

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: P905555

Luminaire Tested: DFN2DIP-HX4F0-110D110US835-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P905555  
REPORT IS A COMBINATION OF REPORTS P899440 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-110D110US835-RLFL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

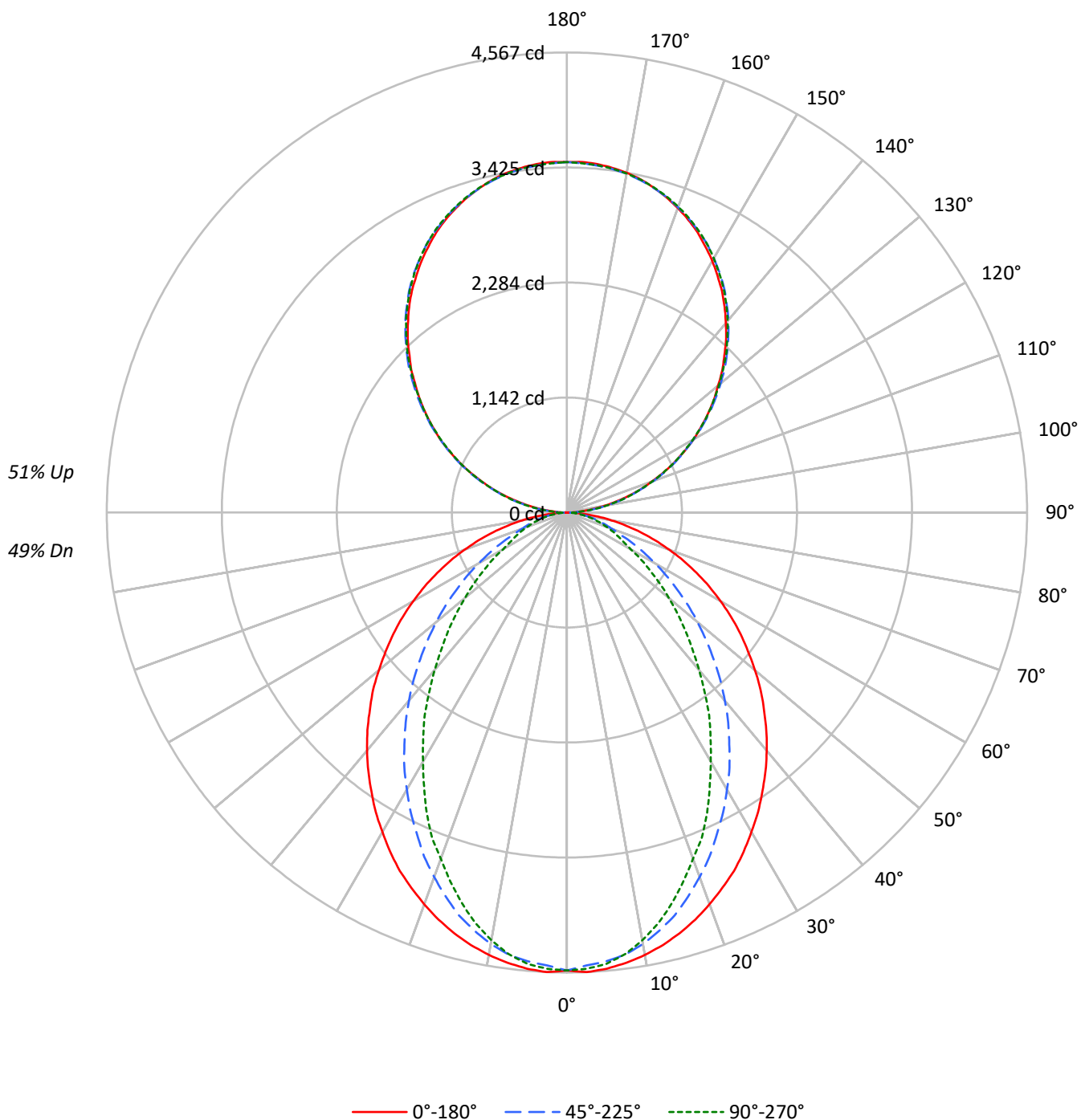
Lumens per Lamp: N/A  
Luminaire Lumens: 19085.0 lumens  
Efficiency: N/A  
Efficacy: 107.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 177.5  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9967  
Total Harmonic Distortion (THDi): 0.063  
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   | 107 | 107 | 107 | 107 | 99 | 99 | 99 | 99 | 83 | 83 | 83 | 68 | 68 | 68 | 55 | 55 | 55 |
| 1   | 98  | 94  | 90  | 87  | 90 | 87 | 84 | 81 | 73 | 71 | 69 | 61 | 59 | 58 | 50 | 49 | 48 |
| 2   | 90  | 83  | 77  | 72  | 82 | 76 | 71 | 67 | 65 | 61 | 58 | 54 | 51 | 49 | 44 | 42 | 41 |
| 3   | 82  | 73  | 66  | 60  | 75 | 68 | 61 | 57 | 58 | 53 | 49 | 48 | 45 | 42 | 40 | 37 | 35 |
| 4   | 75  | 65  | 57  | 51  | 69 | 60 | 54 | 48 | 51 | 46 | 42 | 43 | 40 | 36 | 36 | 33 | 31 |
| 5   | 69  | 58  | 50  | 44  | 64 | 54 | 47 | 42 | 46 | 41 | 37 | 39 | 35 | 32 | 32 | 29 | 27 |
| 6   | 64  | 52  | 44  | 39  | 59 | 49 | 42 | 37 | 42 | 36 | 32 | 35 | 31 | 28 | 30 | 26 | 24 |
| 7   | 59  | 47  | 40  | 34  | 55 | 44 | 37 | 32 | 38 | 33 | 29 | 32 | 28 | 25 | 27 | 24 | 22 |
| 8   | 55  | 43  | 36  | 30  | 51 | 40 | 33 | 29 | 35 | 29 | 26 | 30 | 26 | 23 | 25 | 22 | 20 |
| 9   | 51  | 39  | 32  | 27  | 47 | 37 | 30 | 26 | 32 | 27 | 23 | 27 | 23 | 20 | 23 | 20 | 18 |
| 10  | 48  | 36  | 29  | 24  | 44 | 34 | 28 | 23 | 30 | 24 | 21 | 25 | 21 | 19 | 22 | 18 | 16 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3380 | 3380 | 3380 |
| 5°  | 3386 | 3327 | 3348 |
| 10° | 3353 | 3262 | 3240 |
| 15° | 3307 | 3155 | 3071 |
| 20° | 3246 | 3006 | 2865 |
| 25° | 3184 | 2840 | 2665 |
| 30° | 3100 | 2670 | 2412 |
| 35° | 3018 | 2486 | 2190 |
| 40° | 2935 | 2296 | 1935 |
| 45° | 2838 | 2086 | 1704 |
| 50° | 2738 | 1873 | 1478 |
| 55° | 2633 | 1646 | 1261 |
| 60° | 2512 | 1408 | 1039 |
| 65° | 2373 | 1166 | 935  |
| 70° | 2204 | 941  | 846  |
| 75° | 1993 | 830  | 770  |
| 80° | 1686 | 697  | 669  |
| 85° | 1179 | 467  | 504  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2838 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 426.1   | 2.2       |
| 10°-20°   | 1169.7  | 6.1       |
| 20°-30°   | 1642.2  | 8.6       |
| 30°-40°   | 1790.1  | 9.4       |
| 40°-50°   | 1645.3  | 8.6       |
| 50°-60°   | 1292.1  | 6.8       |
| 60°-70°   | 841.1   | 4.4       |
| 70°-80°   | 432.9   | 2.3       |
| 80°-90°   | 120.4   | 0.6       |
| 90°-100°  | 215.3   | 1.1       |
| 100°-110° | 684.0   | 3.6       |
| 110°-120° | 1170.5  | 6.1       |
| 120°-130° | 1539.4  | 8.1       |
| 130°-140° | 1727.9  | 9.1       |
| 140°-150° | 1694.4  | 8.9       |
| 150°-160° | 1421.4  | 7.4       |
| 160°-170° | 942.6   | 4.9       |
| 170°-180° | 329.5   | 1.7       |
| 0°-30°    | 3238.0  | 17.0      |
| 0°-40°    | 5028.1  | 26.3      |
| 0°-60°    | 7965.5  | 41.7      |
| 0°-90°    | 9359.9  | 49.0      |
| 90°-120°  | 2069.8  | 10.8      |
| 90°-150°  | 7031.6  | 36.8      |
| 90°-180°  | 9725.0  | 51.0      |
| 0°-180°   | 19085.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4546 | 4546  | 4546 | 4546  | 4546 |      |
| 5°   | 4546 | 4526  | 4472 | 4509  | 4497 | 431  |
| 15°  | 4324 | 4279  | 4139 | 4061  | 4020 | 1218 |
| 25°  | 3925 | 3793  | 3522 | 3353  | 3291 | 1805 |
| 35°  | 3382 | 3172  | 2810 | 2551  | 2460 | 2117 |
| 45°  | 2765 | 2489  | 2057 | 1765  | 1666 | 2135 |
| 55°  | 2102 | 1781  | 1337 | 1090  | 1012 | 1879 |
| 65°  | 1420 | 1086  | 716  | 576   | 564  | 1407 |
| 75°  | 757  | 469   | 329  | 300   | 296  | 801  |
| 85°  | 177  | 90    | 78   | 78    | 78   | 203  |
| 90°  | 3    | 38    | 103  | 96    | 100  | 19   |
| 95°  | 153  | 182   | 188  | 188   | 182  | 170  |
| 105° | 631  | 640   | 646  | 651   | 651  | 666  |
| 115° | 1175 | 1191  | 1186 | 1183  | 1175 | 1162 |
| 125° | 1708 | 1735  | 1726 | 1717  | 1714 | 1527 |
| 135° | 2210 | 2242  | 2249 | 2246  | 2237 | 1708 |
| 145° | 2683 | 2704  | 2721 | 2724  | 2712 | 1676 |
| 155° | 3068 | 3076  | 3086 | 3100  | 3091 | 1412 |
| 165° | 3337 | 3334  | 3334 | 3355  | 3340 | 941  |
| 175° | 3473 | 3464  | 3458 | 3479  | 3461 | 330  |
| 180° | 3479 | 3479  | 3479 | 3479  | 3479 |      |



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CATALOG NUMBER: DFN2DIP-HX4F0-110D110US835-RLFL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4546.3 | 4546.3 | 4546.3 | 4546.3 | 4546.3 |
| 2.5°   | 4566.8 | 4546.3 | 4500.9 | 4542.4 | 4534.1 |
| 5°     | 4546.3 | 4525.8 | 4472.1 | 4509.2 | 4497.0 |
| 7.5°   | 4509.2 | 4484.7 | 4427.1 | 4443.3 | 4422.7 |
| 10°    | 4459.9 | 4431.0 | 4349.0 | 4336.3 | 4311.9 |
| 12.5°  | 4398.3 | 4361.2 | 4249.9 | 4225.4 | 4180.0 |
| 15°    | 4324.1 | 4278.7 | 4139.0 | 4060.9 | 4019.8 |
| 17.5°  | 4237.7 | 4171.8 | 3998.9 | 3908.5 | 3842.6 |
| 20°    | 4139.0 | 4056.5 | 3850.9 | 3748.3 | 3657.5 |
| 22.5°  | 4032.1 | 3937.3 | 3698.6 | 3558.9 | 3497.3 |
| 25°    | 3925.1 | 3793.3 | 3521.8 | 3353.3 | 3291.3 |
| 27.5°  | 3797.7 | 3657.5 | 3357.2 | 3163.8 | 3069.1 |
| 30°    | 3661.9 | 3505.2 | 3176.1 | 2966.5 | 2855.2 |
| 32.5°  | 3530.1 | 3340.6 | 3003.6 | 2756.6 | 2653.6 |
| 35°    | 3382.1 | 3172.1 | 2810.3 | 2551.0 | 2460.2 |
| 37.5°  | 3238.1 | 3011.5 | 2629.1 | 2344.9 | 2242.4 |
| 40°    | 3085.7 | 2839.1 | 2439.7 | 2147.6 | 2040.7 |
| 42.5°  | 2929.4 | 2666.2 | 2250.7 | 1946.0 | 1843.4 |
| 45°    | 2764.9 | 2489.0 | 2057.3 | 1764.8 | 1666.2 |
| 47.5°  | 2608.6 | 2316.6 | 1872.2 | 1579.7 | 1489.4 |
| 50°    | 2435.7 | 2143.7 | 1691.1 | 1406.9 | 1320.9 |
| 52.5°  | 2266.8 | 1958.2 | 1518.2 | 1246.7 | 1168.5 |
| 55°    | 2102.2 | 1781.4 | 1337.0 | 1090.4 | 1012.3 |
| 57.5°  | 1933.8 | 1604.6 | 1176.8 | 946.4  | 880.4  |
| 60°    | 1760.9 | 1431.8 | 1007.9 | 798.4  | 732.5  |
| 62.5°  | 1592.4 | 1263.3 | 863.9  | 666.6  | 633.8  |
| 65°    | 1419.5 | 1086.0 | 715.9  | 576.2  | 563.5  |
| 67.5°  | 1255.0 | 921.5  | 576.2  | 505.9  | 493.7  |
| 70°    | 1082.1 | 761.3  | 477.1  | 436.1  | 419.5  |
| 72.5°  | 917.5  | 612.9  | 399.0  | 366.2  | 357.9  |
| 75°    | 756.9  | 468.8  | 329.1  | 300.3  | 296.4  |
| 77.5°  | 596.7  | 333.1  | 259.3  | 242.7  | 234.4  |
| 80°    | 448.3  | 238.8  | 197.3  | 181.2  | 181.2  |
| 82.5°  | 312.5  | 160.6  | 135.8  | 127.5  | 127.5  |
| 85°    | 176.8  | 90.4   | 78.1   | 78.1   | 78.1   |
| 87.5°  | 65.9   | 32.7   | 32.7   | 28.8   | 28.8   |
| 90°    | 3.1    | 37.8   | 102.8  | 96.5   | 99.6   |
| 92.5°  | 65.0   | 88.1   | 91.2   | 94.4   | 94.4   |
| 95°    | 153.1  | 182.5  | 187.7  | 187.7  | 182.5  |
| 97.5°  | 254.9  | 282.1  | 293.7  | 293.7  | 293.7  |
| 100°   | 372.3  | 396.4  | 404.8  | 404.8  | 401.7  |
| 102.5° | 496.1  | 513.9  | 525.5  | 528.6  | 525.5  |
| 105°   | 631.4  | 639.8  | 646.1  | 651.3  | 651.3  |
| 107.5° | 765.6  | 778.2  | 778.2  | 780.3  | 765.6  |
| 110°   | 895.7  | 912.5  | 912.5  | 912.5  | 904.1  |

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CATALOG NUMBER: DFN2DIP-HX4F0-110D110US835-RLFL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1036.2 | 1054.0 | 1050.9 | 1042.5 | 1036.2 |
| 115°   | 1174.7 | 1191.4 | 1186.2 | 1183.1 | 1174.7 |
| 117.5° | 1312.1 | 1335.1 | 1320.4 | 1312.1 | 1303.7 |
| 120°   | 1450.5 | 1473.6 | 1450.5 | 1450.5 | 1441.1 |
| 122.5° | 1576.4 | 1605.7 | 1591.0 | 1582.6 | 1576.4 |
| 125°   | 1708.5 | 1734.7 | 1726.3 | 1716.9 | 1713.7 |
| 127.5° | 1837.5 | 1870.0 | 1858.5 | 1845.9 | 1837.5 |
| 130°   | 1958.1 | 1995.9 | 1990.6 | 1984.3 | 1972.8 |
| 132.5° | 2093.4 | 2122.8 | 2124.9 | 2110.2 | 2101.8 |
| 135°   | 2209.8 | 2242.3 | 2248.6 | 2245.5 | 2237.1 |
| 137.5° | 2339.9 | 2366.1 | 2371.3 | 2369.2 | 2356.7 |
| 140°   | 2454.2 | 2480.4 | 2495.1 | 2495.1 | 2483.6 |
| 142.5° | 2571.7 | 2597.9 | 2606.3 | 2609.4 | 2597.9 |
| 145°   | 2682.8 | 2703.8 | 2720.6 | 2723.7 | 2712.2 |
| 147.5° | 2782.5 | 2808.7 | 2821.3 | 2826.5 | 2815.0 |
| 150°   | 2885.3 | 2903.1 | 2914.6 | 2924.1 | 2914.6 |
| 152.5° | 2976.5 | 2994.3 | 3009.0 | 3020.6 | 3009.0 |
| 155°   | 3067.8 | 3076.1 | 3085.6 | 3100.3 | 3090.8 |
| 157.5° | 3146.4 | 3152.7 | 3157.9 | 3178.9 | 3164.2 |
| 160°   | 3216.7 | 3223.0 | 3226.1 | 3244.0 | 3231.4 |
| 162.5° | 3281.7 | 3281.7 | 3284.9 | 3304.8 | 3290.1 |
| 165°   | 3337.3 | 3334.1 | 3334.1 | 3355.1 | 3340.4 |
| 167.5° | 3387.6 | 3378.2 | 3378.2 | 3399.2 | 3384.5 |
| 170°   | 3425.4 | 3417.0 | 3413.9 | 3434.8 | 3417.0 |
| 172.5° | 3451.6 | 3443.2 | 3440.1 | 3461.1 | 3443.2 |
| 175°   | 3472.6 | 3464.2 | 3457.9 | 3478.9 | 3461.1 |
| 177.5° | 3484.1 | 3475.7 | 3469.4 | 3487.3 | 3469.4 |
| 180°   | 3478.9 | 3478.9 | 3478.9 | 3478.9 | 3478.9 |

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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 | 11.29            | 12.11 | 12.26 | 13.09 | 14.38 | 7.26           | 8.08  | 8.23  | 9.07  | 10.35 |
|                 | 3H   | 12.97            | 13.70 | 13.95 | 14.69 | 16.00 | 8.45           | 9.19  | 9.43  | 10.18 | 11.49 |
|                 | 4H   | 13.57            | 14.27 | 14.57 | 15.26 | 16.58 | 8.90           | 9.60  | 9.90  | 10.59 | 11.91 |
|                 | 6H   | 14.00            | 14.64 | 15.00 | 15.64 | 16.97 | 9.22           | 9.86  | 10.23 | 10.86 | 12.19 |
|                 | 8H   | 14.12            | 14.73 | 15.14 | 15.75 | 17.07 | 9.32           | 9.92  | 10.33 | 10.94 | 12.27 |
|                 | 12H  | 14.19            | 14.76 | 15.20 | 15.77 | 17.12 | 9.36           | 9.94  | 10.38 | 10.95 | 12.30 |
| 4H              | 2H   | 11.31            | 12.00 | 12.31 | 12.99 | 14.31 | 7.86           | 8.55  | 8.86  | 9.55  | 10.86 |
|                 | 3H   | 13.14            | 13.71 | 14.15 | 14.74 | 16.07 | 9.21           | 9.79  | 10.22 | 10.81 | 12.14 |
|                 | 4H   | 13.83            | 14.36 | 14.85 | 15.37 | 16.73 | 9.76           | 10.28 | 10.78 | 11.30 | 12.66 |
|                 | 6H   | 14.34            | 14.80 | 15.37 | 15.84 | 17.19 | 10.18          | 10.63 | 11.21 | 11.67 | 13.02 |
|                 | 8H   | 14.52            | 14.94 | 15.55 | 15.97 | 17.34 | 10.31          | 10.73 | 11.34 | 11.76 | 13.13 |
|                 | 12H  | 14.61            | 15.00 | 15.66 | 16.04 | 17.41 | 10.37          | 10.76 | 11.42 | 11.80 | 13.17 |
| 8H              | 4H   | 13.80            | 14.22 | 14.83 | 15.25 | 16.62 | 10.04          | 10.46 | 11.07 | 11.49 | 12.86 |
|                 | 6H   | 14.36            | 14.71 | 15.42 | 15.79 | 17.15 | 10.56          | 10.91 | 11.61 | 11.98 | 13.34 |
|                 | 8H   | 14.58            | 14.89 | 15.64 | 15.95 | 17.33 | 10.75          | 11.06 | 11.81 | 12.12 | 13.50 |
|                 | 12H  | 14.72            | 14.99 | 15.78 | 16.04 | 17.47 | 10.87          | 11.14 | 11.93 | 12.19 | 13.62 |
| 12H             | 4H   | 13.75            | 14.13 | 14.80 | 15.18 | 16.55 | 10.04          | 10.42 | 11.09 | 11.47 | 12.84 |
|                 | 6H   | 14.34            | 14.65 | 15.40 | 15.70 | 17.09 | 10.61          | 10.91 | 11.67 | 11.97 | 13.36 |
|                 | 8H   | 14.56            | 14.83 | 15.62 | 15.88 | 17.31 | 10.82          | 11.09 | 11.88 | 12.14 | 13.57 |