

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: P917873

Luminaire Tested: DFN2DIP-SQ4F0-160D080US930-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P917873  
REPORT IS A COMBINATION OF REPORTS P901631 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-160D080US930-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

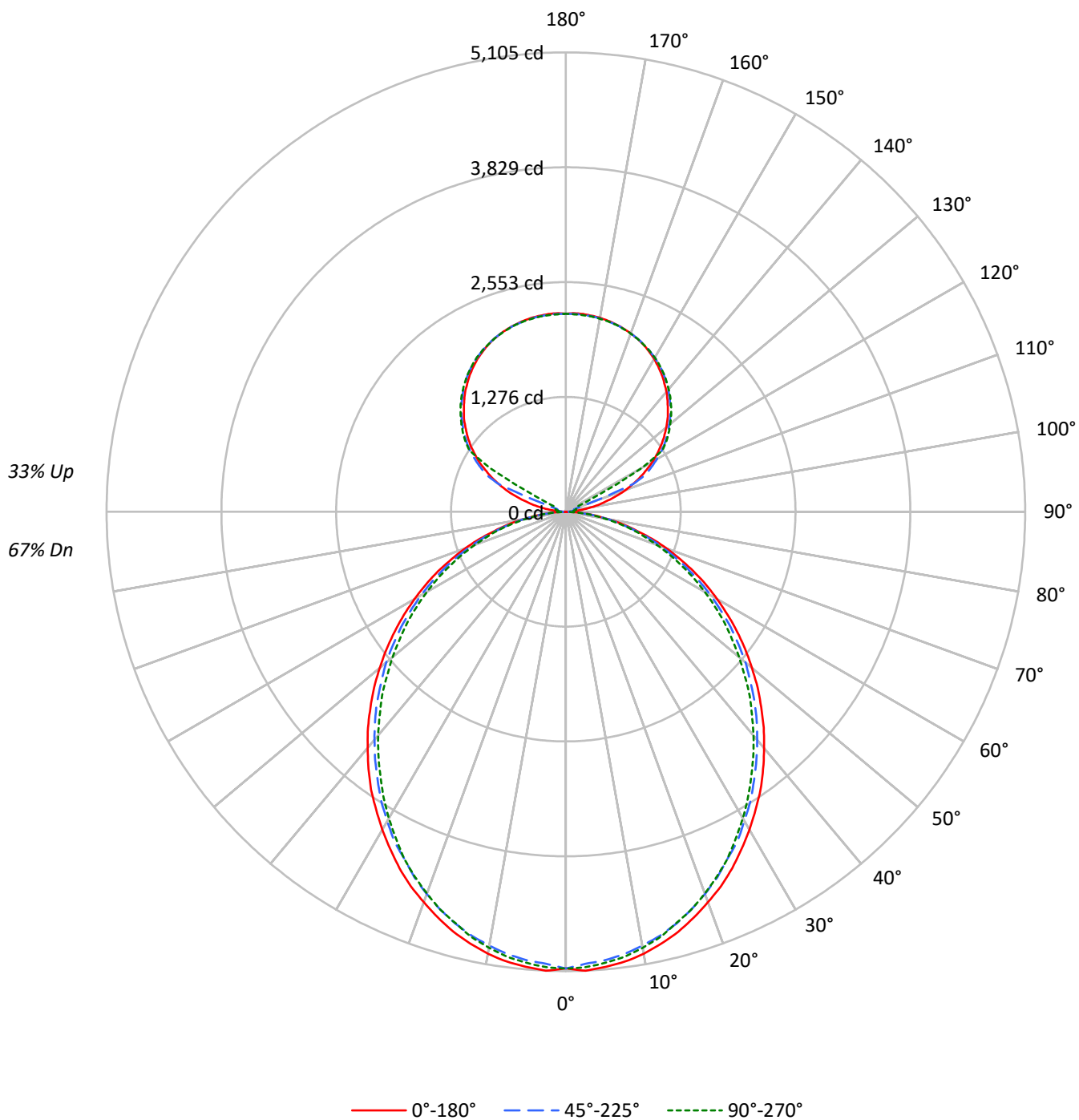
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 19371.5 lumens  
Efficiency: N/A  
Efficacy: 85.6 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: Semi-Direct  
  
Input Watts (W): 226.2  
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 | 30 | 10 |
| RCR |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |
| 0   | 111 | 111 | 111 | 111 | 105 | 105 | 105 | 105 | 93 | 93 | 93 | 82 | 82 | 82 | 71 | 71 | 71 |
| 1   | 102 | 97  | 93  | 90  | 95  | 92  | 88  | 85  | 81 | 79 | 76 | 72 | 70 | 68 | 63 | 62 | 60 |
| 2   | 92  | 85  | 79  | 73  | 87  | 80  | 75  | 70  | 71 | 67 | 63 | 63 | 60 | 57 | 56 | 53 | 51 |
| 3   | 84  | 75  | 67  | 61  | 79  | 71  | 64  | 58  | 63 | 58 | 53 | 56 | 52 | 48 | 49 | 46 | 43 |
| 4   | 77  | 66  | 58  | 52  | 72  | 63  | 55  | 50  | 56 | 50 | 45 | 50 | 45 | 41 | 44 | 40 | 37 |
| 5   | 71  | 59  | 51  | 44  | 67  | 56  | 48  | 43  | 50 | 44 | 39 | 45 | 40 | 36 | 40 | 36 | 33 |
| 6   | 66  | 53  | 45  | 39  | 62  | 50  | 43  | 37  | 45 | 39 | 34 | 41 | 35 | 32 | 36 | 32 | 29 |
| 7   | 61  | 48  | 40  | 34  | 57  | 46  | 38  | 33  | 41 | 35 | 30 | 37 | 32 | 28 | 33 | 29 | 26 |
| 8   | 56  | 44  | 36  | 30  | 53  | 42  | 34  | 29  | 38 | 31 | 27 | 34 | 29 | 25 | 30 | 26 | 23 |
| 9   | 53  | 40  | 32  | 27  | 50  | 38  | 31  | 26  | 35 | 29 | 24 | 31 | 26 | 23 | 28 | 24 | 21 |
| 10  | 49  | 37  | 29  | 24  | 46  | 35  | 28  | 24  | 32 | 26 | 22 | 29 | 24 | 20 | 26 | 22 | 19 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3562 | 3562 | 3562 |
| 5°  | 3567 | 3513 | 3537 |
| 10° | 3538 | 3466 | 3490 |
| 15° | 3486 | 3410 | 3416 |
| 20° | 3416 | 3331 | 3340 |
| 25° | 3346 | 3237 | 3253 |
| 30° | 3258 | 3149 | 3141 |
| 35° | 3175 | 3046 | 3023 |
| 40° | 3073 | 2942 | 2911 |
| 45° | 2971 | 2837 | 2796 |
| 50° | 2859 | 2728 | 2663 |
| 55° | 2742 | 2601 | 2541 |
| 60° | 2610 | 2450 | 2401 |
| 65° | 2466 | 2294 | 2236 |
| 70° | 2283 | 2104 | 2059 |
| 75° | 2029 | 1877 | 1897 |
| 80° | 1724 | 1587 | 1585 |
| 85° | 1246 | 1086 | 1065 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2971 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 477.7   | 2.5       |
| 10°-20°   | 1344.2  | 6.9       |
| 20°-30°   | 1975.4  | 10.2      |
| 30°-40°   | 2294.3  | 11.8      |
| 40°-50°   | 2291.5  | 11.8      |
| 50°-60°   | 1998.1  | 10.3      |
| 60°-70°   | 1477.0  | 7.6       |
| 70°-80°   | 835.6   | 4.3       |
| 80°-90°   | 224.4   | 1.2       |
| 90°-100°  | 72.6    | 0.4       |
| 100°-110° | 270.6   | 1.4       |
| 110°-120° | 717.6   | 3.7       |
| 120°-130° | 1190.2  | 6.1       |
| 130°-140° | 1264.3  | 6.5       |
| 140°-150° | 1175.0  | 6.1       |
| 150°-160° | 944.7   | 4.9       |
| 160°-170° | 608.7   | 3.1       |
| 170°-180° | 209.5   | 1.1       |
| 0°-30°    | 3797.3  | 19.6      |
| 0°-40°    | 6091.6  | 31.4      |
| 0°-60°    | 10381.1 | 53.6      |
| 0°-90°    | 12918.2 | 66.7      |
| 90°-120°  | 1060.8  | 5.5       |
| 90°-150°  | 4690.4  | 24.2      |
| 90°-180°  | 6453.0  | 33.3      |
| 0°-180°   | 19371.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5076 | 5076  | 5076 | 5076  | 5076 |      |
| 5°   | 5076 | 5057  | 5003 | 5042  | 5032 | 482  |
| 15°  | 4832 | 4803  | 4739 | 4759  | 4734 | 1361 |
| 25°  | 4373 | 4334  | 4251 | 4261  | 4251 | 2012 |
| 35°  | 3773 | 3724  | 3646 | 3616  | 3592 | 2356 |
| 45°  | 3070 | 3036  | 2962 | 2909  | 2890 | 2369 |
| 55°  | 2324 | 2294  | 2236 | 2177  | 2153 | 2077 |
| 65°  | 1567 | 1537  | 1489 | 1445  | 1420 | 1549 |
| 75°  | 820  | 810   | 786  | 756   | 766  | 875  |
| 85°  | 200  | 195   | 190  | 176   | 171  | 223  |
| 90°  | 2    | 19    | 32   | 40    | 43   | 18   |
| 95°  | 104  | 51    | 62   | 70    | 68   | 123  |
| 105° | 484  | 532   | 97   | 115   | 121  | 517  |
| 115° | 916  | 943   | 983  | 245   | 131  | 902  |
| 125° | 1295 | 1316  | 1346 | 1357  | 1362 | 1155 |
| 135° | 1602 | 1628  | 1642 | 1658  | 1655 | 1238 |
| 145° | 1859 | 1857  | 1884 | 1895  | 1887 | 1163 |
| 155° | 2047 | 2032  | 2052 | 2061  | 2048 | 943  |
| 165° | 2157 | 2147  | 2152 | 2163  | 2152 | 609  |
| 175° | 2206 | 2195  | 2198 | 2209  | 2193 | 210  |
| 180° | 2201 | 2201  | 2201 | 2201  | 2201 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5075.8 | 5075.8 | 5075.8 | 5075.8 | 5075.8 |
| 2.5°   | 5105.3 | 5080.9 | 5027.1 | 5075.8 | 5066.4 |
| 5°     | 5075.8 | 5056.6 | 5002.8 | 5041.6 | 5032.3 |
| 7.5°   | 5041.6 | 5012.6 | 4958.7 | 4998.1 | 4988.2 |
| 10°    | 4988.2 | 4954.1 | 4895.6 | 4934.4 | 4919.9 |
| 12.5°  | 4914.8 | 4885.8 | 4827.2 | 4851.6 | 4841.7 |
| 15°    | 4831.9 | 4802.9 | 4739.2 | 4758.9 | 4734.5 |
| 17.5°  | 4729.4 | 4700.4 | 4636.7 | 4661.0 | 4636.7 |
| 20°    | 4617.0 | 4588.0 | 4519.6 | 4534.1 | 4515.0 |
| 22.5°  | 4505.2 | 4461.1 | 4397.4 | 4397.4 | 4387.6 |
| 25°    | 4373.1 | 4334.3 | 4251.4 | 4260.7 | 4251.4 |
| 27.5°  | 4226.5 | 4192.3 | 4129.2 | 4114.7 | 4090.4 |
| 30°    | 4080.5 | 4041.2 | 3968.1 | 3953.6 | 3934.0 |
| 32.5°  | 3924.1 | 3895.2 | 3816.9 | 3787.4 | 3767.7 |
| 35°    | 3773.0 | 3724.3 | 3646.0 | 3616.5 | 3592.2 |
| 37.5°  | 3602.1 | 3558.0 | 3479.9 | 3445.6 | 3421.3 |
| 40°    | 3426.5 | 3387.2 | 3309.0 | 3265.4 | 3245.8 |
| 42.5°  | 3255.6 | 3216.3 | 3138.6 | 3089.4 | 3060.4 |
| 45°    | 3070.3 | 3036.0 | 2962.5 | 2909.1 | 2889.5 |
| 47.5°  | 2889.5 | 2855.3 | 2777.2 | 2723.3 | 2694.3 |
| 50°    | 2699.0 | 2674.6 | 2606.3 | 2537.9 | 2513.6 |
| 52.5°  | 2513.6 | 2479.4 | 2416.2 | 2362.3 | 2328.2 |
| 55°    | 2323.5 | 2294.0 | 2235.5 | 2176.9 | 2152.6 |
| 57.5°  | 2133.0 | 2108.6 | 2044.9 | 1986.4 | 1966.7 |
| 60°    | 1942.4 | 1923.2 | 1854.9 | 1801.0 | 1786.5 |
| 62.5°  | 1757.0 | 1722.8 | 1674.1 | 1625.5 | 1605.8 |
| 65°    | 1566.9 | 1537.4 | 1488.7 | 1444.8 | 1420.4 |
| 67.5°  | 1371.7 | 1346.9 | 1303.4 | 1269.2 | 1249.5 |
| 70°    | 1191.0 | 1171.3 | 1127.3 | 1093.2 | 1074.0 |
| 72.5°  | 1005.6 | 985.9  | 961.6  | 927.4  | 913.0  |
| 75°    | 819.7  | 810.4  | 785.5  | 756.5  | 766.4  |
| 77.5°  | 654.0  | 634.4  | 624.5  | 610.0  | 595.5  |
| 80°    | 488.3  | 483.1  | 473.3  | 458.8  | 449.0  |
| 82.5°  | 331.9  | 331.9  | 327.3  | 307.6  | 307.6  |
| 85°    | 199.9  | 195.2  | 190.5  | 175.5  | 170.9  |
| 87.5°  | 88.1   | 78.2   | 68.3   | 53.9   | 48.7   |
| 90°    | 1.5    | 19.1   | 31.8   | 39.9   | 43.0   |
| 92.5°  | 39.9   | 33.5   | 38.2   | 41.4   | 43.0   |
| 95°    | 103.5  | 50.9   | 62.0   | 70.2   | 68.5   |
| 97.5°  | 186.3  | 55.8   | 81.1   | 86.1   | 87.6   |
| 100°   | 282.0  | 63.8   | 90.8   | 103.5  | 106.6  |
| 102.5° | 387.0  | 383.9  | 94.0   | 111.4  | 116.3  |
| 105°   | 484.2  | 532.1  | 97.2   | 114.6  | 121.1  |
| 107.5° | 597.3  | 637.0  | 100.4  | 117.8  | 124.3  |
| 110°   | 705.7  | 739.0  | 278.8  | 119.5  | 125.8  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 807.6  | 836.2  | 809.2  | 122.5  | 127.5  |
| 115°   | 915.8  | 942.9  | 982.8  | 245.3  | 130.7  |
| 117.5° | 1009.8 | 1041.6 | 1068.9 | 840.9  | 423.7  |
| 120°   | 1115.0 | 1138.8 | 1167.6 | 1186.7 | 971.6  |
| 122.5° | 1204.0 | 1229.6 | 1261.6 | 1271.0 | 1272.8 |
| 125°   | 1294.9 | 1315.6 | 1345.9 | 1357.1 | 1361.8 |
| 127.5° | 1377.7 | 1400.0 | 1424.1 | 1439.9 | 1441.4 |
| 130°   | 1455.8 | 1481.3 | 1498.8 | 1516.4 | 1514.8 |
| 132.5° | 1535.5 | 1556.2 | 1573.7 | 1588.0 | 1586.5 |
| 135°   | 1602.4 | 1627.9 | 1642.1 | 1658.2 | 1655.0 |
| 137.5° | 1672.4 | 1691.5 | 1707.6 | 1723.5 | 1718.7 |
| 140°   | 1740.8 | 1753.7 | 1771.2 | 1785.5 | 1777.5 |
| 142.5° | 1798.4 | 1809.5 | 1830.1 | 1842.8 | 1834.8 |
| 145°   | 1858.9 | 1857.2 | 1884.2 | 1895.4 | 1887.4 |
| 147.5° | 1911.3 | 1906.6 | 1933.6 | 1941.6 | 1935.3 |
| 150°   | 1962.3 | 1951.2 | 1976.7 | 1986.1 | 1978.2 |
| 152.5° | 2005.3 | 1992.6 | 2016.4 | 2026.1 | 2014.9 |
| 155°   | 2046.7 | 2032.5 | 2051.6 | 2061.1 | 2048.4 |
| 157.5° | 2080.2 | 2067.5 | 2081.9 | 2093.0 | 2080.2 |
| 160°   | 2108.9 | 2099.3 | 2108.9 | 2118.4 | 2107.2 |
| 162.5° | 2134.3 | 2124.8 | 2132.7 | 2143.9 | 2129.6 |
| 165°   | 2156.6 | 2147.2 | 2151.9 | 2163.0 | 2151.9 |
| 167.5° | 2174.2 | 2164.5 | 2169.4 | 2180.6 | 2166.2 |
| 170°   | 2188.6 | 2178.9 | 2182.1 | 2193.3 | 2178.9 |
| 172.5° | 2198.0 | 2188.6 | 2191.8 | 2202.9 | 2188.6 |
| 175°   | 2206.0 | 2194.8 | 2198.0 | 2209.1 | 2193.3 |
| 177.5° | 2209.1 | 2198.0 | 2199.7 | 2210.8 | 2196.5 |
| 180°   | 2201.2 | 2201.2 | 2201.2 | 2201.2 | 2201.2 |

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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 | 13.11            | 14.14 | 13.91 | 14.97 | 15.98 | 12.67          | 13.70 | 13.47 | 14.52 | 15.53 |
|                 | 3H   | 14.79            | 15.72 | 15.60 | 16.55 | 17.59 | 14.30          | 15.23 | 15.11 | 16.06 | 17.10 |
|                 | 4H   | 15.39            | 16.26 | 16.22 | 17.10 | 18.15 | 14.89          | 15.77 | 15.72 | 16.61 | 17.66 |
|                 | 6H   | 15.80            | 16.61 | 16.64 | 17.46 | 18.52 | 15.30          | 16.11 | 16.14 | 16.95 | 18.02 |
|                 | 8H   | 15.91            | 16.68 | 16.76 | 17.55 | 18.61 | 15.41          | 16.18 | 16.26 | 17.05 | 18.11 |
|                 | 12H  | 15.97            | 16.70 | 16.82 | 17.56 | 18.65 | 15.46          | 16.19 | 16.31 | 17.05 | 18.14 |
| 4H              | 2H   | 13.59            | 14.47 | 14.43 | 15.31 | 16.36 | 13.24          | 14.12 | 14.07 | 14.95 | 16.01 |
|                 | 3H   | 15.48            | 16.21 | 16.32 | 17.08 | 18.15 | 15.07          | 15.80 | 15.92 | 16.68 | 17.74 |
|                 | 4H   | 16.20            | 16.87 | 17.06 | 17.74 | 18.83 | 15.78          | 16.45 | 16.64 | 17.32 | 18.41 |
|                 | 6H   | 16.73            | 17.31 | 17.61 | 18.20 | 19.30 | 16.30          | 16.88 | 17.17 | 17.77 | 18.87 |
|                 | 8H   | 16.89            | 17.43 | 17.77 | 18.32 | 19.43 | 16.45          | 16.99 | 17.33 | 17.88 | 18.99 |
|                 | 12H  | 16.97            | 17.46 | 17.87 | 18.37 | 19.48 | 16.52          | 17.01 | 17.42 | 17.92 | 19.03 |
| 8H              | 4H   | 16.41            | 16.95 | 17.29 | 17.84 | 18.95 | 16.04          | 16.58 | 16.91 | 17.47 | 18.58 |
|                 | 6H   | 17.06            | 17.50 | 17.96 | 18.44 | 19.55 | 16.67          | 17.12 | 17.58 | 18.05 | 19.16 |
|                 | 8H   | 17.28            | 17.68 | 18.20 | 18.60 | 19.73 | 16.89          | 17.29 | 17.81 | 18.21 | 19.34 |
|                 | 12H  | 17.43            | 17.77 | 18.34 | 18.69 | 19.87 | 17.01          | 17.36 | 17.93 | 18.28 | 19.46 |
| 12H             | 4H   | 16.41            | 16.89 | 17.31 | 17.80 | 18.92 | 16.04          | 16.53 | 16.94 | 17.44 | 18.55 |
|                 | 6H   | 17.09            | 17.49 | 18.00 | 18.41 | 19.54 | 16.72          | 17.11 | 17.63 | 18.04 | 19.17 |
|                 | 8H   | 17.34            | 17.69 | 18.26 | 18.61 | 19.79 | 16.96          | 17.31 | 17.88 | 18.23 | 19.41 |