

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: P926080

Luminaire Tested: DFN2DIP-SQ4F0-160D160US950-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P926080  
REPORT IS A COMBINATION OF REPORTS P900219 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-160D160US950-FLLFLL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

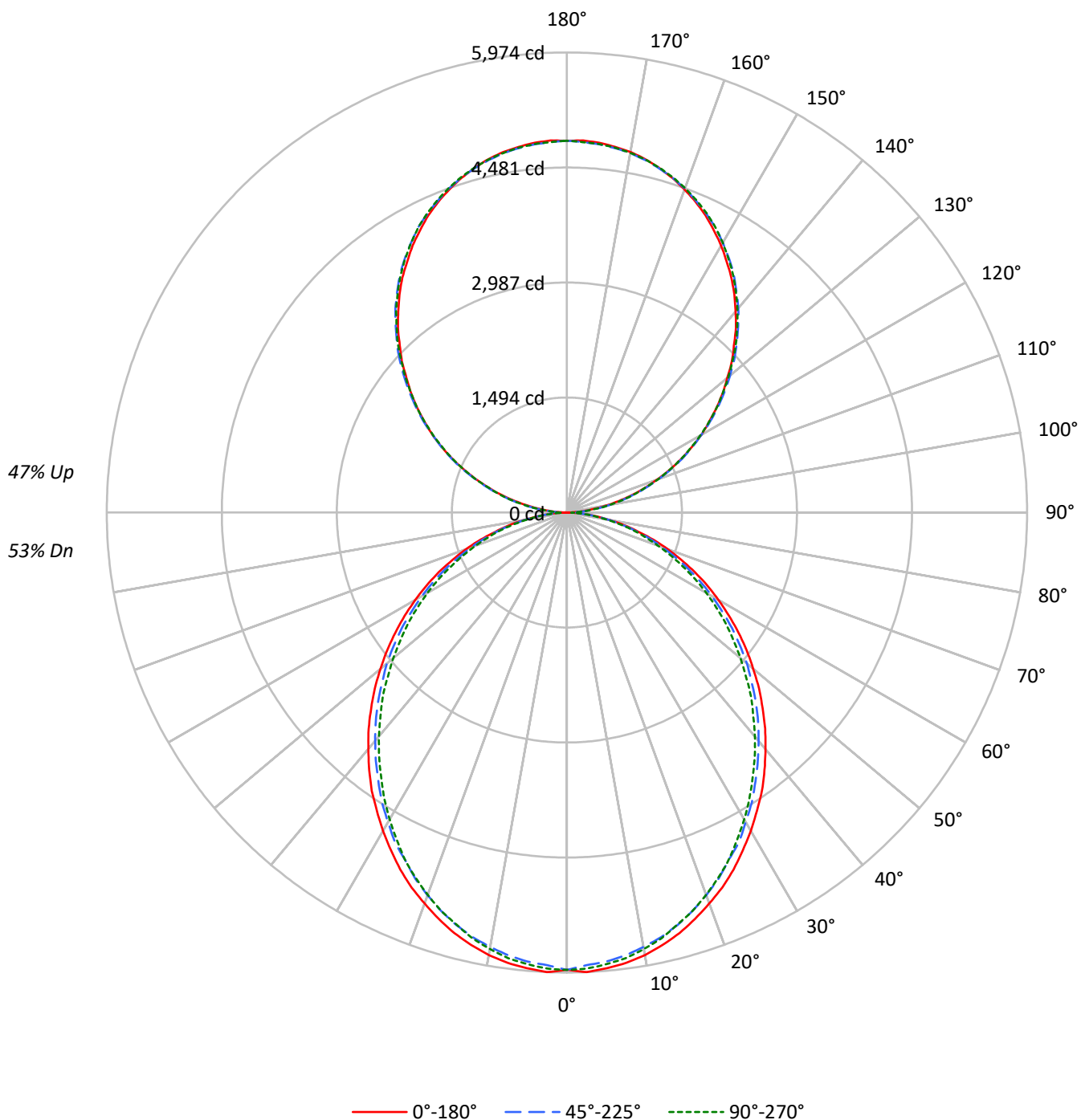
Lumens per Lamp: N/A  
Luminaire Lumens: 28620.9 lumens  
Efficiency: N/A  
Efficacy: 99.1 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 288.8  
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

TEST NUMBER: P926080

CATALOG NUMBER: DFN2DIP-SQ4F0-160D160US950-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P926080

CATALOG NUMBER: DFN2DIP-SQ4F0-160D160US950-FLLFLL

**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   | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 71 | 71 | 71 | 59 | 59 | 59 |
| 1   | 98  | 94  | 90  | 87  | 91  | 87  | 84  | 81  | 74 | 72 | 70 | 63 | 61 | 59 | 52 | 51 | 50 |
| 2   | 90  | 82  | 76  | 71  | 83  | 76  | 71  | 66  | 65 | 61 | 58 | 55 | 52 | 50 | 46 | 44 | 42 |
| 3   | 82  | 72  | 65  | 59  | 75  | 67  | 61  | 55  | 58 | 53 | 49 | 49 | 45 | 42 | 41 | 38 | 36 |
| 4   | 75  | 64  | 56  | 50  | 69  | 60  | 52  | 47  | 51 | 46 | 41 | 43 | 39 | 36 | 36 | 33 | 31 |
| 5   | 69  | 57  | 49  | 43  | 63  | 53  | 46  | 40  | 46 | 40 | 36 | 39 | 35 | 31 | 33 | 29 | 27 |
| 6   | 63  | 51  | 43  | 37  | 58  | 48  | 40  | 35  | 41 | 36 | 31 | 35 | 31 | 27 | 30 | 26 | 24 |
| 7   | 59  | 46  | 38  | 33  | 54  | 43  | 36  | 31  | 37 | 32 | 28 | 32 | 28 | 24 | 27 | 24 | 21 |
| 8   | 54  | 42  | 34  | 29  | 50  | 39  | 32  | 27  | 34 | 29 | 24 | 29 | 25 | 22 | 25 | 21 | 19 |
| 9   | 51  | 38  | 31  | 26  | 47  | 36  | 29  | 24  | 31 | 26 | 22 | 27 | 23 | 19 | 23 | 20 | 17 |
| 10  | 47  | 35  | 28  | 23  | 44  | 33  | 26  | 22  | 29 | 23 | 20 | 25 | 21 | 18 | 21 | 18 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4167 | 4167 | 4167 |
| 5°  | 4174 | 4110 | 4138 |
| 10° | 4140 | 4056 | 4083 |
| 15° | 4079 | 3990 | 3997 |
| 20° | 3997 | 3898 | 3909 |
| 25° | 3915 | 3788 | 3806 |
| 30° | 3812 | 3685 | 3675 |
| 35° | 3715 | 3564 | 3537 |
| 40° | 3595 | 3442 | 3406 |
| 45° | 3476 | 3320 | 3272 |
| 50° | 3346 | 3192 | 3116 |
| 55° | 3209 | 3043 | 2973 |
| 60° | 3054 | 2867 | 2809 |
| 65° | 2886 | 2684 | 2616 |
| 70° | 2672 | 2462 | 2409 |
| 75° | 2374 | 2196 | 2220 |
| 80° | 2017 | 1857 | 1855 |
| 85° | 1458 | 1270 | 1246 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 3798 cd/sqm

TEST NUMBER: P926080

CATALOG NUMBER: DFN2DIP-SQ4F0-160D160US950-FLLFLL

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 559.0   | 2.0       |
| 10°-20°   | 1572.8  | 5.5       |
| 20°-30°   | 2311.4  | 8.1       |
| 30°-40°   | 2684.6  | 9.4       |
| 40°-50°   | 2681.3  | 9.4       |
| 50°-60°   | 2338.0  | 8.2       |
| 60°-70°   | 1728.3  | 6.0       |
| 70°-80°   | 977.8   | 3.4       |
| 80°-90°   | 271.8   | 0.9       |
| 90°-100°  | 298.7   | 1.0       |
| 100°-110° | 949.2   | 3.3       |
| 110°-120° | 1624.4  | 5.7       |
| 120°-130° | 2136.3  | 7.5       |
| 130°-140° | 2397.9  | 8.4       |
| 140°-150° | 2351.4  | 8.2       |
| 150°-160° | 1972.5  | 6.9       |
| 160°-170° | 1308.1  | 4.6       |
| 170°-180° | 457.2   | 1.6       |
| 0°-30°    | 4443.3  | 15.5      |
| 0°-40°    | 7127.9  | 24.9      |
| 0°-60°    | 12147.2 | 42.4      |
| 0°-90°    | 15125.1 | 52.8      |
| 90°-120°  | 2872.3  | 10.0      |
| 90°-150°  | 9757.9  | 34.1      |
| 90°-180°  | 13496.0 | 47.2      |
| 0°-180°   | 28620.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5939 | 5939  | 5939 | 5939  | 5939 |      |
| 5°   | 5939 | 5917  | 5854 | 5899  | 5888 | 564  |
| 15°  | 5654 | 5620  | 5545 | 5568  | 5540 | 1592 |
| 25°  | 5117 | 5072  | 4975 | 4986  | 4975 | 2355 |
| 35°  | 4415 | 4358  | 4266 | 4232  | 4203 | 2757 |
| 45°  | 3593 | 3552  | 3466 | 3404  | 3381 | 2773 |
| 55°  | 2719 | 2684  | 2616 | 2547  | 2519 | 2431 |
| 65°  | 1834 | 1799  | 1742 | 1691  | 1662 | 1813 |
| 75°  | 959  | 948   | 919  | 885   | 897  | 1024 |
| 85°  | 234  | 228   | 223  | 205   | 200  | 261  |
| 90°  | 4    | 52    | 143  | 134   | 138  | 28   |
| 95°  | 212  | 253   | 260  | 260   | 253  | 236  |
| 105° | 876  | 888   | 897  | 904   | 904  | 925  |
| 115° | 1630 | 1653  | 1646 | 1642  | 1630 | 1612 |
| 125° | 2371 | 2407  | 2396 | 2383  | 2378 | 2119 |
| 135° | 3067 | 3112  | 3120 | 3116  | 3104 | 2370 |
| 145° | 3723 | 3752  | 3776 | 3780  | 3764 | 2326 |
| 155° | 4257 | 4269  | 4282 | 4302  | 4289 | 1960 |
| 165° | 4631 | 4627  | 4627 | 4656  | 4636 | 1306 |
| 175° | 4819 | 4807  | 4799 | 4828  | 4803 | 458  |
| 180° | 4828 | 4828  | 4828 | 4828  | 4828 |      |

TEST NUMBER: P926080

CATALOG NUMBER: DFN2DIP-SQ4F0-160D160US950-FLLFL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5939.3 | 5939.3 | 5939.3 | 5939.3 | 5939.3 |
| 2.5°   | 5973.9 | 5945.3 | 5882.4 | 5939.3 | 5928.3 |
| 5°     | 5939.3 | 5916.9 | 5853.8 | 5899.3 | 5888.4 |
| 7.5°   | 5899.3 | 5865.4 | 5802.3 | 5848.4 | 5836.9 |
| 10°    | 5836.9 | 5796.9 | 5728.5 | 5773.9 | 5756.9 |
| 12.5°  | 5750.9 | 5716.9 | 5648.4 | 5677.0 | 5665.4 |
| 15°    | 5653.9 | 5620.0 | 5545.4 | 5568.5 | 5540.0 |
| 17.5°  | 5534.0 | 5500.0 | 5425.5 | 5453.9 | 5425.5 |
| 20°    | 5402.4 | 5368.5 | 5288.5 | 5305.5 | 5283.1 |
| 22.5°  | 5271.6 | 5220.1 | 5145.5 | 5145.5 | 5134.0 |
| 25°    | 5117.1 | 5071.7 | 4974.6 | 4985.6 | 4974.6 |
| 27.5°  | 4945.5 | 4905.6 | 4831.6 | 4814.7 | 4786.2 |
| 30°    | 4774.7 | 4728.7 | 4643.2 | 4626.2 | 4603.2 |
| 32.5°  | 4591.7 | 4557.8 | 4466.2 | 4431.7 | 4408.7 |
| 35°    | 4414.8 | 4357.9 | 4266.3 | 4231.8 | 4203.3 |
| 37.5°  | 4214.9 | 4163.4 | 4071.9 | 4031.8 | 4003.4 |
| 40°    | 4009.4 | 3963.4 | 3871.9 | 3821.0 | 3798.0 |
| 42.5°  | 3809.5 | 3763.4 | 3672.5 | 3615.0 | 3581.0 |
| 45°    | 3592.6 | 3552.5 | 3466.5 | 3404.1 | 3381.1 |
| 47.5°  | 3381.1 | 3341.1 | 3249.6 | 3186.6 | 3152.7 |
| 50°    | 3158.1 | 3129.6 | 3049.7 | 2969.6 | 2941.2 |
| 52.5°  | 2941.2 | 2901.2 | 2827.3 | 2764.2 | 2724.2 |
| 55°    | 2718.8 | 2684.3 | 2615.8 | 2547.3 | 2518.8 |
| 57.5°  | 2495.9 | 2467.3 | 2392.8 | 2324.3 | 2301.3 |
| 60°    | 2272.8 | 2250.4 | 2170.4 | 2107.4 | 2090.4 |
| 62.5°  | 2055.9 | 2015.9 | 1958.9 | 1902.0 | 1879.0 |
| 65°    | 1833.5 | 1799.0 | 1742.0 | 1690.6 | 1662.1 |
| 67.5°  | 1605.1 | 1576.0 | 1525.2 | 1485.1 | 1462.1 |
| 70°    | 1393.6 | 1370.6 | 1319.1 | 1279.1 | 1256.7 |
| 72.5°  | 1176.7 | 1153.7 | 1125.2 | 1085.2 | 1068.3 |
| 75°    | 959.2  | 948.3  | 919.2  | 885.2  | 896.8  |
| 77.5°  | 765.3  | 742.3  | 730.8  | 713.8  | 696.8  |
| 80°    | 571.4  | 565.3  | 553.8  | 536.8  | 525.4  |
| 82.5°  | 388.4  | 388.4  | 382.9  | 359.9  | 359.9  |
| 85°    | 233.9  | 228.4  | 222.9  | 205.4  | 200.0  |
| 87.5°  | 103.0  | 91.5   | 79.9   | 63.1   | 57.0   |
| 90°    | 4.4    | 52.4   | 142.6  | 133.9  | 138.2  |
| 92.5°  | 90.2   | 122.3  | 126.6  | 131.0  | 131.0  |
| 95°    | 212.5  | 253.3  | 260.5  | 260.5  | 253.3  |
| 97.5°  | 353.6  | 391.5  | 407.5  | 407.5  | 407.5  |
| 100°   | 516.7  | 550.2  | 561.8  | 561.8  | 557.4  |
| 102.5° | 688.4  | 713.2  | 729.1  | 733.5  | 729.1  |
| 105°   | 876.2  | 887.8  | 896.6  | 903.8  | 903.8  |
| 107.5° | 1062.5 | 1079.9 | 1079.9 | 1082.9 | 1062.5 |
| 110°   | 1243.0 | 1266.2 | 1266.2 | 1266.2 | 1254.6 |



TEST NUMBER: P926080

CATALOG NUMBER: DFN2DIP-SQ4F0-160D160US950-FLLFL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1438.0 | 1462.8 | 1458.4 | 1446.7 | 1438.0 |
| 115°   | 1630.1 | 1653.4 | 1646.1 | 1641.7 | 1630.1 |
| 117.5° | 1820.8 | 1852.8 | 1832.4 | 1820.8 | 1809.2 |
| 120°   | 2012.9 | 2044.9 | 2012.9 | 2012.9 | 1999.8 |
| 122.5° | 2187.5 | 2228.4 | 2207.9 | 2196.3 | 2187.5 |
| 125°   | 2371.0 | 2407.3 | 2395.7 | 2382.6 | 2378.2 |
| 127.5° | 2549.9 | 2595.1 | 2579.0 | 2561.6 | 2549.9 |
| 130°   | 2717.4 | 2769.7 | 2762.5 | 2753.7 | 2737.7 |
| 132.5° | 2905.1 | 2945.9 | 2948.7 | 2928.4 | 2916.8 |
| 135°   | 3066.6 | 3111.8 | 3120.5 | 3116.1 | 3104.5 |
| 137.5° | 3247.1 | 3283.5 | 3290.8 | 3287.9 | 3270.4 |
| 140°   | 3405.8 | 3442.1 | 3462.5 | 3462.5 | 3446.5 |
| 142.5° | 3568.8 | 3605.2 | 3616.8 | 3621.2 | 3605.2 |
| 145°   | 3723.1 | 3752.2 | 3775.5 | 3779.8 | 3763.8 |
| 147.5° | 3861.3 | 3897.8 | 3915.2 | 3922.5 | 3906.4 |
| 150°   | 4003.9 | 4028.7 | 4044.8 | 4057.8 | 4044.8 |
| 152.5° | 4130.6 | 4155.3 | 4175.8 | 4191.7 | 4175.8 |
| 155°   | 4257.2 | 4268.9 | 4281.9 | 4302.3 | 4289.3 |
| 157.5° | 4366.4 | 4375.1 | 4382.4 | 4411.5 | 4391.2 |
| 160°   | 4463.9 | 4472.6 | 4477.0 | 4501.7 | 4484.3 |
| 162.5° | 4554.1 | 4554.1 | 4558.5 | 4586.2 | 4565.7 |
| 165°   | 4631.3 | 4626.9 | 4626.9 | 4656.0 | 4635.7 |
| 167.5° | 4701.1 | 4688.1 | 4688.1 | 4717.1 | 4696.7 |
| 170°   | 4753.5 | 4741.9 | 4737.6 | 4766.7 | 4741.9 |
| 172.5° | 4789.9 | 4778.3 | 4773.9 | 4803.0 | 4778.3 |
| 175°   | 4819.0 | 4807.4 | 4798.6 | 4827.8 | 4803.0 |
| 177.5° | 4835.1 | 4823.4 | 4814.6 | 4839.5 | 4814.6 |
| 180°   | 4827.8 | 4827.8 | 4827.8 | 4827.8 | 4827.8 |

TEST NUMBER: P926080

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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 | 12.50            | 13.39 | 13.43 | 14.34 | 15.57 | 12.06          | 12.94 | 12.99 | 13.89 | 15.12 |
|                 | 3H   | 14.17            | 14.96 | 15.11 | 15.92 | 17.18 | 13.68          | 14.47 | 14.62 | 15.43 | 16.69 |
|                 | 4H   | 14.76            | 15.51 | 15.72 | 16.48 | 17.74 | 14.27          | 15.02 | 15.22 | 15.98 | 17.24 |
|                 | 6H   | 15.16            | 15.86 | 16.13 | 16.83 | 18.10 | 14.66          | 15.36 | 15.63 | 16.33 | 17.60 |
|                 | 8H   | 15.27            | 15.93 | 16.25 | 16.92 | 18.19 | 14.77          | 15.43 | 15.75 | 16.42 | 17.69 |
|                 | 12H  | 15.32            | 15.95 | 16.30 | 16.93 | 18.23 | 14.81          | 15.44 | 15.79 | 16.42 | 17.72 |
| 4H              | 2H   | 12.97            | 13.72 | 13.93 | 14.68 | 15.95 | 12.61          | 13.36 | 13.58 | 14.33 | 15.59 |
|                 | 3H   | 14.84            | 15.47 | 15.81 | 16.46 | 17.74 | 14.43          | 15.06 | 15.41 | 16.05 | 17.33 |
|                 | 4H   | 15.56            | 16.13 | 16.54 | 17.12 | 18.42 | 15.13          | 15.71 | 16.12 | 16.70 | 18.00 |
|                 | 6H   | 16.08            | 16.57 | 17.07 | 17.58 | 18.88 | 15.65          | 16.14 | 16.64 | 17.15 | 18.45 |
|                 | 8H   | 16.23            | 16.69 | 17.23 | 17.70 | 19.01 | 15.79          | 16.26 | 16.79 | 17.26 | 18.57 |
|                 | 12H  | 16.31            | 16.73 | 17.32 | 17.75 | 19.06 | 15.86          | 16.28 | 16.87 | 17.30 | 18.61 |
| 8H              | 4H   | 15.76            | 16.22 | 16.75 | 17.22 | 18.54 | 15.38          | 15.84 | 16.38 | 16.85 | 18.16 |
|                 | 6H   | 16.39            | 16.78 | 17.42 | 17.82 | 19.13 | 16.01          | 16.39 | 17.03 | 17.44 | 18.75 |
|                 | 8H   | 16.62            | 16.96 | 17.65 | 17.99 | 19.32 | 16.23          | 16.56 | 17.25 | 17.59 | 18.92 |
|                 | 12H  | 16.75            | 17.05 | 17.79 | 18.08 | 19.45 | 16.34          | 16.64 | 17.38 | 17.67 | 19.04 |
| 12H             | 4H   | 15.74            | 16.16 | 16.76 | 17.18 | 18.50 | 15.38          | 15.79 | 16.39 | 16.81 | 18.13 |
|                 | 6H   | 16.42            | 16.76 | 17.45 | 17.79 | 19.12 | 16.05          | 16.39 | 17.08 | 17.42 | 18.75 |
|                 | 8H   | 16.67            | 16.97 | 17.70 | 17.99 | 19.37 | 16.29          | 16.59 | 17.32 | 17.61 | 18.99 |