

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: P909533

Luminaire Tested: DFN2DIP-SQ4F0-090D160US840-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P909533  
REPORT IS A COMBINATION OF REPORTS P901729 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-090D160US840-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

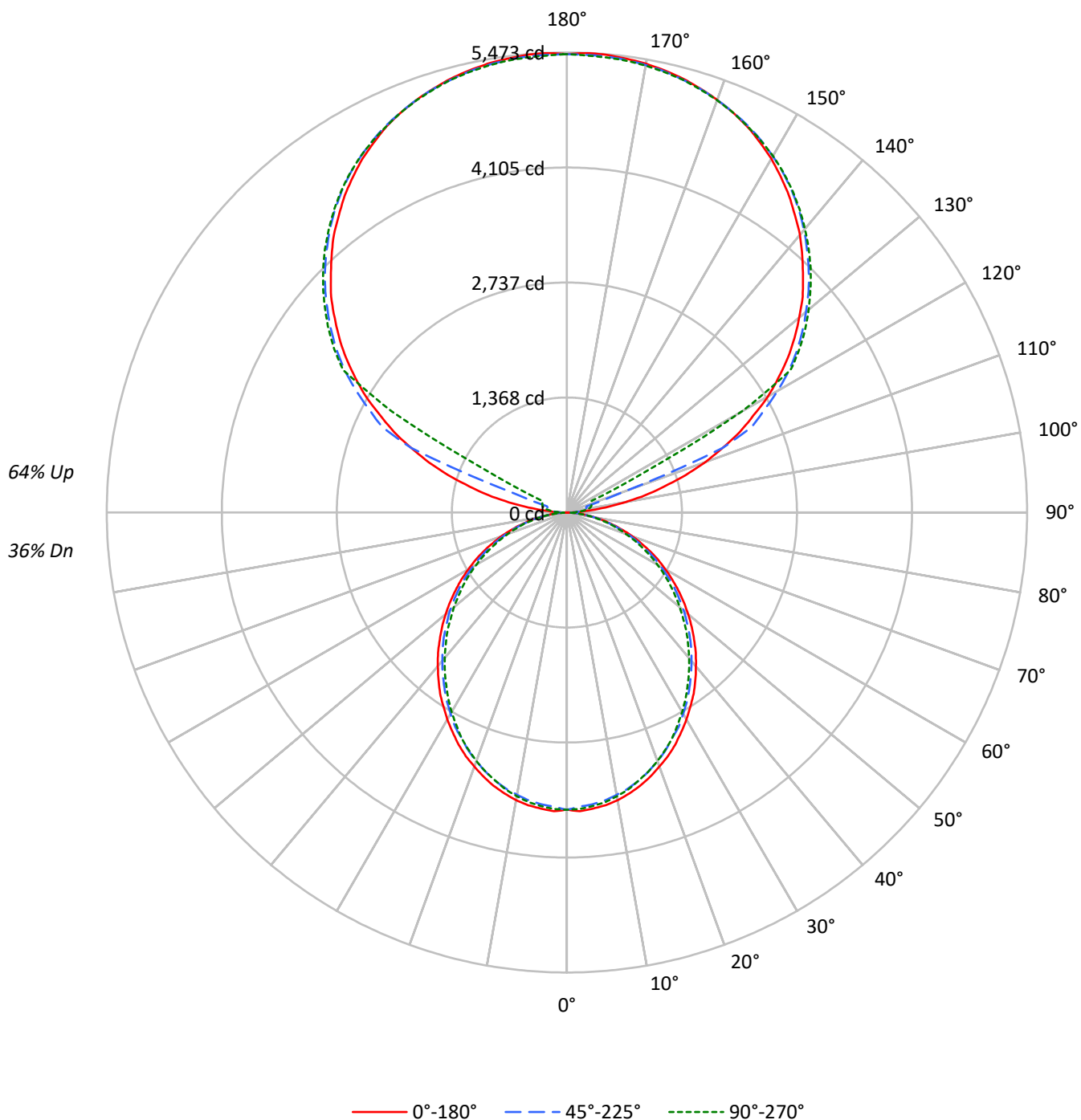
Lumens per Lamp: N/A  
Luminaire Lumens: 24994.2 lumens  
Efficiency: N/A  
Efficacy: 122.0 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 204.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.983  
Total Harmonic Distortion (THDi): 0.073  
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: P909533

CATALOG NUMBER: DFN2DIP-SQ4F0-090D160US840-FLONL

**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   | 104 | 104 | 104 | 104 | 94 | 94 | 94 | 94 | 76 | 76 | 76 | 59 | 59 | 59 | 43 | 43 | 43 |
| 1   | 95  | 90  | 87  | 83  | 86 | 82 | 79 | 76 | 66 | 64 | 62 | 52 | 50 | 49 | 38 | 37 | 37 |
| 2   | 86  | 79  | 73  | 68  | 78 | 72 | 67 | 62 | 58 | 54 | 51 | 45 | 43 | 41 | 34 | 32 | 31 |
| 3   | 79  | 69  | 62  | 57  | 71 | 63 | 57 | 52 | 51 | 47 | 43 | 40 | 37 | 34 | 30 | 28 | 26 |
| 4   | 72  | 61  | 54  | 48  | 65 | 56 | 49 | 44 | 45 | 40 | 37 | 36 | 32 | 29 | 27 | 24 | 23 |
| 5   | 66  | 55  | 47  | 41  | 59 | 50 | 43 | 38 | 40 | 35 | 31 | 32 | 28 | 25 | 24 | 22 | 20 |
| 6   | 61  | 49  | 41  | 35  | 55 | 45 | 38 | 33 | 36 | 31 | 27 | 29 | 25 | 22 | 22 | 19 | 17 |
| 7   | 56  | 44  | 36  | 31  | 51 | 40 | 33 | 29 | 33 | 28 | 24 | 26 | 22 | 20 | 20 | 17 | 15 |
| 8   | 52  | 40  | 32  | 27  | 47 | 36 | 30 | 25 | 30 | 25 | 21 | 24 | 20 | 17 | 18 | 16 | 14 |
| 9   | 48  | 36  | 29  | 24  | 44 | 33 | 27 | 22 | 27 | 22 | 19 | 22 | 18 | 16 | 17 | 14 | 12 |
| 10  | 45  | 33  | 26  | 21  | 41 | 30 | 24 | 20 | 25 | 20 | 17 | 20 | 17 | 14 | 16 | 13 | 11 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2481 | 2481 | 2481 |
| 5°  | 2485 | 2447 | 2464 |
| 10° | 2465 | 2415 | 2431 |
| 15° | 2429 | 2376 | 2380 |
| 20° | 2380 | 2321 | 2327 |
| 25° | 2331 | 2255 | 2266 |
| 30° | 2270 | 2194 | 2189 |
| 35° | 2212 | 2122 | 2106 |
| 40° | 2141 | 2050 | 2028 |
| 45° | 2070 | 1977 | 1948 |
| 50° | 1992 | 1900 | 1855 |
| 55° | 1911 | 1812 | 1770 |
| 60° | 1819 | 1707 | 1673 |
| 65° | 1719 | 1598 | 1558 |
| 70° | 1591 | 1466 | 1435 |
| 75° | 1414 | 1308 | 1322 |
| 80° | 1201 | 1106 | 1104 |
| 85° | 868  | 757  | 742  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2921 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 332.9   | 1.3       |
| 10°-20°   | 936.5   | 3.7       |
| 20°-30°   | 1376.3  | 5.5       |
| 30°-40°   | 1598.5  | 6.4       |
| 40°-50°   | 1596.5  | 6.4       |
| 50°-60°   | 1392.1  | 5.6       |
| 60°-70°   | 1029.1  | 4.1       |
| 70°-80°   | 582.2   | 2.3       |
| 80°-90°   | 163.3   | 0.7       |
| 90°-100°  | 179.8   | 0.7       |
| 100°-110° | 670.3   | 2.7       |
| 110°-120° | 1777.8  | 7.1       |
| 120°-130° | 2948.5  | 11.8      |
| 130°-140° | 3132.1  | 12.5      |
| 140°-150° | 2910.9  | 11.6      |
| 150°-160° | 2340.3  | 9.4       |
| 160°-170° | 1508.0  | 6.0       |
| 170°-180° | 519.0   | 2.1       |
| 0°-30°    | 2645.7  | 10.6      |
| 0°-40°    | 4244.2  | 17.0      |
| 0°-60°    | 7232.9  | 28.9      |
| 0°-90°    | 9007.5  | 36.0      |
| 90°-120°  | 2627.9  | 10.5      |
| 90°-150°  | 11619.4 | 46.5      |
| 90°-180°  | 15987.0 | 64.0      |
| 0°-180°   | 24994.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3536 | 3536  | 3536 | 3536  | 3536 |      |
| 5°   | 3536 | 3523  | 3486 | 3513  | 3506 | 336  |
| 15°  | 3367 | 3346  | 3302 | 3316  | 3299 | 948  |
| 25°  | 3047 | 3020  | 2962 | 2969  | 2962 | 1402 |
| 35°  | 2629 | 2595  | 2540 | 2520  | 2503 | 1642 |
| 45°  | 2139 | 2115  | 2064 | 2027  | 2013 | 1651 |
| 55°  | 1619 | 1598  | 1558 | 1517  | 1500 | 1447 |
| 65°  | 1092 | 1071  | 1037 | 1007  | 990  | 1079 |
| 75°  | 571  | 565   | 547  | 527   | 534  | 610  |
| 85°  | 139  | 136   | 133  | 122   | 119  | 155  |
| 90°  | 4    | 47    | 79   | 99    | 106  | 23   |
| 95°  | 256  | 126   | 154  | 174   | 170  | 304  |
| 105° | 1200 | 1318  | 241  | 284   | 300  | 1282 |
| 115° | 2269 | 2336  | 2435 | 608   | 324  | 2234 |
| 125° | 3208 | 3259  | 3334 | 3362  | 3374 | 2861 |
| 135° | 3970 | 4033  | 4068 | 4108  | 4100 | 3066 |
| 145° | 4605 | 4601  | 4668 | 4695  | 4676 | 2880 |
| 155° | 5070 | 5035  | 5082 | 5106  | 5074 | 2336 |
| 165° | 5342 | 5319  | 5331 | 5358  | 5331 | 1509 |
| 175° | 5465 | 5437  | 5445 | 5473  | 5433 | 520  |
| 180° | 5453 | 5453  | 5453 | 5453  | 5453 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3536.4 | 3536.4 | 3536.4 | 3536.4 | 3536.4 |
| 2.5°   | 3557.0 | 3540.1 | 3502.6 | 3536.4 | 3530.0 |
| 5°     | 3536.4 | 3523.1 | 3485.7 | 3512.7 | 3506.2 |
| 7.5°   | 3512.7 | 3492.5 | 3455.0 | 3482.4 | 3475.6 |
| 10°    | 3475.6 | 3451.7 | 3410.9 | 3438.0 | 3427.9 |
| 12.5°  | 3424.3 | 3404.1 | 3363.4 | 3380.2 | 3373.5 |
| 15°    | 3366.6 | 3346.4 | 3302.0 | 3315.7 | 3298.7 |
| 17.5°  | 3295.1 | 3274.9 | 3230.6 | 3247.5 | 3230.6 |
| 20°    | 3216.8 | 3196.6 | 3149.0 | 3159.1 | 3145.7 |
| 22.5°  | 3138.9 | 3108.3 | 3063.8 | 3063.8 | 3057.0 |
| 25°    | 3046.9 | 3019.8 | 2962.1 | 2968.6 | 2962.1 |
| 27.5°  | 2944.8 | 2920.9 | 2877.0 | 2866.9 | 2849.9 |
| 30°    | 2843.1 | 2815.6 | 2764.7 | 2754.6 | 2741.0 |
| 32.5°  | 2734.1 | 2713.9 | 2659.4 | 2638.9 | 2625.1 |
| 35°    | 2628.8 | 2594.8 | 2540.3 | 2519.8 | 2502.9 |
| 37.5°  | 2509.7 | 2479.0 | 2424.5 | 2400.8 | 2383.8 |
| 40°    | 2387.3 | 2360.0 | 2305.4 | 2275.1 | 2261.5 |
| 42.5°  | 2268.3 | 2240.9 | 2186.8 | 2152.5 | 2132.3 |
| 45°    | 2139.1 | 2115.4 | 2064.1 | 2026.9 | 2013.3 |
| 47.5°  | 2013.3 | 1989.4 | 1934.9 | 1897.4 | 1877.2 |
| 50°    | 1880.5 | 1863.5 | 1815.8 | 1768.3 | 1751.3 |
| 52.5°  | 1751.3 | 1727.5 | 1683.4 | 1646.0 | 1622.1 |
| 55°    | 1618.9 | 1598.3 | 1557.5 | 1516.8 | 1499.9 |
| 57.5°  | 1486.1 | 1469.2 | 1424.8 | 1384.0 | 1370.3 |
| 60°    | 1353.3 | 1340.0 | 1292.3 | 1254.9 | 1244.8 |
| 62.5°  | 1224.2 | 1200.3 | 1166.4 | 1132.6 | 1118.8 |
| 65°    | 1091.8 | 1071.2 | 1037.2 | 1006.6 | 989.7  |
| 67.5°  | 955.7  | 938.5  | 908.1  | 884.3  | 870.6  |
| 70°    | 829.8  | 816.1  | 785.5  | 761.6  | 748.3  |
| 72.5°  | 700.6  | 686.9  | 669.9  | 646.2  | 636.1  |
| 75°    | 571.2  | 564.6  | 547.3  | 527.1  | 534.0  |
| 77.5°  | 455.7  | 442.0  | 435.2  | 425.1  | 415.0  |
| 80°    | 340.2  | 336.6  | 329.7  | 319.6  | 312.9  |
| 82.5°  | 231.3  | 231.3  | 228.0  | 214.3  | 214.3  |
| 85°    | 139.3  | 136.0  | 132.8  | 122.3  | 119.1  |
| 87.5°  | 61.3   | 54.4   | 47.7   | 37.6   | 33.9   |
| 90°    | 3.7    | 47.4   | 78.7   | 98.9   | 106.3  |
| 92.5°  | 98.9   | 82.9   | 94.6   | 102.6  | 106.3  |
| 95°    | 256.3  | 126.0  | 153.7  | 173.8  | 169.7  |
| 97.5°  | 461.5  | 138.3  | 201.0  | 213.2  | 216.9  |
| 100°   | 698.6  | 157.9  | 224.9  | 256.3  | 264.3  |
| 102.5° | 958.7  | 951.2  | 232.9  | 276.0  | 288.1  |
| 105°   | 1199.5 | 1318.1 | 240.9  | 284.0  | 299.8  |
| 107.5° | 1479.7 | 1578.1 | 248.8  | 292.0  | 307.8  |
| 110°   | 1748.2 | 1830.7 | 690.6  | 296.1  | 311.5  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 2000.7 | 2071.5 | 2004.5 | 303.7  | 315.8  |
| 115°   | 2268.8 | 2335.7 | 2434.6 | 607.7  | 323.8  |
| 117.5° | 2501.6 | 2580.3 | 2647.9 | 2083.3 | 1049.6 |
| 120°   | 2762.2 | 2821.2 | 2892.4 | 2939.7 | 2407.0 |
| 122.5° | 2982.8 | 3046.1 | 3125.2 | 3148.7 | 3152.9 |
| 125°   | 3207.7 | 3259.2 | 3334.3 | 3361.9 | 3373.7 |
| 127.5° | 3412.9 | 3468.3 | 3527.8 | 3567.1 | 3570.9 |
| 130°   | 3606.5 | 3669.8 | 3712.9 | 3756.4 | 3752.7 |
| 132.5° | 3803.8 | 3855.3 | 3898.4 | 3934.0 | 3930.3 |
| 135°   | 3969.6 | 4032.9 | 4068.0 | 4107.8 | 4099.9 |
| 137.5° | 4143.0 | 4190.3 | 4230.1 | 4269.5 | 4257.8 |
| 140°   | 4312.6 | 4344.4 | 4387.6 | 4423.2 | 4403.5 |
| 142.5° | 4455.0 | 4482.7 | 4533.8 | 4565.2 | 4545.5 |
| 145°   | 4605.0 | 4600.7 | 4667.8 | 4695.4 | 4675.8 |
| 147.5° | 4734.8 | 4723.0 | 4790.1 | 4809.8 | 4794.2 |
| 150°   | 4861.3 | 4833.6 | 4896.9 | 4920.4 | 4900.7 |
| 152.5° | 4967.6 | 4936.2 | 4995.3 | 5019.2 | 4991.6 |
| 155°   | 5070.2 | 5035.1 | 5082.5 | 5105.9 | 5074.5 |
| 157.5° | 5153.2 | 5121.8 | 5157.4 | 5185.1 | 5153.2 |
| 160°   | 5224.4 | 5200.5 | 5224.4 | 5247.9 | 5220.2 |
| 162.5° | 5287.3 | 5263.8 | 5283.4 | 5311.1 | 5275.5 |
| 165°   | 5342.5 | 5319.1 | 5330.8 | 5358.4 | 5330.8 |
| 167.5° | 5386.1 | 5362.2 | 5374.4 | 5402.0 | 5366.4 |
| 170°   | 5421.7 | 5397.8 | 5405.7 | 5433.4 | 5397.8 |
| 172.5° | 5445.1 | 5421.7 | 5429.6 | 5457.3 | 5421.7 |
| 175°   | 5464.8 | 5437.1 | 5445.1 | 5472.8 | 5433.4 |
| 177.5° | 5472.8 | 5445.1 | 5449.3 | 5477.0 | 5441.4 |
| 180°   | 5453.1 | 5453.1 | 5453.1 | 5453.1 | 5453.1 |

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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 | 8.99             | 9.74  | 10.06 | 10.81 | 12.27 | 8.55           | 9.30  | 9.62  | 10.37 | 11.82 |
|                 | 3H   | 10.65            | 11.32 | 11.73 | 12.40 | 13.87 | 10.16          | 10.83 | 11.24 | 11.91 | 13.38 |
|                 | 4H   | 11.23            | 11.87 | 12.32 | 12.95 | 14.43 | 10.74          | 11.38 | 11.83 | 12.46 | 13.94 |
|                 | 6H   | 11.63            | 12.22 | 12.73 | 13.30 | 14.80 | 11.13          | 11.72 | 12.23 | 12.80 | 14.29 |
|                 | 8H   | 11.74            | 12.29 | 12.84 | 13.39 | 14.88 | 11.23          | 11.79 | 12.34 | 12.89 | 14.38 |
|                 | 12H  | 11.78            | 12.31 | 12.89 | 13.40 | 14.92 | 11.27          | 11.80 | 12.38 | 12.89 | 14.41 |
| 4H              | 2H   | 9.44             | 10.08 | 10.54 | 11.16 | 12.64 | 9.09           | 9.72  | 10.18 | 10.80 | 12.28 |
|                 | 3H   | 11.30            | 11.83 | 12.40 | 12.94 | 14.43 | 10.89          | 11.42 | 12.00 | 12.53 | 14.03 |
|                 | 4H   | 12.01            | 12.50 | 13.12 | 13.60 | 15.11 | 11.59          | 12.08 | 12.70 | 13.17 | 14.69 |
|                 | 6H   | 12.53            | 12.94 | 13.64 | 14.07 | 15.57 | 12.09          | 12.51 | 13.21 | 13.63 | 15.14 |
|                 | 8H   | 12.68            | 13.07 | 13.79 | 14.18 | 15.70 | 12.24          | 12.63 | 13.35 | 13.74 | 15.27 |
|                 | 12H  | 12.75            | 13.10 | 13.88 | 14.22 | 15.75 | 12.30          | 12.65 | 13.43 | 13.78 | 15.30 |
| 8H              | 4H   | 12.20            | 12.59 | 13.32 | 13.70 | 15.23 | 11.83          | 12.22 | 12.94 | 13.33 | 14.85 |
|                 | 6H   | 12.83            | 13.16 | 13.97 | 14.31 | 15.83 | 12.45          | 12.77 | 13.59 | 13.93 | 15.45 |
|                 | 8H   | 13.06            | 13.34 | 14.20 | 14.47 | 16.01 | 12.66          | 12.95 | 13.81 | 14.08 | 15.62 |
|                 | 12H  | 13.18            | 13.43 | 14.33 | 14.56 | 16.14 | 12.77          | 13.02 | 13.92 | 14.15 | 15.73 |
| 12H             | 4H   | 12.18            | 12.54 | 13.31 | 13.66 | 15.19 | 11.81          | 12.17 | 12.95 | 13.29 | 14.82 |
|                 | 6H   | 12.86            | 13.14 | 14.00 | 14.28 | 15.82 | 12.49          | 12.77 | 13.63 | 13.91 | 15.45 |
|                 | 8H   | 13.10            | 13.35 | 14.25 | 14.48 | 16.06 | 12.72          | 12.97 | 13.87 | 14.10 | 15.68 |