.5° | 1030.2 | 1062.6 | 1090.4 | 857.9  | 432.2  |
| 120°   | 1137.5 | 1161.8 | 1191.2 | 1210.6 | 991.2  |
| 122.5° | 1228.3 | 1254.4 | 1287.0 | 1296.6 | 1298.4 |
| 125°   | 1321.0 | 1342.2 | 1373.1 | 1384.5 | 1389.2 |
| 127.5° | 1405.5 | 1428.3 | 1452.8 | 1469.0 | 1470.5 |
| 130°   | 1485.2 | 1511.2 | 1529.0 | 1546.9 | 1545.4 |
| 132.5° | 1566.5 | 1587.6 | 1605.4 | 1620.0 | 1618.5 |
| 135°   | 1634.8 | 1660.8 | 1675.3 | 1691.7 | 1688.3 |
| 137.5° | 1706.1 | 1725.6 | 1742.0 | 1758.2 | 1753.4 |
| 140°   | 1776.0 | 1789.1 | 1806.9 | 1821.5 | 1813.4 |
| 142.5° | 1834.6 | 1846.0 | 1867.1 | 1880.0 | 1871.9 |
| 145°   | 1896.4 | 1894.6 | 1922.2 | 1933.7 | 1925.6 |
| 147.5° | 1949.8 | 1945.0 | 1972.6 | 1980.7 | 1974.4 |
| 150°   | 2002.0 | 1990.5 | 2016.6 | 2026.3 | 2018.2 |
| 152.5° | 2045.8 | 2032.8 | 2057.1 | 2067.0 | 2055.5 |
| 155°   | 2088.0 | 2073.5 | 2093.0 | 2102.7 | 2089.7 |
| 157.5° | 2122.2 | 2109.2 | 2123.8 | 2135.3 | 2122.2 |
| 160°   | 2151.5 | 2141.6 | 2151.5 | 2161.1 | 2149.8 |
| 162.5° | 2177.3 | 2167.7 | 2175.7 | 2187.2 | 2172.5 |
| 165°   | 2200.1 | 2190.5 | 2195.3 | 2206.7 | 2195.3 |
| 167.5° | 2218.0 | 2208.2 | 2213.2 | 2224.7 | 2209.9 |
| 170°   | 2232.7 | 2222.9 | 2226.2 | 2237.5 | 2222.9 |
| 172.5° | 2242.4 | 2232.7 | 2236.0 | 2247.4 | 2232.7 |
| 175°   | 2250.5 | 2239.1 | 2242.4 | 2253.7 | 2237.5 |
| 177.5° | 2253.7 | 2242.4 | 2244.1 | 2255.5 | 2240.8 |
| 180°   | 2245.6 | 2245.6 | 2245.6 | 2245.6 | 2245.6 |

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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 | 12.95            | 13.88 | 13.81 | 14.76 | 15.86 | 8.92           | 9.85  | 9.78  | 10.73 | 11.83 |
|                 | 3H   | 14.63            | 15.46 | 15.51 | 16.35 | 17.48 | 10.12          | 10.95 | 10.99 | 11.84 | 12.97 |
|                 | 4H   | 15.24            | 16.03 | 16.14 | 16.92 | 18.07 | 10.57          | 11.36 | 11.46 | 12.25 | 13.39 |
|                 | 6H   | 15.67            | 16.39 | 16.57 | 17.30 | 18.45 | 10.90          | 11.62 | 11.80 | 12.52 | 13.68 |
|                 | 8H   | 15.80            | 16.49 | 16.71 | 17.41 | 18.56 | 10.99          | 11.68 | 11.90 | 12.60 | 13.75 |
|                 | 12H  | 15.87            | 16.52 | 16.78 | 17.43 | 18.61 | 11.04          | 11.70 | 11.96 | 12.61 | 13.79 |
| 4H              | 2H   | 12.98            | 13.76 | 13.87 | 14.66 | 15.80 | 9.53           | 10.31 | 10.42 | 11.21 | 12.35 |
|                 | 3H   | 14.82            | 15.47 | 15.72 | 16.39 | 17.55 | 10.89          | 11.54 | 11.79 | 12.47 | 13.62 |
|                 | 4H   | 15.51            | 16.11 | 16.43 | 17.03 | 18.21 | 11.44          | 12.03 | 12.36 | 12.96 | 14.14 |
|                 | 6H   | 16.03            | 16.54 | 16.96 | 17.49 | 18.67 | 11.87          | 12.38 | 12.80 | 13.32 | 14.51 |
|                 | 8H   | 16.21            | 16.69 | 17.14 | 17.63 | 18.82 | 12.00          | 12.48 | 12.93 | 13.42 | 14.61 |
|                 | 12H  | 16.31            | 16.74 | 17.26 | 17.70 | 18.90 | 12.07          | 12.50 | 13.02 | 13.46 | 14.66 |
| 8H              | 4H   | 15.49            | 15.96 | 16.42 | 16.90 | 18.10 | 11.73          | 12.21 | 12.66 | 13.15 | 14.34 |
|                 | 6H   | 16.06            | 16.45 | 17.02 | 17.43 | 18.63 | 12.25          | 12.65 | 13.21 | 13.63 | 14.82 |
|                 | 8H   | 16.27            | 16.62 | 17.24 | 17.59 | 18.81 | 12.44          | 12.79 | 13.41 | 13.76 | 14.98 |
|                 | 12H  | 16.42            | 16.72 | 17.39 | 17.69 | 18.95 | 12.57          | 12.88 | 13.54 | 13.84 | 15.10 |
| 12H             | 4H   | 15.44            | 15.87 | 16.40 | 16.83 | 18.03 | 11.74          | 12.17 | 12.69 | 13.12 | 14.33 |
|                 | 6H   | 16.03            | 16.38 | 17.00 | 17.35 | 18.57 | 12.30          | 12.65 | 13.27 | 13.62 | 14.84 |
|                 | 8H   | 16.26            | 16.56 | 17.23 | 17.53 | 18.79 | 12.52          | 12.82 | 13.49 | 13.79 | 15.05 |