

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: P908232

Luminaire Tested: DFN2DIP-HX4F0-090D040US840-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P908232  
REPORT IS A COMBINATION OF REPORTS P899309 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D040US840-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

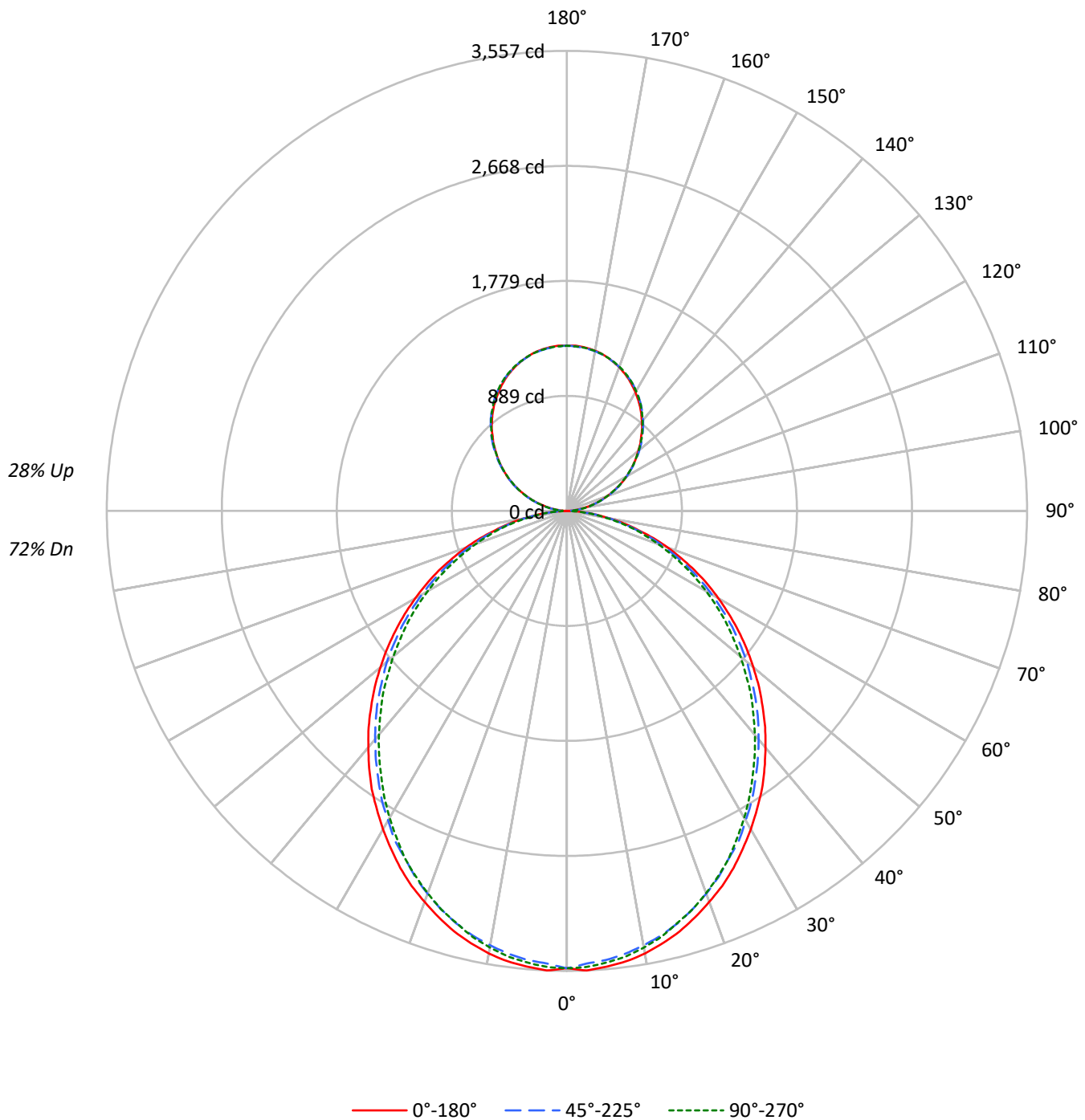
Lumens per Lamp: N/A  
Luminaire Lumens: 12572.8 lumens  
Efficiency: N/A  
Efficacy: 111.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 112.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9821  
Total Harmonic Distortion (THDi): 0.08  
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



TEST NUMBER: P908232

CATALOG NUMBER: DFN2DIP-HX4F0-090D040US840-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   | 112 | 112 | 112 | 112 | 106 | 106 | 106 | 106 | 95 | 95 | 95 | 85 | 85 | 85 | 76 | 76 | 76 |
| 1   | 103 | 98  | 94  | 91  | 97  | 93  | 90  | 86  | 84 | 81 | 79 | 75 | 73 | 71 | 67 | 66 | 64 |
| 2   | 93  | 86  | 79  | 74  | 88  | 81  | 76  | 71  | 73 | 69 | 65 | 66 | 63 | 59 | 59 | 56 | 54 |
| 3   | 85  | 75  | 68  | 62  | 81  | 72  | 65  | 59  | 65 | 59 | 55 | 58 | 54 | 50 | 52 | 49 | 46 |
| 4   | 78  | 67  | 59  | 52  | 74  | 64  | 56  | 51  | 58 | 52 | 47 | 52 | 47 | 43 | 47 | 43 | 40 |
| 5   | 72  | 60  | 51  | 45  | 68  | 57  | 49  | 44  | 52 | 45 | 41 | 47 | 42 | 38 | 42 | 38 | 35 |
| 6   | 66  | 54  | 45  | 39  | 63  | 51  | 44  | 38  | 47 | 40 | 35 | 42 | 37 | 33 | 38 | 34 | 31 |
| 7   | 61  | 49  | 40  | 35  | 58  | 47  | 39  | 34  | 42 | 36 | 31 | 39 | 33 | 29 | 35 | 31 | 27 |
| 8   | 57  | 44  | 36  | 31  | 54  | 42  | 35  | 30  | 39 | 33 | 28 | 35 | 30 | 26 | 32 | 28 | 24 |
| 9   | 53  | 41  | 33  | 28  | 50  | 39  | 32  | 27  | 36 | 30 | 25 | 33 | 27 | 24 | 30 | 25 | 22 |
| 10  | 50  | 37  | 30  | 25  | 47  | 36  | 29  | 24  | 33 | 27 | 23 | 30 | 25 | 21 | 28 | 23 | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2630 | 2630 | 2630 |
| 5°  | 2634 | 2593 | 2611 |
| 10° | 2613 | 2559 | 2575 |
| 15° | 2575 | 2517 | 2520 |
| 20° | 2523 | 2458 | 2464 |
| 25° | 2472 | 2389 | 2399 |
| 30° | 2407 | 2324 | 2316 |
| 35° | 2346 | 2247 | 2228 |
| 40° | 2271 | 2170 | 2144 |
| 45° | 2196 | 2093 | 2059 |
| 50° | 2114 | 2011 | 1960 |
| 55° | 2028 | 1917 | 1869 |
| 60° | 1931 | 1805 | 1765 |
| 65° | 1825 | 1690 | 1642 |
| 70° | 1690 | 1549 | 1510 |
| 75° | 1504 | 1380 | 1388 |
| 80° | 1279 | 1165 | 1155 |
| 85° | 929  | 795  | 768  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2196 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 332.9   | 2.6       |
| 10°-20°   | 936.5   | 7.4       |
| 20°-30°   | 1376.3  | 10.9      |
| 30°-40°   | 1598.5  | 12.7      |
| 40°-50°   | 1596.5  | 12.7      |
| 50°-60°   | 1392.1  | 11.1      |
| 60°-70°   | 1029.1  | 8.2       |
| 70°-80°   | 582.2   | 4.6       |
| 80°-90°   | 157.3   | 1.3       |
| 90°-100°  | 79.1    | 0.6       |
| 100°-110° | 251.2   | 2.0       |
| 110°-120° | 429.8   | 3.4       |
| 120°-130° | 565.3   | 4.5       |
| 130°-140° | 634.5   | 5.0       |
| 140°-150° | 622.2   | 4.9       |
| 150°-160° | 522.0   | 4.2       |
| 160°-170° | 346.2   | 2.8       |
| 170°-180° | 121.0   | 1.0       |
| 0°-30°    | 2645.7  | 21.0      |
| 0°-40°    | 4244.2  | 33.8      |
| 0°-60°    | 7232.9  | 57.5      |
| 0°-90°    | 9001.5  | 71.6      |
| 90°-120°  | 760.1   | 6.0       |
| 90°-150°  | 2582.2  | 20.5      |
| 90°-180°  | 3571.0  | 28.4      |
| 0°-180°   | 12572.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3536 | 3536  | 3536 | 3536  | 3536 |      |
| 5°   | 3536 | 3523  | 3486 | 3513  | 3506 | 336  |
| 15°  | 3367 | 3346  | 3302 | 3316  | 3299 | 948  |
| 25°  | 3047 | 3020  | 2962 | 2969  | 2962 | 1402 |
| 35°  | 2629 | 2595  | 2540 | 2520  | 2503 | 1642 |
| 45°  | 2139 | 2115  | 2064 | 2027  | 2013 | 1651 |
| 55°  | 1619 | 1598  | 1558 | 1517  | 1500 | 1447 |
| 65°  | 1092 | 1071  | 1037 | 1007  | 990  | 1079 |
| 75°  | 571  | 565   | 547  | 527   | 534  | 610  |
| 85°  | 139  | 136   | 133  | 122   | 119  | 155  |
| 90°  | 1    | 14    | 38   | 35    | 37   | 12   |
| 95°  | 56   | 67    | 69   | 69    | 67   | 63   |
| 105° | 232  | 235   | 237  | 239   | 239  | 245  |
| 115° | 431  | 438   | 436  | 434   | 431  | 427  |
| 125° | 627  | 637   | 634  | 630   | 629  | 561  |
| 135° | 812  | 823   | 826  | 825   | 822  | 627  |
| 145° | 985  | 993   | 999  | 1000  | 996  | 616  |
| 155° | 1126 | 1130  | 1133 | 1138  | 1135 | 519  |
| 165° | 1226 | 1224  | 1224 | 1232  | 1227 | 346  |
| 175° | 1275 | 1272  | 1270 | 1278  | 1271 | 121  |
| 180° | 1278 | 1278  | 1278 | 1278  | 1278 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3536.4 | 3536.4 | 3536.4 | 3536.4 | 3536.4 |
| 2.5°   | 3557.0 | 3540.1 | 3502.6 | 3536.4 | 3530.0 |
| 5°     | 3536.4 | 3523.1 | 3485.7 | 3512.7 | 3506.2 |
| 7.5°   | 3512.7 | 3492.5 | 3455.0 | 3482.4 | 3475.6 |
| 10°    | 3475.6 | 3451.7 | 3410.9 | 3438.0 | 3427.9 |
| 12.5°  | 3424.3 | 3404.1 | 3363.4 | 3380.2 | 3373.5 |
| 15°    | 3366.6 | 3346.4 | 3302.0 | 3315.7 | 3298.7 |
| 17.5°  | 3295.1 | 3274.9 | 3230.6 | 3247.5 | 3230.6 |
| 20°    | 3216.8 | 3196.6 | 3149.0 | 3159.1 | 3145.7 |
| 22.5°  | 3138.9 | 3108.3 | 3063.8 | 3063.8 | 3057.0 |
| 25°    | 3046.9 | 3019.8 | 2962.1 | 2968.6 | 2962.1 |
| 27.5°  | 2944.8 | 2920.9 | 2877.0 | 2866.9 | 2849.9 |
| 30°    | 2843.1 | 2815.6 | 2764.7 | 2754.6 | 2741.0 |
| 32.5°  | 2734.1 | 2713.9 | 2659.4 | 2638.9 | 2625.1 |
| 35°    | 2628.8 | 2594.8 | 2540.3 | 2519.8 | 2502.9 |
| 37.5°  | 2509.7 | 2479.0 | 2424.5 | 2400.8 | 2383.8 |
| 40°    | 2387.3 | 2360.0 | 2305.4 | 2275.1 | 2261.5 |
| 42.5°  | 2268.3 | 2240.9 | 2186.8 | 2152.5 | 2132.3 |
| 45°    | 2139.1 | 2115.4 | 2064.1 | 2026.9 | 2013.3 |
| 47.5°  | 2013.3 | 1989.4 | 1934.9 | 1897.4 | 1877.2 |
| 50°    | 1880.5 | 1863.5 | 1815.8 | 1768.3 | 1751.3 |
| 52.5°  | 1751.3 | 1727.5 | 1683.4 | 1646.0 | 1622.1 |
| 55°    | 1618.9 | 1598.3 | 1557.5 | 1516.8 | 1499.9 |
| 57.5°  | 1486.1 | 1469.2 | 1424.8 | 1384.0 | 1370.3 |
| 60°    | 1353.3 | 1340.0 | 1292.3 | 1254.9 | 1244.8 |
| 62.5°  | 1224.2 | 1200.3 | 1166.4 | 1132.6 | 1118.8 |
| 65°    | 1091.8 | 1071.2 | 1037.2 | 1006.6 | 989.7  |
| 67.5°  | 955.7  | 938.5  | 908.1  | 884.3  | 870.6  |
| 70°    | 829.8  | 816.1  | 785.5  | 761.6  | 748.3  |
| 72.5°  | 700.6  | 686.9  | 669.9  | 646.2  | 636.1  |
| 75°    | 571.2  | 564.6  | 547.3  | 527.1  | 534.0  |
| 77.5°  | 455.7  | 442.0  | 435.2  | 425.1  | 415.0  |
| 80°    | 340.2  | 336.6  | 329.7  | 319.6  | 312.9  |
| 82.5°  | 231.3  | 231.3  | 228.0  | 214.3  | 214.3  |
| 85°    | 139.3  | 136.0  | 132.8  | 122.3  | 119.1  |
| 87.5°  | 61.3   | 54.4   | 47.7   | 37.6   | 33.9   |
| 90°    | 1.1    | 13.8   | 37.8   | 35.4   | 36.6   |
| 92.5°  | 23.8   | 32.3   | 33.5   | 34.6   | 34.6   |
| 95°    | 56.2   | 67.1   | 69.0   | 69.0   | 67.1   |
| 97.5°  | 93.6   | 103.6  | 107.9  | 107.9  | 107.9  |
| 100°   | 136.7  | 145.6  | 148.7  | 148.7  | 147.5  |
| 102.5° | 182.2  | 188.7  | 193.0  | 194.1  | 193.0  |
| 105°   | 231.9  | 234.9  | 237.2  | 239.1  | 239.1  |
| 107.5° | 281.1  | 285.8  | 285.8  | 286.5  | 281.1  |
| 110°   | 328.9  | 335.1  | 335.1  | 335.1  | 332.0  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 380.5  | 387.1  | 385.9  | 382.8  | 380.5  |
| 115°   | 431.3  | 437.6  | 435.6  | 434.4  | 431.3  |
| 117.5° | 481.8  | 490.3  | 484.9  | 481.8  | 478.8  |
| 120°   | 532.7  | 541.1  | 532.7  | 532.7  | 529.2  |
| 122.5° | 578.9  | 589.7  | 584.3  | 581.2  | 578.9  |
| 125°   | 627.4  | 637.0  | 634.0  | 630.5  | 629.3  |
| 127.5° | 674.8  | 686.7  | 682.5  | 677.8  | 674.8  |
| 130°   | 719.0  | 733.0  | 731.0  | 728.7  | 724.5  |
| 132.5° | 768.7  | 779.5  | 780.3  | 774.9  | 771.8  |
| 135°   | 811.5  | 823.4  | 825.8  | 824.6  | 821.5  |
| 137.5° | 859.3  | 868.9  | 870.8  | 870.0  | 865.5  |
| 140°   | 901.2  | 910.9  | 916.3  | 916.3  | 912.0  |
| 142.5° | 944.4  | 954.0  | 957.0  | 958.3  | 954.0  |
| 145°   | 985.2  | 992.9  | 999.1  | 1000.3 | 996.0  |
| 147.5° | 1021.8 | 1031.4 | 1036.0 | 1037.9 | 1033.7 |
| 150°   | 1059.6 | 1066.1 | 1070.4 | 1073.8 | 1070.4 |
| 152.5° | 1093.1 | 1099.5 | 1105.0 | 1109.2 | 1105.0 |
| 155°   | 1126.5 | 1129.6 | 1133.1 | 1138.5 | 1135.0 |
| 157.5° | 1155.5 | 1157.7 | 1159.6 | 1167.4 | 1162.0 |
| 160°   | 1181.2 | 1183.6 | 1184.7 | 1191.2 | 1186.6 |
| 162.5° | 1205.1 | 1205.1 | 1206.3 | 1213.6 | 1208.2 |
| 165°   | 1225.6 | 1224.4 | 1224.4 | 1232.0 | 1226.7 |
| 167.5° | 1244.1 | 1240.5 | 1240.5 | 1248.3 | 1242.8 |
| 170°   | 1257.9 | 1254.8 | 1253.6 | 1261.3 | 1254.8 |
| 172.5° | 1267.5 | 1264.5 | 1263.2 | 1271.0 | 1264.5 |
| 175°   | 1275.3 | 1272.1 | 1269.8 | 1277.5 | 1271.0 |
| 177.5° | 1279.5 | 1276.4 | 1274.0 | 1280.6 | 1274.0 |
| 180°   | 1277.5 | 1277.5 | 1277.5 | 1277.5 | 1277.5 |

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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 | 12.42            | 13.52 | 13.17 | 14.29 | 15.21 | 11.99          | 13.09 | 12.74 | 13.85 | 14.78 |
|                 | 3H   | 14.10            | 15.09 | 14.86 | 15.86 | 16.82 | 13.63          | 14.61 | 14.39 | 15.39 | 16.35 |
|                 | 4H   | 14.70            | 15.63 | 15.48 | 16.42 | 17.38 | 14.23          | 15.16 | 15.00 | 15.94 | 16.91 |
|                 | 6H   | 15.11            | 15.97 | 15.90 | 16.77 | 17.75 | 14.64          | 15.49 | 15.43 | 16.29 | 17.27 |
|                 | 8H   | 15.22            | 16.04 | 16.02 | 16.86 | 17.84 | 14.75          | 15.57 | 15.55 | 16.38 | 17.36 |
|                 | 12H  | 15.28            | 16.06 | 16.09 | 16.87 | 17.88 | 14.80          | 15.58 | 15.61 | 16.39 | 17.40 |
| 4H              | 2H   | 12.91            | 13.84 | 13.69 | 14.63 | 15.60 | 12.57          | 13.50 | 13.35 | 14.28 | 15.25 |
|                 | 3H   | 14.80            | 15.58 | 15.59 | 16.40 | 17.38 | 14.41          | 15.18 | 15.20 | 16.01 | 16.99 |
|                 | 4H   | 15.52            | 16.23 | 16.33 | 17.05 | 18.06 | 15.12          | 15.82 | 15.93 | 16.65 | 17.66 |
|                 | 6H   | 16.05            | 16.67 | 16.88 | 17.51 | 18.53 | 15.64          | 16.26 | 16.47 | 17.10 | 18.12 |
|                 | 8H   | 16.21            | 16.78 | 17.04 | 17.62 | 18.65 | 15.80          | 16.37 | 16.63 | 17.21 | 18.24 |
|                 | 12H  | 16.29            | 16.81 | 17.14 | 17.67 | 18.71 | 15.87          | 16.39 | 16.72 | 17.25 | 18.29 |
| 8H              | 4H   | 15.74            | 16.31 | 16.57 | 17.15 | 18.18 | 15.38          | 15.95 | 16.21 | 16.79 | 17.82 |
|                 | 6H   | 16.38            | 16.86 | 17.24 | 17.74 | 18.77 | 16.02          | 16.49 | 16.88 | 17.38 | 18.41 |
|                 | 8H   | 16.61            | 17.03 | 17.48 | 17.91 | 18.95 | 16.24          | 16.66 | 17.11 | 17.54 | 18.58 |
|                 | 12H  | 16.75            | 17.12 | 17.62 | 17.99 | 19.09 | 16.37          | 16.74 | 17.24 | 17.61 | 18.71 |
| 12H             | 4H   | 15.74            | 16.25 | 16.59 | 17.11 | 18.15 | 15.39          | 15.90 | 16.23 | 16.76 | 17.80 |
|                 | 6H   | 16.41            | 16.84 | 17.28 | 17.72 | 18.76 | 16.06          | 16.48 | 16.93 | 17.36 | 18.41 |
|                 | 8H   | 16.67            | 17.04 | 17.54 | 17.91 | 19.01 | 16.31          | 16.68 | 17.18 | 17.55 | 18.66 |