

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: P923344

Luminaire Tested: DFN2DIP-SQ4F0-160D120US940-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P923344  
REPORT IS A COMBINATION OF REPORTS P900183 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-160D120US940-FLLFLL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

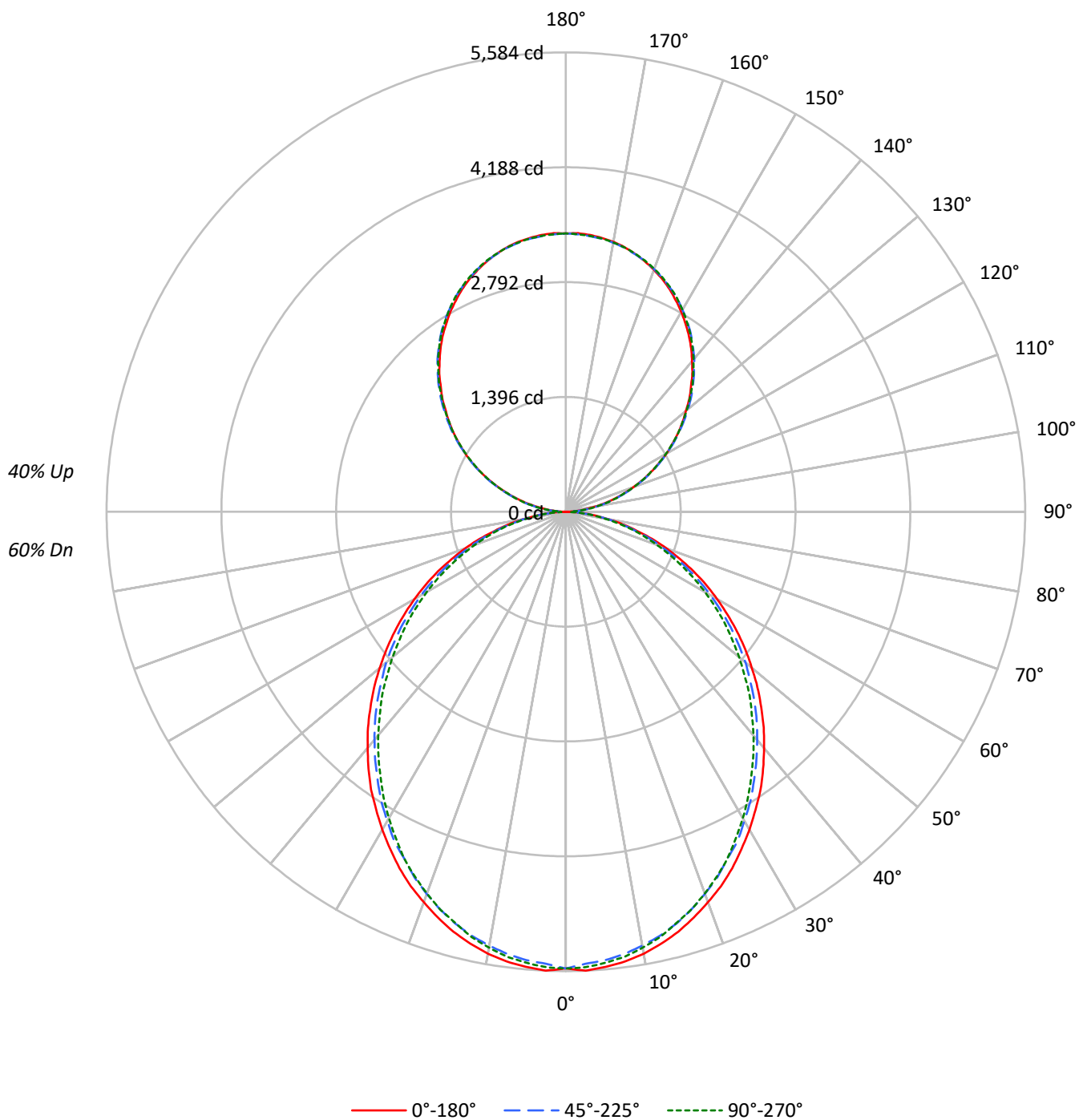
Lumens per Lamp: N/A  
Luminaire Lumens: 23594.6 lumens  
Efficiency: N/A  
Efficacy: 91.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 256.8  
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: P923344

CATALOG NUMBER: DFN2DIP-SQ4F0-160D120US940-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P923344

CATALOG NUMBER: DFN2DIP-SQ4F0-160D120US940-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   | 110 | 110 | 110 | 110 | 102 | 102 | 102 | 102 | 89 | 89 | 89 | 77 | 77 | 77 | 65 | 65 | 65 |
| 1   | 100 | 96  | 92  | 88  | 93  | 89  | 86  | 83  | 78 | 75 | 73 | 67 | 66 | 64 | 58 | 56 | 55 |
| 2   | 91  | 84  | 77  | 72  | 85  | 78  | 73  | 68  | 68 | 64 | 61 | 59 | 56 | 53 | 51 | 48 | 46 |
| 3   | 83  | 73  | 66  | 60  | 77  | 69  | 62  | 57  | 60 | 55 | 51 | 52 | 48 | 45 | 45 | 42 | 40 |
| 4   | 76  | 65  | 57  | 51  | 71  | 61  | 54  | 48  | 54 | 48 | 43 | 47 | 42 | 39 | 40 | 37 | 34 |
| 5   | 70  | 58  | 50  | 44  | 65  | 55  | 47  | 42  | 48 | 42 | 38 | 42 | 37 | 34 | 36 | 33 | 30 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 42  | 36  | 43 | 37 | 33 | 38 | 33 | 29 | 33 | 29 | 26 |
| 7   | 60  | 47  | 39  | 33  | 56  | 44  | 37  | 32  | 39 | 33 | 29 | 35 | 30 | 26 | 30 | 26 | 23 |
| 8   | 55  | 43  | 35  | 30  | 52  | 40  | 33  | 28  | 36 | 30 | 26 | 32 | 27 | 23 | 28 | 24 | 21 |
| 9   | 52  | 39  | 32  | 26  | 48  | 37  | 30  | 25  | 33 | 27 | 23 | 29 | 24 | 21 | 26 | 22 | 19 |
| 10  | 48  | 36  | 29  | 24  | 45  | 34  | 27  | 23  | 30 | 25 | 21 | 27 | 22 | 19 | 24 | 20 | 17 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3895 | 3895 | 3895 |
| 5°  | 3902 | 3842 | 3868 |
| 10° | 3870 | 3791 | 3817 |
| 15° | 3813 | 3729 | 3736 |
| 20° | 3736 | 3643 | 3653 |
| 25° | 3659 | 3540 | 3558 |
| 30° | 3563 | 3445 | 3436 |
| 35° | 3473 | 3332 | 3306 |
| 40° | 3361 | 3218 | 3184 |
| 45° | 3249 | 3103 | 3058 |
| 50° | 3127 | 2983 | 2912 |
| 55° | 2999 | 2844 | 2779 |
| 60° | 2855 | 2679 | 2626 |
| 65° | 2698 | 2509 | 2445 |
| 70° | 2497 | 2301 | 2252 |
| 75° | 2219 | 2053 | 2075 |
| 80° | 1885 | 1736 | 1733 |
| 85° | 1362 | 1188 | 1165 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3249 cd/sqm

TEST NUMBER: P923344

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 522.5   | 2.2       |
| 10°-20°   | 1470.1  | 6.2       |
| 20°-30°   | 2160.5  | 9.2       |
| 30°-40°   | 2509.3  | 10.6      |
| 40°-50°   | 2506.2  | 10.6      |
| 50°-60°   | 2185.3  | 9.3       |
| 60°-70°   | 1615.4  | 6.8       |
| 70°-80°   | 914.0   | 3.9       |
| 80°-90°   | 250.8   | 1.1       |
| 90°-100°  | 209.4   | 0.9       |
| 100°-110° | 665.4   | 2.8       |
| 110°-120° | 1138.7  | 4.8       |
| 120°-130° | 1497.5  | 6.3       |
| 130°-140° | 1680.9  | 7.1       |
| 140°-150° | 1648.3  | 7.0       |
| 150°-160° | 1382.7  | 5.9       |
| 160°-170° | 917.0   | 3.9       |
| 170°-180° | 320.5   | 1.4       |
| 0°-30°    | 4153.2  | 17.6      |
| 0°-40°    | 6662.5  | 28.2      |
| 0°-60°    | 11354.0 | 48.1      |
| 0°-90°    | 14134.3 | 59.9      |
| 90°-120°  | 2013.4  | 8.5       |
| 90°-150°  | 6840.1  | 29.0      |
| 90°-180°  | 9460.0  | 40.1      |
| 0°-180°   | 23594.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5552 | 5552  | 5552 | 5552  | 5552 |      |
| 5°   | 5552 | 5531  | 5472 | 5514  | 5504 | 527  |
| 15°  | 5285 | 5253  | 5183 | 5205  | 5178 | 1488 |
| 25°  | 4783 | 4740  | 4650 | 4660  | 4650 | 2201 |
| 35°  | 4127 | 4073  | 3988 | 3955  | 3929 | 2577 |
| 45°  | 3358 | 3321  | 3240 | 3182  | 3160 | 2592 |
| 55°  | 2541 | 2509  | 2445 | 2381  | 2354 | 2272 |
| 65°  | 1714 | 1682  | 1628 | 1580  | 1554 | 1694 |
| 75°  | 896  | 886   | 859  | 827   | 838  | 957  |
| 85°  | 219  | 214   | 208  | 192   | 187  | 244  |
| 90°  | 3    | 37    | 100  | 94    | 97   | 23   |
| 95°  | 149  | 178   | 183  | 183   | 178  | 166  |
| 105° | 614  | 622   | 628  | 634   | 634  | 648  |
| 115° | 1143 | 1159  | 1154 | 1151  | 1143 | 1130 |
| 125° | 1662 | 1688  | 1679 | 1670  | 1667 | 1485 |
| 135° | 2150 | 2181  | 2188 | 2184  | 2176 | 1662 |
| 145° | 2610 | 2630  | 2646 | 2650  | 2638 | 1631 |
| 155° | 2984 | 2992  | 3002 | 3016  | 3007 | 1374 |
| 165° | 3246 | 3243  | 3243 | 3264  | 3250 | 916  |
| 175° | 3378 | 3370  | 3364 | 3384  | 3367 | 321  |
| 180° | 3384 | 3384  | 3384 | 3384  | 3384 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5551.5 | 5551.5 | 5551.5 | 5551.5 | 5551.5 |
| 2.5°   | 5583.8 | 5557.1 | 5498.3 | 5551.5 | 5541.3 |
| 5°     | 5551.5 | 5530.6 | 5471.6 | 5514.2 | 5503.9 |
| 7.5°   | 5514.2 | 5482.4 | 5423.5 | 5466.5 | 5455.8 |
| 10°    | 5455.8 | 5418.4 | 5354.5 | 5396.9 | 5381.0 |
| 12.5°  | 5375.4 | 5343.7 | 5279.6 | 5306.3 | 5295.5 |
| 15°    | 5284.7 | 5253.1 | 5183.3 | 5204.9 | 5178.3 |
| 17.5°  | 5172.6 | 5140.9 | 5071.2 | 5097.8 | 5071.2 |
| 20°    | 5049.7 | 5018.0 | 4943.2 | 4959.1 | 4938.1 |
| 22.5°  | 4927.4 | 4879.3 | 4809.5 | 4809.5 | 4798.8 |
| 25°    | 4783.0 | 4740.5 | 4649.8 | 4660.1 | 4649.8 |
| 27.5°  | 4622.6 | 4585.3 | 4516.2 | 4500.4 | 4473.7 |
| 30°    | 4462.9 | 4419.9 | 4340.0 | 4324.2 | 4302.7 |
| 32.5°  | 4291.9 | 4260.2 | 4174.6 | 4142.4 | 4120.9 |
| 35°    | 4126.6 | 4073.3 | 3987.7 | 3955.4 | 3928.9 |
| 37.5°  | 3939.7 | 3891.5 | 3806.0 | 3768.5 | 3742.0 |
| 40°    | 3747.6 | 3704.6 | 3619.1 | 3571.5 | 3550.0 |
| 42.5°  | 3560.8 | 3517.7 | 3432.7 | 3379.0 | 3347.2 |
| 45°    | 3358.0 | 3320.6 | 3240.2 | 3181.8 | 3160.3 |
| 47.5°  | 3160.3 | 3122.9 | 3037.4 | 2978.5 | 2946.8 |
| 50°    | 2951.9 | 2925.3 | 2850.5 | 2775.7 | 2749.1 |
| 52.5°  | 2749.1 | 2711.8 | 2642.7 | 2583.7 | 2546.4 |
| 55°    | 2541.3 | 2509.0 | 2445.0 | 2381.0 | 2354.4 |
| 57.5°  | 2332.9 | 2306.2 | 2236.6 | 2172.6 | 2151.1 |
| 60°    | 2124.4 | 2103.5 | 2028.7 | 1969.8 | 1953.9 |
| 62.5°  | 1921.6 | 1884.3 | 1831.0 | 1777.8 | 1756.3 |
| 65°    | 1713.8 | 1681.5 | 1628.3 | 1580.2 | 1553.5 |
| 67.5°  | 1500.3 | 1473.1 | 1425.6 | 1388.1 | 1366.6 |
| 70°    | 1302.6 | 1281.1 | 1233.0 | 1195.6 | 1174.7 |
| 72.5°  | 1099.8 | 1078.3 | 1051.8 | 1014.3 | 998.5  |
| 75°    | 896.5  | 886.4  | 859.2  | 827.4  | 838.2  |
| 77.5°  | 715.3  | 693.8  | 683.1  | 667.2  | 651.3  |
| 80°    | 534.0  | 528.4  | 517.6  | 501.8  | 491.1  |
| 82.5°  | 363.0  | 363.0  | 357.9  | 336.4  | 336.4  |
| 85°    | 218.6  | 213.5  | 208.4  | 192.0  | 186.9  |
| 87.5°  | 96.3   | 85.5   | 74.7   | 58.9   | 53.2   |
| 90°    | 3.0    | 36.7   | 100.0  | 93.9   | 96.9   |
| 92.5°  | 63.2   | 85.7   | 88.7   | 91.8   | 91.8   |
| 95°    | 148.9  | 177.5  | 182.6  | 182.6  | 177.5  |
| 97.5°  | 247.9  | 274.5  | 285.7  | 285.7  | 285.7  |
| 100°   | 362.2  | 385.7  | 393.8  | 393.8  | 390.7  |
| 102.5° | 482.6  | 499.9  | 511.1  | 514.2  | 511.1  |
| 105°   | 614.2  | 622.3  | 628.5  | 633.6  | 633.6  |
| 107.5° | 744.8  | 757.1  | 757.1  | 759.0  | 744.8  |
| 110°   | 871.3  | 887.6  | 887.6  | 887.6  | 879.5  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1008.0 | 1025.4 | 1022.3 | 1014.1 | 1008.0 |
| 115°   | 1142.6 | 1159.0 | 1153.9 | 1150.8 | 1142.6 |
| 117.5° | 1276.3 | 1298.8 | 1284.5 | 1276.3 | 1268.2 |
| 120°   | 1411.0 | 1433.4 | 1411.0 | 1411.0 | 1401.9 |
| 122.5° | 1533.5 | 1562.0 | 1547.7 | 1539.5 | 1533.5 |
| 125°   | 1662.0 | 1687.5 | 1679.4 | 1670.2 | 1667.1 |
| 127.5° | 1787.5 | 1819.1 | 1807.9 | 1795.6 | 1787.5 |
| 130°   | 1904.8 | 1941.5 | 1936.4 | 1930.3 | 1919.0 |
| 132.5° | 2036.4 | 2065.0 | 2067.0 | 2052.7 | 2044.6 |
| 135°   | 2149.6 | 2181.3 | 2187.5 | 2184.3 | 2176.2 |
| 137.5° | 2276.2 | 2301.7 | 2306.8 | 2304.7 | 2292.5 |
| 140°   | 2387.4 | 2412.9 | 2427.1 | 2427.1 | 2415.9 |
| 142.5° | 2501.7 | 2527.2 | 2535.3 | 2538.3 | 2527.2 |
| 145°   | 2609.8 | 2630.2 | 2646.5 | 2649.6 | 2638.4 |
| 147.5° | 2706.7 | 2732.2 | 2744.5 | 2749.6 | 2738.4 |
| 150°   | 2806.7 | 2824.0 | 2835.3 | 2844.5 | 2835.3 |
| 152.5° | 2895.5 | 2912.8 | 2927.1 | 2938.4 | 2927.1 |
| 155°   | 2984.2 | 2992.4 | 3001.6 | 3015.9 | 3006.7 |
| 157.5° | 3060.8 | 3066.9 | 3071.9 | 3092.4 | 3078.1 |
| 160°   | 3129.1 | 3135.3 | 3138.3 | 3155.7 | 3143.4 |
| 162.5° | 3192.3 | 3192.3 | 3195.4 | 3214.8 | 3200.5 |
| 165°   | 3246.4 | 3243.4 | 3243.4 | 3263.7 | 3249.5 |
| 167.5° | 3295.4 | 3286.2 | 3286.2 | 3306.6 | 3292.4 |
| 170°   | 3332.1 | 3323.9 | 3320.9 | 3341.3 | 3323.9 |
| 172.5° | 3357.6 | 3349.4 | 3346.4 | 3366.8 | 3349.4 |
| 175°   | 3378.1 | 3369.9 | 3363.8 | 3384.1 | 3366.8 |
| 177.5° | 3389.3 | 3381.1 | 3374.9 | 3392.3 | 3374.9 |
| 180°   | 3384.1 | 3384.1 | 3384.1 | 3384.1 | 3384.1 |

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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 | 12.87            | 13.83 | 13.74 | 14.72 | 15.84 | 12.43          | 13.39 | 13.30 | 14.28 | 15.40 |
|                 | 3H   | 14.55            | 15.41 | 15.43 | 16.30 | 17.45 | 14.06          | 14.92 | 14.94 | 15.81 | 16.96 |
|                 | 4H   | 15.14            | 15.95 | 16.04 | 16.86 | 18.02 | 14.65          | 15.46 | 15.54 | 16.36 | 17.52 |
|                 | 6H   | 15.55            | 16.30 | 16.46 | 17.21 | 18.38 | 15.05          | 15.80 | 15.96 | 16.71 | 17.88 |
|                 | 8H   | 15.66            | 16.37 | 16.57 | 17.30 | 18.47 | 15.16          | 15.87 | 16.07 | 16.80 | 17.97 |
|                 | 12H  | 15.71            | 16.39 | 16.63 | 17.31 | 18.51 | 15.20          | 15.88 | 16.12 | 16.80 | 18.00 |
| 4H              | 2H   | 13.35            | 14.16 | 14.25 | 15.06 | 16.22 | 12.99          | 13.81 | 13.89 | 14.71 | 15.87 |
|                 | 3H   | 15.23            | 15.91 | 16.14 | 16.84 | 18.01 | 14.82          | 15.50 | 15.73 | 16.43 | 17.61 |
|                 | 4H   | 15.95            | 16.57 | 16.87 | 17.50 | 18.70 | 15.52          | 16.14 | 16.45 | 17.07 | 18.27 |
|                 | 6H   | 16.47            | 17.01 | 17.41 | 17.96 | 19.16 | 16.04          | 16.58 | 16.98 | 17.53 | 18.73 |
|                 | 8H   | 16.63            | 17.13 | 17.57 | 18.08 | 19.29 | 16.19          | 16.69 | 17.13 | 17.64 | 18.85 |
|                 | 12H  | 16.71            | 17.16 | 17.67 | 18.12 | 19.34 | 16.26          | 16.71 | 17.22 | 17.68 | 18.89 |
| 8H              | 4H   | 16.15            | 16.65 | 17.09 | 17.60 | 18.81 | 15.78          | 16.28 | 16.72 | 17.22 | 18.44 |
|                 | 6H   | 16.79            | 17.21 | 17.76 | 18.20 | 19.41 | 16.41          | 16.82 | 17.37 | 17.81 | 19.03 |
|                 | 8H   | 17.02            | 17.38 | 17.99 | 18.36 | 19.59 | 16.63          | 16.99 | 17.60 | 17.97 | 19.20 |
|                 | 12H  | 17.16            | 17.48 | 18.13 | 18.45 | 19.73 | 16.75          | 17.07 | 17.72 | 18.04 | 19.32 |
| 12H             | 4H   | 16.14            | 16.59 | 17.10 | 17.56 | 18.78 | 15.78          | 16.23 | 16.73 | 17.19 | 18.41 |
|                 | 6H   | 16.82            | 17.19 | 17.80 | 18.17 | 19.40 | 16.45          | 16.82 | 17.43 | 17.80 | 19.03 |
|                 | 8H   | 17.07            | 17.40 | 18.05 | 18.37 | 19.65 | 16.69          | 17.02 | 17.67 | 17.99 | 19.27 |