

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: P904242

Luminaire Tested: DFN2DIP-SQ4F0-160D100US830-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P904242  
REPORT IS A COMBINATION OF REPORTS P900148 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-160D100US830-RLLFLL  
Description: 4 foot, Square Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

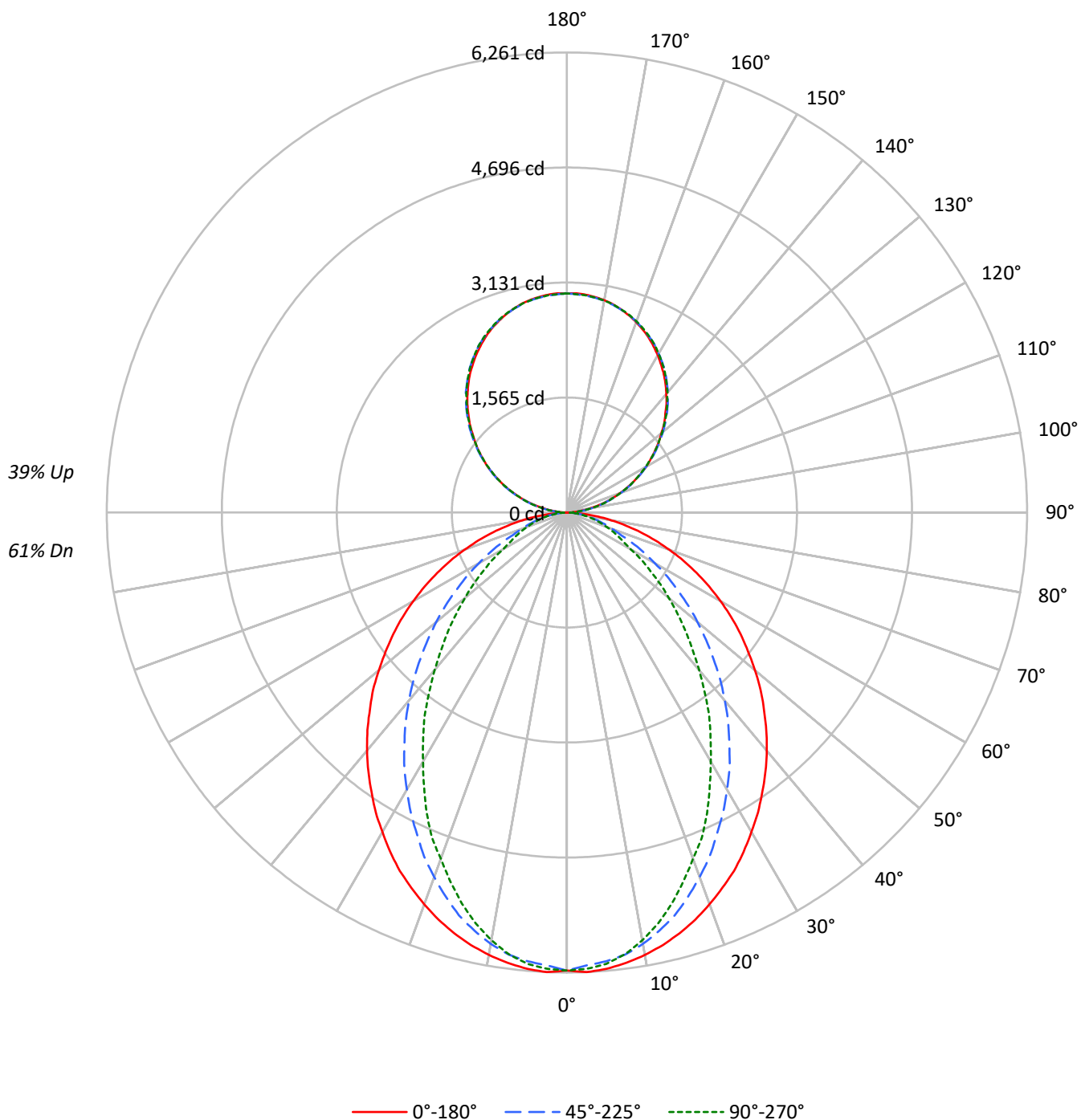
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 21160.1 lumens  
Efficiency: N/A  
Efficacy: 87.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Direct  
  
Input Watts (W): 241.4  
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



TEST NUMBER: P904242

CATALOG NUMBER: DFN2DIP-SQ4F0-160D100US830-RLLFLL

**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 | 89 | 89 | 89 | 77 | 77 | 77 | 66 | 66 | 66 |
| 1   | 101 | 97  | 93  | 89  | 94  | 91  | 87  | 84  | 79 | 77 | 75 | 69 | 67 | 65 | 59 | 58 | 57 |
| 2   | 92  | 85  | 79  | 74  | 86  | 80  | 75  | 70  | 70 | 66 | 63 | 61 | 58 | 56 | 53 | 51 | 49 |
| 3   | 85  | 75  | 68  | 62  | 79  | 71  | 64  | 59  | 62 | 57 | 53 | 55 | 51 | 48 | 47 | 45 | 42 |
| 4   | 78  | 67  | 59  | 53  | 72  | 63  | 56  | 51  | 56 | 50 | 46 | 49 | 45 | 41 | 43 | 39 | 37 |
| 5   | 72  | 60  | 52  | 46  | 67  | 57  | 50  | 44  | 50 | 45 | 40 | 44 | 40 | 36 | 39 | 35 | 32 |
| 6   | 66  | 54  | 46  | 41  | 62  | 51  | 44  | 39  | 46 | 40 | 35 | 40 | 36 | 32 | 35 | 32 | 29 |
| 7   | 61  | 49  | 41  | 36  | 57  | 47  | 39  | 34  | 42 | 36 | 32 | 37 | 32 | 29 | 32 | 29 | 26 |
| 8   | 57  | 45  | 37  | 32  | 53  | 43  | 36  | 31  | 38 | 32 | 28 | 34 | 29 | 26 | 30 | 26 | 23 |
| 9   | 53  | 41  | 34  | 29  | 50  | 39  | 32  | 28  | 35 | 29 | 26 | 31 | 27 | 23 | 28 | 24 | 21 |
| 10  | 50  | 38  | 31  | 26  | 47  | 36  | 29  | 25  | 32 | 27 | 23 | 29 | 25 | 21 | 26 | 22 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4373 | 4373 | 4373 |
| 5°  | 4380 | 4305 | 4333 |
| 10° | 4337 | 4221 | 4193 |
| 15° | 4277 | 4083 | 3976 |
| 20° | 4198 | 3891 | 3710 |
| 25° | 4117 | 3676 | 3452 |
| 30° | 4009 | 3456 | 3126 |
| 35° | 3902 | 3219 | 2838 |
| 40° | 3794 | 2974 | 2509 |
| 45° | 3668 | 2701 | 2210 |
| 50° | 3538 | 2426 | 1918 |
| 55° | 3402 | 2133 | 1638 |
| 60° | 3244 | 1825 | 1350 |
| 65° | 3064 | 1512 | 1216 |
| 70° | 2844 | 1221 | 1103 |
| 75° | 2569 | 1078 | 1006 |
| 80° | 2169 | 907  | 877  |
| 85° | 1510 | 611  | 668  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3668 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 584.1   | 2.8       |
| 10°-20°   | 1603.6  | 7.6       |
| 20°-30°   | 2251.4  | 10.6      |
| 30°-40°   | 2454.2  | 11.6      |
| 40°-50°   | 2255.7  | 10.7      |
| 50°-60°   | 1771.5  | 8.4       |
| 60°-70°   | 1153.0  | 5.4       |
| 70°-80°   | 593.5   | 2.8       |
| 80°-90°   | 160.0   | 0.8       |
| 90°-100°  | 184.5   | 0.9       |
| 100°-110° | 586.1   | 2.8       |
| 110°-120° | 1003.0  | 4.7       |
| 120°-130° | 1319.1  | 6.2       |
| 130°-140° | 1480.6  | 7.0       |
| 140°-150° | 1451.9  | 6.9       |
| 150°-160° | 1217.9  | 5.8       |
| 160°-170° | 807.7   | 3.8       |
| 170°-180° | 282.3   | 1.3       |
| 0°-30°    | 4439.2  | 21.0      |
| 0°-40°    | 6893.3  | 32.6      |
| 0°-60°    | 10920.4 | 51.6      |
| 0°-90°    | 12827.0 | 60.6      |
| 90°-120°  | 1773.5  | 8.4       |
| 90°-150°  | 6025.1  | 28.5      |
| 90°-180°  | 8333.0  | 39.4      |
| 0°-180°   | 21160.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 6233 | 6233  | 6233 | 6233  | 6233 |      |
| 5°   | 6233 | 6205  | 6131 | 6182  | 6165 | 591  |
| 15°  | 5928 | 5866  | 5674 | 5567  | 5511 | 1671 |
| 25°  | 5381 | 5200  | 4828 | 4597  | 4512 | 2475 |
| 35°  | 4637 | 4349  | 3853 | 3497  | 3373 | 2902 |
| 45°  | 3790 | 3412  | 2820 | 2420  | 2284 | 2927 |
| 55°  | 2882 | 2442  | 1833 | 1495  | 1388 | 2575 |
| 65°  | 1946 | 1489  | 982  | 790   | 773  | 1929 |
| 75°  | 1038 | 643   | 451  | 412   | 406  | 1098 |
| 85°  | 242  | 124   | 107  | 107   | 107  | 278  |
| 90°  | 3    | 32    | 88   | 83    | 85   | 21   |
| 95°  | 131  | 156   | 161  | 161   | 156  | 146  |
| 105° | 541  | 548   | 554  | 558   | 558  | 571  |
| 115° | 1006 | 1021  | 1016 | 1014  | 1006 | 996  |
| 125° | 1464 | 1486  | 1479 | 1471  | 1468 | 1308 |
| 135° | 1894 | 1921  | 1927 | 1924  | 1917 | 1464 |
| 145° | 2299 | 2317  | 2331 | 2334  | 2324 | 1436 |
| 155° | 2629 | 2636  | 2644 | 2656  | 2648 | 1210 |
| 165° | 2860 | 2857  | 2857 | 2875  | 2862 | 807  |
| 175° | 2976 | 2968  | 2963 | 2981  | 2966 | 283  |
| 180° | 2981 | 2981  | 2981 | 2981  | 2981 |      |

TEST NUMBER: P904242

CATALOG NUMBER: DFN2DIP-SQ4F0-160D100US830-RLFL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 6232.8 | 6232.8 | 6232.8 | 6232.8 | 6232.8 |
| 2.5°   | 6260.9 | 6232.8 | 6170.5 | 6227.5 | 6216.1 |
| 5°     | 6232.8 | 6204.7 | 6131.0 | 6181.9 | 6165.2 |
| 7.5°   | 6181.9 | 6148.4 | 6069.4 | 6091.6 | 6063.5 |
| 10°    | 6114.4 | 6074.9 | 5962.3 | 5945.0 | 5911.4 |
| 12.5°  | 6029.9 | 5979.1 | 5826.5 | 5793.0 | 5730.8 |
| 15°    | 5928.2 | 5866.0 | 5674.5 | 5567.3 | 5511.0 |
| 17.5°  | 5809.7 | 5719.3 | 5482.4 | 5358.4 | 5268.2 |
| 20°    | 5674.5 | 5561.4 | 5279.5 | 5138.8 | 5014.4 |
| 22.5°  | 5527.8 | 5397.9 | 5070.6 | 4879.2 | 4794.7 |
| 25°    | 5381.3 | 5200.5 | 4828.3 | 4597.3 | 4512.3 |
| 27.5°  | 5206.5 | 5014.4 | 4602.6 | 4337.6 | 4207.7 |
| 30°    | 5020.4 | 4805.6 | 4354.3 | 4067.1 | 3914.5 |
| 32.5°  | 4839.7 | 4579.9 | 4117.9 | 3779.2 | 3637.9 |
| 35°    | 4636.7 | 4348.9 | 3852.8 | 3497.3 | 3372.9 |
| 37.5°  | 4439.3 | 4128.7 | 3604.5 | 3214.8 | 3074.2 |
| 40°    | 4230.4 | 3892.3 | 3344.7 | 2944.3 | 2797.7 |
| 42.5°  | 4016.2 | 3655.3 | 3085.6 | 2667.9 | 2527.2 |
| 45°    | 3790.5 | 3412.4 | 2820.5 | 2419.5 | 2284.3 |
| 47.5°  | 3576.3 | 3176.0 | 2566.7 | 2165.8 | 2041.9 |
| 50°    | 3339.3 | 2938.9 | 2318.4 | 1928.8 | 1810.9 |
| 52.5°  | 3107.8 | 2684.6 | 2081.4 | 1709.2 | 1602.0 |
| 55°    | 2882.1 | 2442.2 | 1833.1 | 1494.9 | 1387.8 |
| 57.5°  | 2651.1 | 2199.9 | 1613.4 | 1297.4 | 1207.0 |
| 60°    | 2414.1 | 1962.9 | 1381.8 | 1094.6 | 1004.2 |
| 62.5°  | 2183.1 | 1731.9 | 1184.3 | 913.8  | 868.9  |
| 65°    | 1946.2 | 1488.9 | 981.5  | 789.9  | 772.6  |
| 67.5°  | 1720.5 | 1263.3 | 789.9  | 693.6  | 676.8  |
| 70°    | 1483.6 | 1043.7 | 654.1  | 597.9  | 575.1  |
| 72.5°  | 1257.9 | 840.2  | 547.0  | 502.1  | 490.7  |
| 75°    | 1037.7 | 642.7  | 451.2  | 411.7  | 406.3  |
| 77.5°  | 818.0  | 456.6  | 355.4  | 332.7  | 321.4  |
| 80°    | 614.6  | 327.3  | 270.5  | 248.4  | 248.4  |
| 82.5°  | 428.5  | 220.3  | 186.2  | 174.7  | 174.7  |
| 85°    | 242.3  | 123.9  | 107.2  | 107.2  | 107.2  |
| 87.5°  | 90.4   | 44.9   | 44.9   | 39.5   | 39.5   |
| 90°    | 2.7    | 32.3   | 88.0   | 82.7   | 85.4   |
| 92.5°  | 55.7   | 75.5   | 78.2   | 80.9   | 80.9   |
| 95°    | 131.2  | 156.4  | 160.9  | 160.9  | 156.4  |
| 97.5°  | 218.4  | 241.8  | 251.7  | 251.7  | 251.7  |
| 100°   | 319.1  | 339.7  | 346.9  | 346.9  | 344.2  |
| 102.5° | 425.1  | 440.4  | 450.3  | 452.9  | 450.3  |
| 105°   | 541.0  | 548.2  | 553.6  | 558.1  | 558.1  |
| 107.5° | 656.0  | 666.8  | 666.8  | 668.6  | 656.0  |
| 110°   | 767.5  | 781.8  | 781.8  | 781.8  | 774.7  |



TEST NUMBER: P904242

CATALOG NUMBER: DFN2DIP-SQ4F0-160D100US830-RLFL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 887.9  | 903.1  | 900.5  | 893.2  | 887.9  |
| 115°   | 1006.5 | 1020.9 | 1016.4 | 1013.7 | 1006.5 |
| 117.5° | 1124.3 | 1144.1 | 1131.4 | 1124.3 | 1117.0 |
| 120°   | 1242.8 | 1262.6 | 1242.8 | 1242.8 | 1234.8 |
| 122.5° | 1350.7 | 1375.8 | 1363.3 | 1356.1 | 1350.7 |
| 125°   | 1464.0 | 1486.4 | 1479.2 | 1471.1 | 1468.5 |
| 127.5° | 1574.5 | 1602.3 | 1592.4 | 1581.7 | 1574.5 |
| 130°   | 1677.8 | 1710.1 | 1705.7 | 1700.3 | 1690.4 |
| 132.5° | 1793.8 | 1818.9 | 1820.7 | 1808.2 | 1800.9 |
| 135°   | 1893.5 | 1921.4 | 1926.7 | 1924.1 | 1916.8 |
| 137.5° | 2005.0 | 2027.4 | 2031.9 | 2030.1 | 2019.3 |
| 140°   | 2102.9 | 2125.3 | 2138.0 | 2138.0 | 2128.1 |
| 142.5° | 2203.6 | 2226.0 | 2233.2 | 2235.9 | 2226.0 |
| 145°   | 2298.8 | 2316.8 | 2331.2 | 2333.8 | 2323.9 |
| 147.5° | 2384.2 | 2406.7 | 2417.4 | 2422.0 | 2412.1 |
| 150°   | 2472.3 | 2487.6 | 2497.5 | 2505.5 | 2497.5 |
| 152.5° | 2550.4 | 2565.7 | 2578.3 | 2588.2 | 2578.3 |
| 155°   | 2628.7 | 2635.8 | 2643.9 | 2656.5 | 2648.4 |
| 157.5° | 2696.0 | 2701.4 | 2705.9 | 2723.9 | 2711.3 |
| 160°   | 2756.3 | 2761.6 | 2764.3 | 2779.6 | 2768.8 |
| 162.5° | 2812.0 | 2812.0 | 2814.6 | 2831.7 | 2819.1 |
| 165°   | 2859.6 | 2856.8 | 2856.8 | 2874.8 | 2862.3 |
| 167.5° | 2902.7 | 2894.6 | 2894.6 | 2912.6 | 2900.0 |
| 170°   | 2935.1 | 2927.9 | 2925.2 | 2943.2 | 2927.9 |
| 172.5° | 2957.5 | 2950.3 | 2947.6 | 2965.6 | 2950.3 |
| 175°   | 2975.5 | 2968.3 | 2963.0 | 2980.9 | 2965.6 |
| 177.5° | 2985.4 | 2978.2 | 2972.8 | 2988.0 | 2972.8 |
| 180°   | 2980.9 | 2980.9 | 2980.9 | 2980.9 | 2980.9 |

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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 | 13.22            | 14.15 | 14.09 | 15.03 | 16.15 | 9.18           | 10.11 | 10.05 | 10.99 | 12.11 |
|                 | 3H   | 14.91            | 15.74 | 15.79 | 16.63 | 17.77 | 10.38          | 11.21 | 11.26 | 12.10 | 13.24 |
|                 | 4H   | 15.53            | 16.31 | 16.42 | 17.21 | 18.36 | 10.83          | 11.62 | 11.73 | 12.51 | 13.67 |
|                 | 6H   | 15.96            | 16.68 | 16.87 | 17.58 | 18.75 | 11.16          | 11.88 | 12.07 | 12.79 | 13.95 |
|                 | 8H   | 16.09            | 16.77 | 17.00 | 17.70 | 18.86 | 11.25          | 11.94 | 12.17 | 12.86 | 14.02 |
|                 | 12H  | 16.16            | 16.81 | 17.08 | 17.72 | 18.91 | 11.30          | 11.95 | 12.22 | 12.87 | 14.06 |
| 4H              | 2H   | 13.25            | 14.03 | 14.15 | 14.93 | 16.08 | 9.79           | 10.57 | 10.69 | 11.47 | 12.62 |
|                 | 3H   | 15.10            | 15.74 | 16.01 | 16.67 | 17.84 | 11.15          | 11.80 | 12.06 | 12.73 | 13.90 |
|                 | 4H   | 15.79            | 16.38 | 16.72 | 17.31 | 18.50 | 11.70          | 12.30 | 12.63 | 13.22 | 14.41 |
|                 | 6H   | 16.32            | 16.83 | 17.25 | 17.78 | 18.97 | 12.13          | 12.64 | 13.07 | 13.59 | 14.78 |
|                 | 8H   | 16.50            | 16.97 | 17.44 | 17.92 | 19.12 | 12.26          | 12.74 | 13.20 | 13.68 | 14.89 |
|                 | 12H  | 16.60            | 17.03 | 17.56 | 17.99 | 19.20 | 12.33          | 12.76 | 13.29 | 13.72 | 14.93 |
| 8H              | 4H   | 15.77            | 16.24 | 16.71 | 17.19 | 18.39 | 11.99          | 12.47 | 12.93 | 13.41 | 14.62 |
|                 | 6H   | 16.34            | 16.74 | 17.31 | 17.72 | 18.93 | 12.52          | 12.91 | 13.48 | 13.90 | 15.10 |
|                 | 8H   | 16.56            | 16.91 | 17.54 | 17.89 | 19.11 | 12.71          | 13.06 | 13.68 | 14.03 | 15.25 |
|                 | 12H  | 16.71            | 17.01 | 17.69 | 17.98 | 19.25 | 12.83          | 13.14 | 13.81 | 14.11 | 15.38 |
| 12H             | 4H   | 15.73            | 16.15 | 16.68 | 17.11 | 18.33 | 12.00          | 12.43 | 12.96 | 13.39 | 14.60 |
|                 | 6H   | 16.32            | 16.67 | 17.29 | 17.64 | 18.86 | 12.57          | 12.92 | 13.54 | 13.89 | 15.11 |
|                 | 8H   | 16.55            | 16.85 | 17.52 | 17.82 | 19.09 | 12.78          | 13.09 | 13.76 | 14.06 | 15.33 |