

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: P912404

Luminaire Tested: DFN2DIP-SQ4F0-140D160US850-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P912404  
REPORT IS A COMBINATION OF REPORTS P900217 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-140D160US850-FLLFLL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

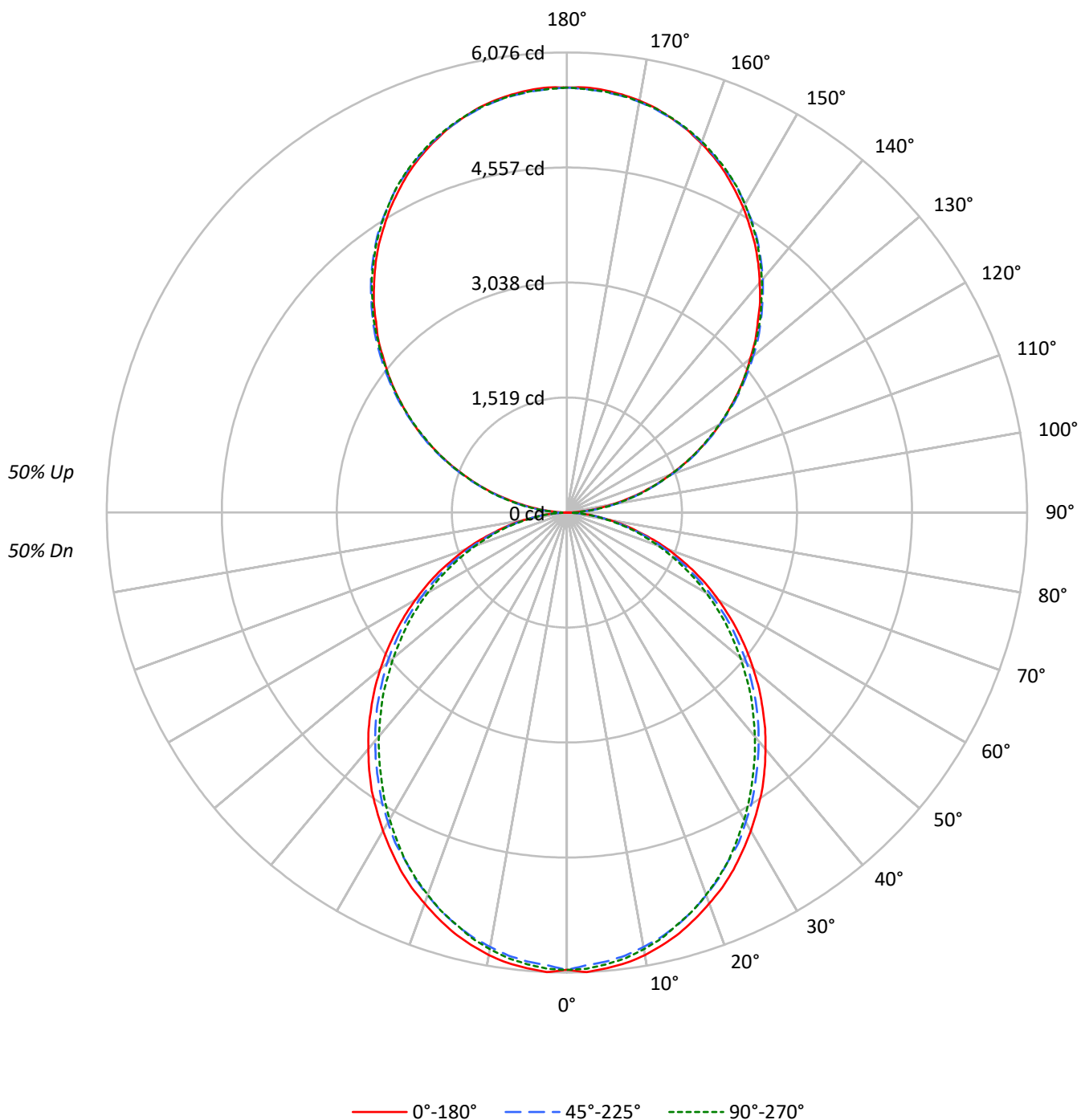
Lumens per Lamp: N/A  
Luminaire Lumens: 31075.3 lumens  
Efficiency: N/A  
Efficacy: 116.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 265.9  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9789  
Total Harmonic Distortion (THDi): 0.074  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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CATALOG NUMBER: DFN2DIP-SQ4F0-140D160US850-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P912404

CATALOG NUMBER: DFN2DIP-SQ4F0-140D160US850-FLLFL

**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 | 69 | 69 | 69 | 56 | 56 | 56 |
| 1   | 98  | 93  | 89  | 86  | 90 | 86 | 83 | 80 | 73 | 70 | 68 | 61 | 59 | 57 | 49 | 48 | 47 |
| 2   | 89  | 82  | 75  | 70  | 82 | 75 | 70 | 66 | 64 | 60 | 56 | 53 | 50 | 48 | 43 | 41 | 40 |
| 3   | 81  | 72  | 64  | 58  | 74 | 66 | 60 | 55 | 56 | 51 | 47 | 47 | 43 | 40 | 38 | 36 | 34 |
| 4   | 74  | 63  | 56  | 49  | 68 | 59 | 52 | 46 | 50 | 45 | 40 | 42 | 38 | 35 | 34 | 31 | 29 |
| 5   | 68  | 57  | 48  | 42  | 63 | 52 | 45 | 40 | 45 | 39 | 35 | 38 | 33 | 30 | 31 | 28 | 25 |
| 6   | 63  | 51  | 43  | 37  | 58 | 47 | 40 | 35 | 40 | 35 | 30 | 34 | 30 | 26 | 28 | 25 | 22 |
| 7   | 58  | 46  | 38  | 32  | 53 | 43 | 35 | 30 | 37 | 31 | 27 | 31 | 27 | 23 | 26 | 22 | 20 |
| 8   | 54  | 42  | 34  | 28  | 50 | 39 | 32 | 27 | 33 | 28 | 24 | 28 | 24 | 21 | 24 | 20 | 18 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 29 | 24 | 31 | 25 | 21 | 26 | 22 | 19 | 22 | 18 | 16 |
| 10  | 47  | 35  | 28  | 23  | 43 | 33 | 26 | 22 | 28 | 23 | 19 | 24 | 20 | 17 | 20 | 17 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4239 | 4239 | 4239 |
| 5°  | 4246 | 4181 | 4209 |
| 10° | 4211 | 4125 | 4153 |
| 15° | 4149 | 4058 | 4066 |
| 20° | 4066 | 3965 | 3976 |
| 25° | 3982 | 3853 | 3871 |
| 30° | 3878 | 3748 | 3739 |
| 35° | 3779 | 3626 | 3598 |
| 40° | 3657 | 3501 | 3464 |
| 45° | 3536 | 3377 | 3328 |
| 50° | 3403 | 3246 | 3169 |
| 55° | 3264 | 3095 | 3024 |
| 60° | 3107 | 2916 | 2858 |
| 65° | 2936 | 2731 | 2661 |
| 70° | 2717 | 2504 | 2450 |
| 75° | 2415 | 2234 | 2258 |
| 80° | 2051 | 1890 | 1886 |
| 85° | 1483 | 1293 | 1268 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 4416 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 568.6   | 1.8       |
| 10°-20°   | 1599.8  | 5.1       |
| 20°-30°   | 2351.1  | 7.6       |
| 30°-40°   | 2730.7  | 8.8       |
| 40°-50°   | 2727.3  | 8.8       |
| 50°-60°   | 2378.1  | 7.7       |
| 60°-70°   | 1757.9  | 5.7       |
| 70°-80°   | 994.6   | 3.2       |
| 80°-90°   | 278.4   | 0.9       |
| 90°-100°  | 347.3   | 1.1       |
| 100°-110° | 1103.4  | 3.6       |
| 110°-120° | 1888.3  | 6.1       |
| 120°-130° | 2483.4  | 8.0       |
| 130°-140° | 2787.5  | 9.0       |
| 140°-150° | 2733.5  | 8.8       |
| 150°-160° | 2293.0  | 7.4       |
| 160°-170° | 1520.7  | 4.9       |
| 170°-180° | 531.5   | 1.7       |
| 0°-30°    | 4519.6  | 14.5      |
| 0°-40°    | 7250.2  | 23.3      |
| 0°-60°    | 12355.7 | 39.8      |
| 0°-90°    | 15386.7 | 49.5      |
| 90°-120°  | 3339.0  | 10.7      |
| 90°-150°  | 11343.4 | 36.5      |
| 90°-180°  | 15689.0 | 50.5      |
| 0°-180°   | 31075.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 6041 | 6041  | 6041 | 6041  | 6041 |      |
| 5°   | 6041 | 6018  | 5954 | 6001  | 5990 | 573  |
| 15°  | 5751 | 5716  | 5641 | 5664  | 5635 | 1620 |
| 25°  | 5205 | 5159  | 5060 | 5071  | 5060 | 2395 |
| 35°  | 4491 | 4433  | 4340 | 4304  | 4275 | 2804 |
| 45°  | 3654 | 3614  | 3526 | 3462  | 3439 | 2820 |
| 55°  | 2766 | 2730  | 2661 | 2591  | 2562 | 2472 |
| 65°  | 1865 | 1830  | 1772 | 1720  | 1691 | 1844 |
| 75°  | 976  | 965   | 935  | 900   | 912  | 1042 |
| 85°  | 238  | 232   | 227  | 209   | 203  | 265  |
| 90°  | 5    | 61    | 166  | 156   | 161  | 30   |
| 95°  | 247  | 294   | 303  | 303   | 294  | 275  |
| 105° | 1018 | 1032  | 1042 | 1051  | 1051 | 1075 |
| 115° | 1895 | 1922  | 1914 | 1908  | 1895 | 1874 |
| 125° | 2756 | 2798  | 2785 | 2770  | 2765 | 2463 |
| 135° | 3565 | 3617  | 3628 | 3622  | 3609 | 2756 |
| 145° | 4328 | 4362  | 4389 | 4394  | 4375 | 2704 |
| 155° | 4949 | 4962  | 4978 | 5001  | 4986 | 2278 |
| 165° | 5384 | 5379  | 5379 | 5412  | 5389 | 1519 |
| 175° | 5602 | 5588  | 5578 | 5612  | 5583 | 532  |
| 180° | 5612 | 5612  | 5612 | 5612  | 5612 |      |

TEST NUMBER: P912404

CATALOG NUMBER: DFN2DIP-SQ4F0-140D160US850-FLLFLL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 6041.3 | 6041.3 | 6041.3 | 6041.3 | 6041.3 |
| 2.5°   | 6076.3 | 6047.4 | 5983.3 | 6041.3 | 6030.2 |
| 5°     | 6041.3 | 6018.4 | 5954.3 | 6000.6 | 5989.5 |
| 7.5°   | 6000.6 | 5966.1 | 5902.0 | 5948.8 | 5937.0 |
| 10°    | 5937.0 | 5896.4 | 5826.8 | 5873.0 | 5855.7 |
| 12.5°  | 5849.5 | 5815.0 | 5745.4 | 5774.3 | 5762.7 |
| 15°    | 5750.9 | 5716.5 | 5640.6 | 5664.1 | 5635.1 |
| 17.5°  | 5629.0 | 5594.5 | 5518.6 | 5547.6 | 5518.6 |
| 20°    | 5495.2 | 5460.7 | 5379.3 | 5396.6 | 5373.8 |
| 22.5°  | 5362.0 | 5309.7 | 5233.8 | 5233.8 | 5222.2 |
| 25°    | 5204.9 | 5158.6 | 5060.0 | 5071.1 | 5060.0 |
| 27.5°  | 5030.4 | 4989.8 | 4914.6 | 4897.3 | 4868.4 |
| 30°    | 4856.6 | 4809.8 | 4722.9 | 4705.7 | 4682.2 |
| 32.5°  | 4670.6 | 4636.1 | 4542.9 | 4507.9 | 4484.4 |
| 35°    | 4490.6 | 4432.7 | 4339.5 | 4304.5 | 4275.4 |
| 37.5°  | 4287.2 | 4234.8 | 4141.7 | 4101.1 | 4072.0 |
| 40°    | 4078.2 | 4031.4 | 3938.3 | 3886.6 | 3863.1 |
| 42.5°  | 3874.8 | 3828.0 | 3735.6 | 3677.0 | 3642.5 |
| 45°    | 3654.2 | 3613.6 | 3526.1 | 3462.5 | 3439.1 |
| 47.5°  | 3439.1 | 3398.4 | 3305.4 | 3241.3 | 3206.8 |
| 50°    | 3212.3 | 3183.4 | 3102.0 | 3020.6 | 2991.6 |
| 52.5°  | 2991.6 | 2950.9 | 2875.7 | 2811.6 | 2771.1 |
| 55°    | 2765.5 | 2730.4 | 2660.7 | 2591.1 | 2562.1 |
| 57.5°  | 2538.6 | 2509.7 | 2433.9 | 2364.3 | 2340.8 |
| 60°    | 2311.8 | 2289.1 | 2207.7 | 2143.6 | 2126.3 |
| 62.5°  | 2091.2 | 2050.5 | 1992.5 | 1934.7 | 1911.3 |
| 65°    | 1865.0 | 1829.8 | 1772.0 | 1719.5 | 1690.6 |
| 67.5°  | 1632.7 | 1603.1 | 1551.3 | 1510.6 | 1487.2 |
| 70°    | 1417.5 | 1394.1 | 1341.8 | 1301.1 | 1278.2 |
| 72.5°  | 1196.9 | 1173.4 | 1144.5 | 1103.9 | 1086.6 |
| 75°    | 975.7  | 964.6  | 935.0  | 900.5  | 912.2  |
| 77.5°  | 778.4  | 755.0  | 743.3  | 726.1  | 708.8  |
| 80°    | 581.2  | 575.0  | 563.4  | 546.1  | 534.3  |
| 82.5°  | 395.0  | 395.0  | 389.5  | 366.1  | 366.1  |
| 85°    | 237.9  | 232.3  | 226.8  | 208.9  | 203.4  |
| 87.5°  | 104.8  | 93.0   | 81.4   | 64.1   | 57.9   |
| 90°    | 5.1    | 60.9   | 165.8  | 155.7  | 160.7  |
| 92.5°  | 104.9  | 142.2  | 147.2  | 152.3  | 152.3  |
| 95°    | 247.0  | 294.4  | 302.9  | 302.9  | 294.4  |
| 97.5°  | 411.1  | 455.1  | 473.8  | 473.8  | 473.8  |
| 100°   | 600.6  | 639.6  | 653.1  | 653.1  | 648.0  |
| 102.5° | 800.3  | 829.1  | 847.6  | 852.7  | 847.6  |
| 105°   | 1018.5 | 1032.0 | 1042.2 | 1050.7 | 1050.7 |
| 107.5° | 1235.1 | 1255.4 | 1255.4 | 1258.8 | 1235.1 |
| 110°   | 1444.9 | 1472.0 | 1472.0 | 1472.0 | 1458.4 |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1671.6 | 1700.4 | 1695.3 | 1681.8 | 1671.6 |
| 115°   | 1894.9 | 1922.0 | 1913.6 | 1908.5 | 1894.9 |
| 117.5° | 2116.6 | 2153.8 | 2130.2 | 2116.6 | 2103.1 |
| 120°   | 2340.0 | 2377.1 | 2340.0 | 2340.0 | 2324.7 |
| 122.5° | 2542.9 | 2590.4 | 2566.7 | 2553.1 | 2542.9 |
| 125°   | 2756.2 | 2798.5 | 2784.9 | 2769.7 | 2764.6 |
| 127.5° | 2964.2 | 3016.7 | 2998.1 | 2977.8 | 2964.2 |
| 130°   | 3158.9 | 3219.8 | 3211.3 | 3201.1 | 3182.5 |
| 132.5° | 3377.1 | 3424.5 | 3427.8 | 3404.2 | 3390.7 |
| 135°   | 3564.9 | 3617.3 | 3627.5 | 3622.4 | 3608.9 |
| 137.5° | 3774.7 | 3817.0 | 3825.5 | 3822.1 | 3801.8 |
| 140°   | 3959.1 | 4001.4 | 4025.1 | 4025.1 | 4006.5 |
| 142.5° | 4148.7 | 4190.9 | 4204.4 | 4209.5 | 4190.9 |
| 145°   | 4328.0 | 4361.8 | 4388.9 | 4394.0 | 4375.3 |
| 147.5° | 4488.7 | 4531.0 | 4551.3 | 4559.8 | 4541.1 |
| 150°   | 4654.5 | 4683.3 | 4701.9 | 4717.1 | 4701.9 |
| 152.5° | 4801.7 | 4830.5 | 4854.2 | 4872.7 | 4854.2 |
| 155°   | 4948.9 | 4962.4 | 4977.6 | 5001.4 | 4986.2 |
| 157.5° | 5075.8 | 5086.0 | 5094.4 | 5128.2 | 5104.6 |
| 160°   | 5189.1 | 5199.3 | 5204.4 | 5233.1 | 5212.9 |
| 162.5° | 5294.0 | 5294.0 | 5299.1 | 5331.3 | 5307.6 |
| 165°   | 5383.8 | 5378.6 | 5378.6 | 5412.5 | 5388.9 |
| 167.5° | 5464.9 | 5449.7 | 5449.7 | 5483.6 | 5459.8 |
| 170°   | 5525.8 | 5512.3 | 5507.3 | 5541.1 | 5512.3 |
| 172.5° | 5568.2 | 5554.6 | 5549.5 | 5583.4 | 5554.6 |
| 175°   | 5602.0 | 5588.5 | 5578.3 | 5612.2 | 5583.4 |
| 177.5° | 5620.6 | 5607.1 | 5596.9 | 5625.7 | 5596.9 |
| 180°   | 5612.2 | 5612.2 | 5612.2 | 5612.2 | 5612.2 |

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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 | 12.26            | 13.11 | 13.22 | 14.09 | 15.37 | 11.81          | 12.67 | 12.77 | 13.64 | 14.92 |
|                 | 3H   | 13.92            | 14.69 | 14.89 | 15.67 | 16.97 | 13.43          | 14.20 | 14.40 | 15.18 | 16.48 |
|                 | 4H   | 14.51            | 15.24 | 15.50 | 16.23 | 17.54 | 14.02          | 14.74 | 15.00 | 15.73 | 17.04 |
|                 | 6H   | 14.91            | 15.58 | 15.91 | 16.58 | 17.90 | 14.41          | 15.08 | 15.41 | 16.08 | 17.40 |
|                 | 8H   | 15.02            | 15.66 | 16.02 | 16.67 | 17.99 | 14.52          | 15.16 | 15.52 | 16.17 | 17.49 |
|                 | 12H  | 15.07            | 15.68 | 16.08 | 16.68 | 18.02 | 14.56          | 15.17 | 15.57 | 16.17 | 17.52 |
| 4H              | 2H   | 12.72            | 13.44 | 13.71 | 14.43 | 15.74 | 12.36          | 13.09 | 13.35 | 14.08 | 15.39 |
|                 | 3H   | 14.59            | 15.19 | 15.59 | 16.21 | 17.54 | 14.18          | 14.79 | 15.18 | 15.81 | 17.13 |
|                 | 4H   | 15.30            | 15.86 | 16.31 | 16.87 | 18.22 | 14.88          | 15.44 | 15.89 | 16.45 | 17.79 |
|                 | 6H   | 15.82            | 16.30 | 16.84 | 17.34 | 18.68 | 15.39          | 15.87 | 16.41 | 16.90 | 18.25 |
|                 | 8H   | 15.98            | 16.42 | 17.00 | 17.45 | 18.81 | 15.54          | 15.99 | 16.56 | 17.01 | 18.37 |
|                 | 12H  | 16.05            | 16.45 | 17.09 | 17.50 | 18.86 | 15.60          | 16.01 | 16.64 | 17.05 | 18.41 |
| 8H              | 4H   | 15.50            | 15.95 | 16.52 | 16.98 | 18.33 | 15.12          | 15.57 | 16.15 | 16.60 | 17.96 |
|                 | 6H   | 16.14            | 16.51 | 17.18 | 17.58 | 18.93 | 15.75          | 16.12 | 16.80 | 17.19 | 18.55 |
|                 | 8H   | 16.36            | 16.69 | 17.41 | 17.74 | 19.12 | 15.97          | 16.29 | 17.02 | 17.35 | 18.72 |
|                 | 12H  | 16.50            | 16.78 | 17.55 | 17.83 | 19.25 | 16.08          | 16.37 | 17.14 | 17.42 | 18.84 |
| 12H             | 4H   | 15.49            | 15.89 | 16.53 | 16.93 | 18.30 | 15.12          | 15.52 | 16.16 | 16.57 | 17.93 |
|                 | 6H   | 16.17            | 16.49 | 17.22 | 17.55 | 18.92 | 15.80          | 16.12 | 16.85 | 17.18 | 18.55 |
|                 | 8H   | 16.41            | 16.70 | 17.47 | 17.75 | 19.16 | 16.03          | 16.32 | 17.09 | 17.37 | 18.78 |