

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: P906981

Luminaire Tested: DFN2DIP-SQ4F0-160D140US835-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P906981  
REPORT IS A COMBINATION OF REPORTS P901721 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-160D140US835-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

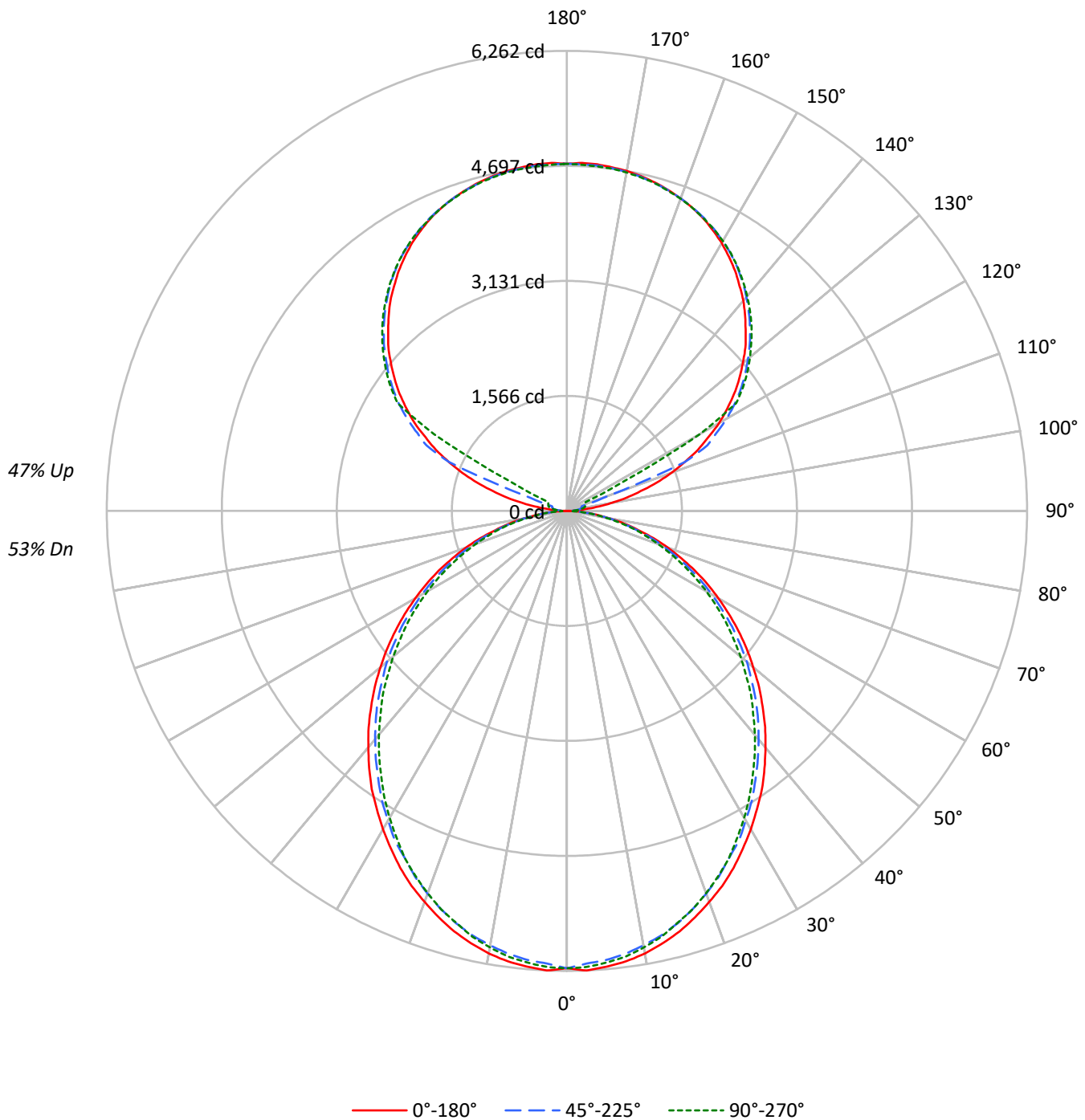
Lumens per Lamp: N/A  
Luminaire Lumens: 29700.0 lumens  
Efficiency: N/A  
Efficacy: 109.0 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 272.5  
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



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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 |
| RCR |     |     |     |     |     |     |     |     |    |    |    |  |    |    |    |  |    |
| 0   | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 |  | 72 | 72 | 72 |  | 59 |
| 1   | 99  | 94  | 90  | 87  | 91  | 87  | 84  | 81  | 75 | 72 | 70 |  | 63 | 61 | 60 |  | 52 |
| 2   | 90  | 82  | 76  | 71  | 83  | 76  | 71  | 66  | 65 | 61 | 58 |  | 55 | 52 | 50 |  | 46 |
| 3   | 82  | 72  | 65  | 59  | 76  | 67  | 61  | 56  | 58 | 53 | 49 |  | 49 | 45 | 42 |  | 41 |
| 4   | 75  | 64  | 56  | 50  | 69  | 60  | 53  | 47  | 51 | 46 | 42 |  | 44 | 40 | 36 |  | 37 |
| 5   | 69  | 57  | 49  | 43  | 63  | 53  | 46  | 41  | 46 | 40 | 36 |  | 39 | 35 | 31 |  | 33 |
| 6   | 63  | 51  | 43  | 37  | 59  | 48  | 41  | 35  | 41 | 36 | 31 |  | 35 | 31 | 28 |  | 30 |
| 7   | 59  | 46  | 38  | 33  | 54  | 43  | 36  | 31  | 38 | 32 | 28 |  | 32 | 28 | 24 |  | 27 |
| 8   | 54  | 42  | 34  | 29  | 50  | 39  | 32  | 27  | 34 | 29 | 25 |  | 30 | 25 | 22 |  | 25 |
| 9   | 51  | 38  | 31  | 26  | 47  | 36  | 29  | 25  | 31 | 26 | 22 |  | 27 | 23 | 20 |  | 23 |
| 10  | 47  | 35  | 28  | 23  | 44  | 33  | 26  | 22  | 29 | 24 | 20 |  | 25 | 21 | 18 |  | 21 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4368 | 4368 | 4368 |
| 5°  | 4375 | 4308 | 4338 |
| 10° | 4340 | 4251 | 4280 |
| 15° | 4276 | 4182 | 4190 |
| 20° | 4190 | 4086 | 4097 |
| 25° | 4104 | 3970 | 3990 |
| 30° | 3996 | 3863 | 3853 |
| 35° | 3894 | 3736 | 3708 |
| 40° | 3769 | 3608 | 3570 |
| 45° | 3644 | 3480 | 3429 |
| 50° | 3507 | 3346 | 3266 |
| 55° | 3364 | 3190 | 3116 |
| 60° | 3202 | 3005 | 2945 |
| 65° | 3025 | 2814 | 2742 |
| 70° | 2800 | 2581 | 2525 |
| 75° | 2489 | 2302 | 2327 |
| 80° | 2114 | 1947 | 1944 |
| 85° | 1528 | 1332 | 1306 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3644 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 586.0   | 2.0       |
| 10°-20°   | 1648.7  | 5.6       |
| 20°-30°   | 2422.9  | 8.2       |
| 30°-40°   | 2814.1  | 9.5       |
| 40°-50°   | 2810.6  | 9.5       |
| 50°-60°   | 2450.7  | 8.3       |
| 60°-70°   | 1811.6  | 6.1       |
| 70°-80°   | 1025.0  | 3.5       |
| 80°-90°   | 278.8   | 0.9       |
| 90°-100°  | 155.8   | 0.5       |
| 100°-110° | 580.8   | 2.0       |
| 110°-120° | 1540.3  | 5.2       |
| 120°-130° | 2554.8  | 8.6       |
| 130°-140° | 2713.8  | 9.1       |
| 140°-150° | 2522.1  | 8.5       |
| 150°-160° | 2027.7  | 6.8       |
| 160°-170° | 1306.6  | 4.4       |
| 170°-180° | 449.7   | 1.5       |
| 0°-30°    | 4657.5  | 15.7      |
| 0°-40°    | 7471.6  | 25.2      |
| 0°-60°    | 12732.9 | 42.9      |
| 0°-90°    | 15848.3 | 53.4      |
| 90°-120°  | 2276.9  | 7.7       |
| 90°-150°  | 10067.6 | 33.9      |
| 90°-180°  | 13852.0 | 46.6      |
| 0°-180°   | 29700.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 6226 | 6226  | 6226 | 6226  | 6226 |      |
| 5°   | 6226 | 6202  | 6136 | 6184  | 6172 | 591  |
| 15°  | 5926 | 5891  | 5813 | 5837  | 5807 | 1669 |
| 25°  | 5364 | 5316  | 5214 | 5226  | 5214 | 2468 |
| 35°  | 4628 | 4568  | 4472 | 4436  | 4406 | 2890 |
| 45°  | 3766 | 3724  | 3634 | 3568  | 3544 | 2906 |
| 55°  | 2850 | 2814  | 2742 | 2670  | 2640 | 2548 |
| 65°  | 1922 | 1886  | 1826 | 1772  | 1742 | 1900 |
| 75°  | 1005 | 994   | 964  | 928   | 940  | 1073 |
| 85°  | 245  | 239   | 234  | 215   | 210  | 273  |
| 90°  | 3    | 41    | 68   | 86    | 92   | 27   |
| 95°  | 222  | 109   | 133  | 151   | 147  | 263  |
| 105° | 1039 | 1142  | 209  | 246   | 260  | 1110 |
| 115° | 1966 | 2024  | 2110 | 527   | 280  | 1935 |
| 125° | 2779 | 2824  | 2889 | 2913  | 2923 | 2479 |
| 135° | 3440 | 3494  | 3525 | 3559  | 3552 | 2657 |
| 145° | 3990 | 3986  | 4044 | 4068  | 4051 | 2495 |
| 155° | 4393 | 4363  | 4404 | 4424  | 4397 | 2024 |
| 165° | 4629 | 4609  | 4619 | 4643  | 4619 | 1308 |
| 175° | 4735 | 4711  | 4718 | 4742  | 4708 | 451  |
| 180° | 4725 | 4725  | 4725 | 4725  | 4725 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 6225.7 | 6225.7 | 6225.7 | 6225.7 | 6225.7 |
| 2.5°   | 6261.9 | 6232.0 | 6166.0 | 6225.7 | 6214.2 |
| 5°     | 6225.7 | 6202.2 | 6136.1 | 6183.8 | 6172.3 |
| 7.5°   | 6183.8 | 6148.2 | 6082.1 | 6130.4 | 6118.3 |
| 10°    | 6118.3 | 6076.4 | 6004.7 | 6052.3 | 6034.5 |
| 12.5°  | 6028.2 | 5992.6 | 5920.8 | 5950.7 | 5938.6 |
| 15°    | 5926.5 | 5891.0 | 5812.8 | 5837.0 | 5807.1 |
| 17.5°  | 5800.8 | 5765.2 | 5687.1 | 5716.9 | 5687.1 |
| 20°    | 5662.9 | 5627.4 | 5543.5 | 5561.3 | 5537.8 |
| 22.5°  | 5525.8 | 5471.8 | 5393.6 | 5393.6 | 5381.6 |
| 25°    | 5363.8 | 5316.2 | 5214.5 | 5226.0 | 5214.5 |
| 27.5°  | 5184.0 | 5142.1 | 5064.6 | 5046.9 | 5017.0 |
| 30°    | 5004.9 | 4956.7 | 4867.1 | 4849.3 | 4825.2 |
| 32.5°  | 4813.1 | 4777.6 | 4681.6 | 4645.4 | 4621.3 |
| 35°    | 4627.7 | 4568.0 | 4472.0 | 4435.8 | 4406.0 |
| 37.5°  | 4418.1 | 4364.1 | 4268.2 | 4226.2 | 4196.4 |
| 40°    | 4202.7 | 4154.5 | 4058.6 | 4005.2 | 3981.1 |
| 42.5°  | 3993.2 | 3944.9 | 3849.6 | 3789.3 | 3753.7 |
| 45°    | 3765.8 | 3723.8 | 3633.7 | 3568.2 | 3544.1 |
| 47.5°  | 3544.1 | 3502.2 | 3406.3 | 3340.2 | 3304.7 |
| 50°    | 3310.4 | 3280.5 | 3196.7 | 3112.8 | 3083.0 |
| 52.5°  | 3083.0 | 3041.1 | 2963.6 | 2897.5 | 2855.6 |
| 55°    | 2849.9 | 2813.7 | 2741.9 | 2670.1 | 2640.3 |
| 57.5°  | 2616.2 | 2586.3 | 2508.2 | 2436.4 | 2412.3 |
| 60°    | 2382.4 | 2358.9 | 2275.1 | 2209.0 | 2191.2 |
| 62.5°  | 2155.0 | 2113.1 | 2053.4 | 1993.7 | 1969.6 |
| 65°    | 1921.9 | 1885.7 | 1826.0 | 1772.1 | 1742.2 |
| 67.5°  | 1682.5 | 1652.0 | 1598.7 | 1556.7 | 1532.6 |
| 70°    | 1460.8 | 1436.7 | 1382.7 | 1340.8 | 1317.3 |
| 72.5°  | 1233.4 | 1209.3 | 1179.5 | 1137.5 | 1119.8 |
| 75°    | 1005.4 | 994.0  | 963.5  | 927.9  | 940.0  |
| 77.5°  | 802.2  | 778.1  | 766.0  | 748.2  | 730.4  |
| 80°    | 598.9  | 592.6  | 580.5  | 562.7  | 550.7  |
| 82.5°  | 407.1  | 407.1  | 401.4  | 377.3  | 377.3  |
| 85°    | 245.2  | 239.4  | 233.7  | 215.3  | 209.6  |
| 87.5°  | 108.0  | 95.9   | 83.8   | 66.1   | 59.7   |
| 90°    | 3.2    | 41.0   | 68.2   | 85.7   | 92.2   |
| 92.5°  | 85.7   | 71.9   | 82.0   | 88.9   | 92.2   |
| 95°    | 222.1  | 109.2  | 133.2  | 150.6  | 147.0  |
| 97.5°  | 399.9  | 119.8  | 174.2  | 184.7  | 188.0  |
| 100°   | 605.3  | 136.8  | 194.9  | 222.1  | 229.0  |
| 102.5° | 830.6  | 824.1  | 201.8  | 239.1  | 249.7  |
| 105°   | 1039.3 | 1142.0 | 208.7  | 246.0  | 259.8  |
| 107.5° | 1282.1 | 1367.3 | 215.6  | 252.9  | 266.7  |
| 110°   | 1514.7 | 1586.2 | 598.4  | 256.6  | 270.0  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1733.5 | 1794.8 | 1736.8 | 263.1  | 273.6  |
| 115°   | 1965.8 | 2023.8 | 2109.5 | 526.6  | 280.5  |
| 117.5° | 2167.5 | 2235.7 | 2294.2 | 1805.0 | 909.4  |
| 120°   | 2393.3 | 2444.4 | 2506.1 | 2547.1 | 2085.5 |
| 122.5° | 2584.5 | 2639.3 | 2707.9 | 2728.2 | 2731.9 |
| 125°   | 2779.4 | 2824.0 | 2889.0 | 2912.9 | 2923.1 |
| 127.5° | 2957.2 | 3005.1 | 3056.6 | 3090.7 | 3094.0 |
| 130°   | 3124.8 | 3179.7 | 3217.0 | 3254.8 | 3251.5 |
| 132.5° | 3295.8 | 3340.4 | 3377.8 | 3408.6 | 3405.4 |
| 135°   | 3439.5 | 3494.3 | 3524.7 | 3559.2 | 3552.3 |
| 137.5° | 3589.7 | 3630.7 | 3665.2 | 3699.3 | 3689.2 |
| 140°   | 3736.7 | 3764.3 | 3801.6 | 3832.5 | 3815.4 |
| 142.5° | 3860.1 | 3884.0 | 3928.3 | 3955.5 | 3938.4 |
| 145°   | 3990.0 | 3986.3 | 4044.4 | 4068.4 | 4051.3 |
| 147.5° | 4102.5 | 4092.3 | 4150.4 | 4167.4 | 4154.0 |
| 150°   | 4212.1 | 4188.1 | 4242.9 | 4263.2 | 4246.2 |
| 152.5° | 4304.2 | 4277.0 | 4328.2 | 4348.9 | 4324.9 |
| 155°   | 4393.1 | 4362.7 | 4403.7 | 4424.0 | 4396.8 |
| 157.5° | 4465.0 | 4437.8 | 4468.7 | 4492.6 | 4465.0 |
| 160°   | 4526.7 | 4506.0 | 4526.7 | 4547.0 | 4523.1 |
| 162.5° | 4581.1 | 4560.8 | 4577.9 | 4601.8 | 4571.0 |
| 165°   | 4629.0 | 4608.7 | 4618.9 | 4642.8 | 4618.9 |
| 167.5° | 4666.8 | 4646.1 | 4656.6 | 4680.6 | 4649.7 |
| 170°   | 4697.6 | 4676.9 | 4683.8 | 4707.8 | 4676.9 |
| 172.5° | 4717.9 | 4697.6 | 4704.5 | 4728.5 | 4697.6 |
| 175°   | 4735.0 | 4711.0 | 4717.9 | 4741.9 | 4707.8 |
| 177.5° | 4741.9 | 4717.9 | 4721.6 | 4745.5 | 4714.7 |
| 180°   | 4724.8 | 4724.8 | 4724.8 | 4724.8 | 4724.8 |

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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 | 12.71            | 13.60 | 13.64 | 14.55 | 15.77 | 12.27          | 13.16 | 13.20 | 14.11 | 15.33 |
|                 | 3H   | 14.38            | 15.18 | 15.32 | 16.13 | 17.38 | 13.89          | 14.69 | 14.83 | 15.64 | 16.89 |
|                 | 4H   | 14.97            | 15.73 | 15.93 | 16.69 | 17.94 | 14.48          | 15.23 | 15.43 | 16.19 | 17.45 |
|                 | 6H   | 15.38            | 16.07 | 16.34 | 17.04 | 18.31 | 14.88          | 15.57 | 15.84 | 16.54 | 17.81 |
|                 | 8H   | 15.48            | 16.15 | 16.46 | 17.13 | 18.40 | 14.98          | 15.65 | 15.95 | 16.63 | 17.89 |
|                 | 12H  | 15.54            | 16.17 | 16.51 | 17.14 | 18.43 | 15.03          | 15.66 | 16.00 | 16.63 | 17.92 |
| 4H              | 2H   | 13.18            | 13.94 | 14.14 | 14.89 | 16.15 | 12.82          | 13.58 | 13.78 | 14.54 | 15.79 |
|                 | 3H   | 15.05            | 15.68 | 16.02 | 16.67 | 17.94 | 14.64          | 15.28 | 15.61 | 16.26 | 17.53 |
|                 | 4H   | 15.77            | 16.35 | 16.75 | 17.33 | 18.62 | 15.35          | 15.92 | 16.32 | 16.91 | 18.20 |
|                 | 6H   | 16.29            | 16.79 | 17.28 | 17.80 | 19.09 | 15.86          | 16.36 | 16.85 | 17.36 | 18.65 |
|                 | 8H   | 16.44            | 16.91 | 17.44 | 17.91 | 19.22 | 16.01          | 16.47 | 17.00 | 17.47 | 18.78 |
|                 | 12H  | 16.52            | 16.94 | 17.53 | 17.96 | 19.27 | 16.07          | 16.49 | 17.08 | 17.51 | 18.82 |
| 8H              | 4H   | 15.97            | 16.43 | 16.96 | 17.43 | 18.74 | 15.59          | 16.06 | 16.59 | 17.06 | 18.36 |
|                 | 6H   | 16.61            | 16.99 | 17.62 | 18.03 | 19.34 | 16.22          | 16.61 | 17.24 | 17.65 | 18.95 |
|                 | 8H   | 16.83            | 17.17 | 17.86 | 18.20 | 19.52 | 16.44          | 16.78 | 17.46 | 17.81 | 19.13 |
|                 | 12H  | 16.97            | 17.27 | 18.00 | 18.29 | 19.66 | 16.56          | 16.85 | 17.59 | 17.88 | 19.24 |
| 12H             | 4H   | 15.96            | 16.38 | 16.97 | 17.39 | 18.70 | 15.59          | 16.01 | 16.60 | 17.03 | 18.34 |
|                 | 6H   | 16.64            | 16.98 | 17.66 | 18.01 | 19.33 | 16.27          | 16.61 | 17.29 | 17.63 | 18.96 |
|                 | 8H   | 16.88            | 17.18 | 17.91 | 18.21 | 19.57 | 16.50          | 16.80 | 17.53 | 17.83 | 19.19 |