

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: P908240

Luminaire Tested: DFN2DIP-HX4F0-090D080US840-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P908240  
REPORT IS A COMBINATION OF REPORTS P899381 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D080US840-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

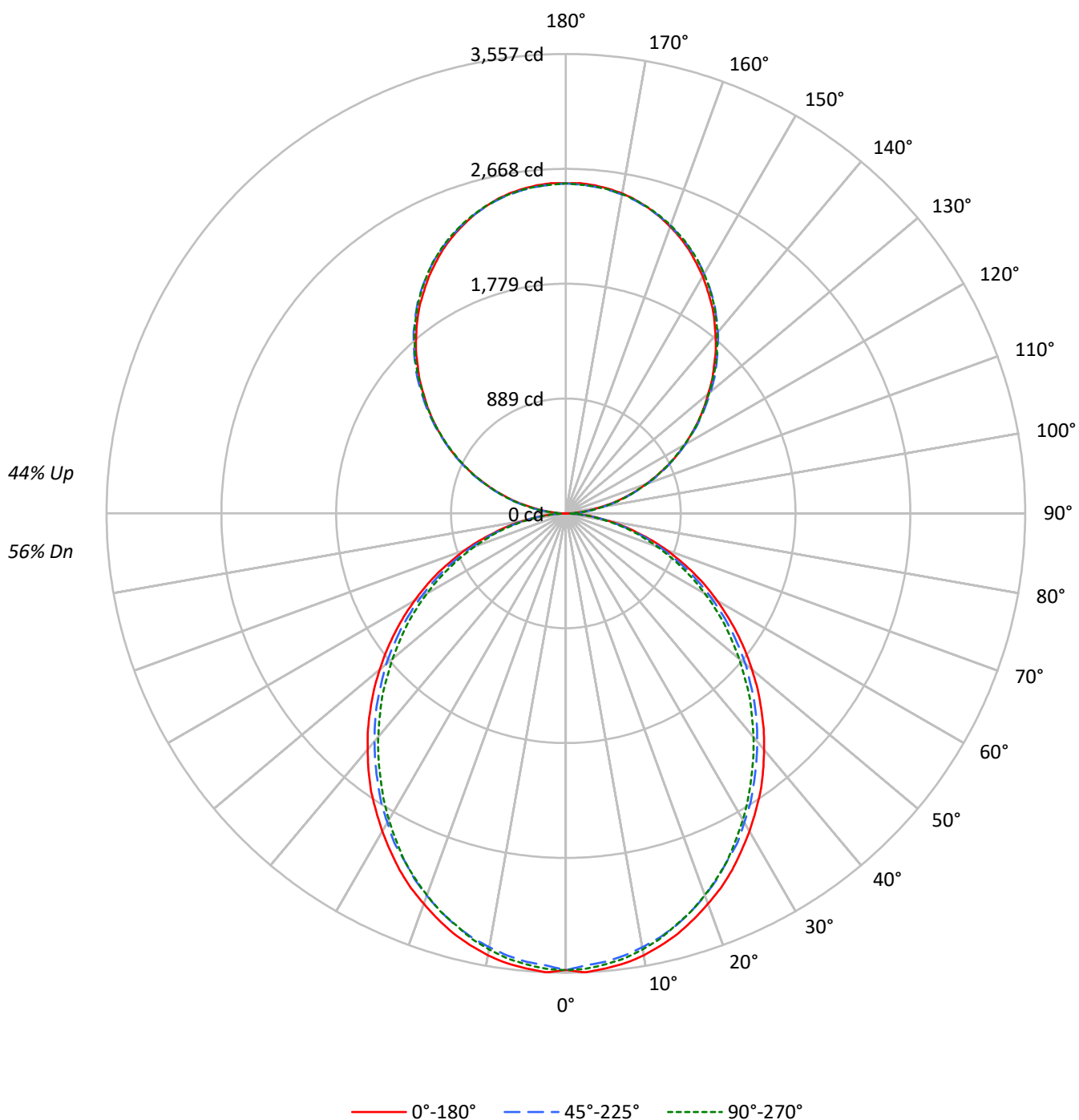
Lumens per Lamp: N/A  
Luminaire Lumens: 16147.7 lumens  
Efficiency: N/A  
Efficacy: 120.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 134  
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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CATALOG NUMBER: DFN2DIP-HX4F0-090D080US840-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P908240

CATALOG NUMBER: DFN2DIP-HX4F0-090D080US840-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   | 109 | 109 | 109 | 109 |  | 101 | 101 | 101 | 101 |  | 87 | 87 | 87 |  | 73 | 73 | 73 |  | 61 | 61 | 61 |
| 1   | 99  | 95  | 91  | 87  |  | 92  | 88  | 85  | 82  |  | 76 | 73 | 71 |  | 65 | 63 | 61 |  | 54 | 53 | 52 |
| 2   | 90  | 83  | 77  | 71  |  | 84  | 77  | 72  | 67  |  | 67 | 62 | 59 |  | 57 | 54 | 51 |  | 48 | 46 | 44 |
| 3   | 82  | 73  | 65  | 59  |  | 76  | 68  | 61  | 56  |  | 59 | 54 | 50 |  | 50 | 46 | 43 |  | 42 | 40 | 37 |
| 4   | 75  | 64  | 56  | 50  |  | 70  | 60  | 53  | 48  |  | 52 | 47 | 42 |  | 45 | 41 | 37 |  | 38 | 35 | 32 |
| 5   | 69  | 57  | 49  | 43  |  | 64  | 54  | 46  | 41  |  | 47 | 41 | 36 |  | 40 | 36 | 32 |  | 34 | 31 | 28 |
| 6   | 64  | 52  | 43  | 37  |  | 59  | 48  | 41  | 36  |  | 42 | 36 | 32 |  | 36 | 32 | 28 |  | 31 | 27 | 25 |
| 7   | 59  | 47  | 39  | 33  |  | 55  | 44  | 36  | 31  |  | 38 | 32 | 28 |  | 33 | 28 | 25 |  | 28 | 25 | 22 |
| 8   | 55  | 42  | 35  | 29  |  | 51  | 40  | 33  | 28  |  | 35 | 29 | 25 |  | 30 | 26 | 22 |  | 26 | 22 | 20 |
| 9   | 51  | 39  | 31  | 26  |  | 47  | 36  | 30  | 25  |  | 32 | 26 | 22 |  | 28 | 23 | 20 |  | 24 | 20 | 18 |
| 10  | 48  | 36  | 28  | 23  |  | 44  | 33  | 27  | 22  |  | 30 | 24 | 20 |  | 26 | 21 | 18 |  | 22 | 19 | 16 |

**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

TEST NUMBER: P908240

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 332.9   | 2.1       |
| 10°-20°   | 936.5   | 5.8       |
| 20°-30°   | 1376.3  | 8.5       |
| 30°-40°   | 1598.5  | 9.9       |
| 40°-50°   | 1596.5  | 9.9       |
| 50°-60°   | 1392.1  | 8.6       |
| 60°-70°   | 1029.1  | 6.4       |
| 70°-80°   | 582.2   | 3.6       |
| 80°-90°   | 160.9   | 1.0       |
| 90°-100°  | 158.1   | 1.0       |
| 100°-110° | 502.4   | 3.1       |
| 110°-120° | 859.7   | 5.3       |
| 120°-130° | 1130.6  | 7.0       |
| 130°-140° | 1269.1  | 7.9       |
| 140°-150° | 1244.5  | 7.7       |
| 150°-160° | 1043.9  | 6.5       |
| 160°-170° | 692.3   | 4.3       |
| 170°-180° | 242.0   | 1.5       |
| 0°-30°    | 2645.7  | 16.4      |
| 0°-40°    | 4244.2  | 26.3      |
| 0°-60°    | 7232.9  | 44.8      |
| 0°-90°    | 9005.2  | 55.8      |
| 90°-120°  | 1520.1  | 9.4       |
| 90°-150°  | 5164.3  | 32.0      |
| 90°-180°  | 7143.0  | 44.2      |
| 0°-180°   | 16147.7 | 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°  | 2    | 28    | 76   | 71    | 73   | 16   |
| 95°  | 112  | 134   | 138  | 138   | 134  | 125  |
| 105° | 464  | 470   | 474  | 478   | 478  | 489  |
| 115° | 863  | 875   | 871  | 869   | 863  | 853  |
| 125° | 1255 | 1274  | 1268 | 1261  | 1259 | 1121 |
| 135° | 1623 | 1647  | 1652 | 1649  | 1643 | 1254 |
| 145° | 1970 | 1986  | 1998 | 2000  | 1992 | 1231 |
| 155° | 2253 | 2259  | 2266 | 2277  | 2270 | 1037 |
| 165° | 2451 | 2449  | 2449 | 2464  | 2453 | 691  |
| 175° | 2550 | 2544  | 2540 | 2555  | 2542 | 242  |
| 180° | 2555 | 2555  | 2555 | 2555  | 2555 |      |

TEST NUMBER: P908240

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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°    | 2.3    | 27.8   | 75.5   | 70.9   | 73.2   |
| 92.5°  | 47.8   | 64.7   | 67.1   | 69.3   | 69.3   |
| 95°    | 112.5  | 134.0  | 137.8  | 137.8  | 134.0  |
| 97.5°  | 187.2  | 207.2  | 215.7  | 215.7  | 215.7  |
| 100°   | 273.5  | 291.1  | 297.3  | 297.3  | 295.0  |
| 102.5° | 364.4  | 377.5  | 385.9  | 388.2  | 385.9  |
| 105°   | 463.7  | 469.9  | 474.5  | 478.4  | 478.4  |
| 107.5° | 562.3  | 571.6  | 571.6  | 573.1  | 562.3  |
| 110°   | 657.8  | 670.1  | 670.1  | 670.1  | 664.0  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 761.0  | 774.2  | 771.8  | 765.7  | 761.0  |
| 115°   | 862.7  | 875.0  | 871.2  | 868.9  | 862.7  |
| 117.5° | 963.6  | 980.6  | 969.8  | 963.6  | 957.5  |
| 120°   | 1065.3 | 1082.3 | 1065.3 | 1065.3 | 1058.3 |
| 122.5° | 1157.7 | 1179.3 | 1168.5 | 1162.4 | 1157.7 |
| 125°   | 1254.8 | 1274.0 | 1267.9 | 1260.9 | 1258.7 |
| 127.5° | 1349.6 | 1373.4 | 1364.9 | 1355.7 | 1349.6 |
| 130°   | 1438.1 | 1465.8 | 1462.0 | 1457.4 | 1449.0 |
| 132.5° | 1537.5 | 1559.0 | 1560.6 | 1549.8 | 1543.7 |
| 135°   | 1623.0 | 1646.9 | 1651.5 | 1649.2 | 1643.1 |
| 137.5° | 1718.5 | 1737.8 | 1741.6 | 1740.1 | 1730.8 |
| 140°   | 1802.5 | 1821.7 | 1832.5 | 1832.5 | 1824.0 |
| 142.5° | 1888.8 | 1908.0 | 1914.2 | 1916.5 | 1908.0 |
| 145°   | 1970.4 | 1985.8 | 1998.1 | 2000.4 | 1992.0 |
| 147.5° | 2043.6 | 2062.9 | 2072.0 | 2076.0 | 2067.5 |
| 150°   | 2119.1 | 2132.1 | 2140.6 | 2147.6 | 2140.6 |
| 152.5° | 2186.1 | 2199.2 | 2210.0 | 2218.5 | 2210.0 |
| 155°   | 2253.1 | 2259.3 | 2266.2 | 2276.9 | 2270.1 |
| 157.5° | 2310.9 | 2315.5 | 2319.4 | 2334.7 | 2324.0 |
| 160°   | 2362.5 | 2367.1 | 2369.4 | 2382.5 | 2373.3 |
| 162.5° | 2410.2 | 2410.2 | 2412.6 | 2427.2 | 2416.4 |
| 165°   | 2451.0 | 2448.7 | 2448.7 | 2464.2 | 2453.4 |
| 167.5° | 2488.0 | 2481.1 | 2481.1 | 2496.5 | 2485.7 |
| 170°   | 2515.8 | 2509.6 | 2507.3 | 2522.7 | 2509.6 |
| 172.5° | 2535.1 | 2528.9 | 2526.6 | 2541.9 | 2528.9 |
| 175°   | 2550.4 | 2544.3 | 2539.6 | 2555.1 | 2541.9 |
| 177.5° | 2558.9 | 2552.7 | 2548.1 | 2561.2 | 2548.1 |
| 180°   | 2555.1 | 2555.1 | 2555.1 | 2555.1 | 2555.1 |

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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 | 11.15            | 12.06 | 12.05 | 12.99 | 14.17 | 10.72          | 11.63 | 11.62 | 12.56 | 13.74 |
|                 | 3H   | 12.81            | 13.63 | 13.73 | 14.57 | 15.78 | 12.34          | 13.16 | 13.26 | 14.10 | 15.31 |
|                 | 4H   | 13.40            | 14.18 | 14.34 | 15.12 | 16.34 | 12.93          | 13.71 | 13.86 | 14.65 | 15.87 |
|                 | 6H   | 13.81            | 14.52 | 14.75 | 15.47 | 16.70 | 13.33          | 14.05 | 14.28 | 14.99 | 16.23 |
|                 | 8H   | 13.91            | 14.60 | 14.86 | 15.56 | 16.79 | 13.44          | 14.12 | 14.39 | 15.08 | 16.31 |
|                 | 12H  | 13.96            | 14.61 | 14.92 | 15.57 | 16.83 | 13.48          | 14.13 | 14.44 | 15.09 | 16.35 |
| 4H              | 2H   | 11.62            | 12.39 | 12.55 | 13.33 | 14.55 | 11.27          | 12.05 | 12.21 | 12.99 | 14.21 |
|                 | 3H   | 13.49            | 14.14 | 14.44 | 15.11 | 16.34 | 13.09          | 13.74 | 14.04 | 14.71 | 15.95 |
|                 | 4H   | 14.21            | 14.80 | 15.16 | 15.76 | 17.02 | 13.80          | 14.39 | 14.76 | 15.36 | 16.62 |
|                 | 6H   | 14.72            | 15.24 | 15.70 | 16.22 | 17.48 | 14.31          | 14.83 | 15.29 | 15.81 | 17.07 |
|                 | 8H   | 14.88            | 15.35 | 15.85 | 16.34 | 17.61 | 14.46          | 14.94 | 15.44 | 15.92 | 17.20 |
|                 | 12H  | 14.95            | 15.38 | 15.94 | 16.38 | 17.66 | 14.53          | 14.96 | 15.52 | 15.96 | 17.24 |
| 8H              | 4H   | 14.41            | 14.88 | 15.38 | 15.87 | 17.14 | 14.05          | 14.52 | 15.02 | 15.51 | 16.78 |
|                 | 6H   | 15.04            | 15.44 | 16.04 | 16.46 | 17.73 | 14.68          | 15.07 | 15.68 | 16.10 | 17.37 |
|                 | 8H   | 15.26            | 15.61 | 16.27 | 16.62 | 17.91 | 14.89          | 15.24 | 15.90 | 16.25 | 17.54 |
|                 | 12H  | 15.40            | 15.71 | 16.41 | 16.71 | 18.05 | 15.01          | 15.32 | 16.02 | 16.33 | 17.66 |
| 12H             | 4H   | 14.40            | 14.83 | 15.39 | 15.82 | 17.10 | 14.04          | 14.47 | 15.04 | 15.47 | 16.75 |
|                 | 6H   | 15.07            | 15.42 | 16.08 | 16.43 | 17.72 | 14.72          | 15.07 | 15.73 | 16.08 | 17.37 |
|                 | 8H   | 15.32            | 15.63 | 16.33 | 16.63 | 17.97 | 14.96          | 15.27 | 15.97 | 16.27 | 17.61 |