

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: P916442

Luminaire Tested: DFN2DIP-HX4F0-100D080US930-FLLFLL

Issue Date: 11/21/2024

**Test Information**

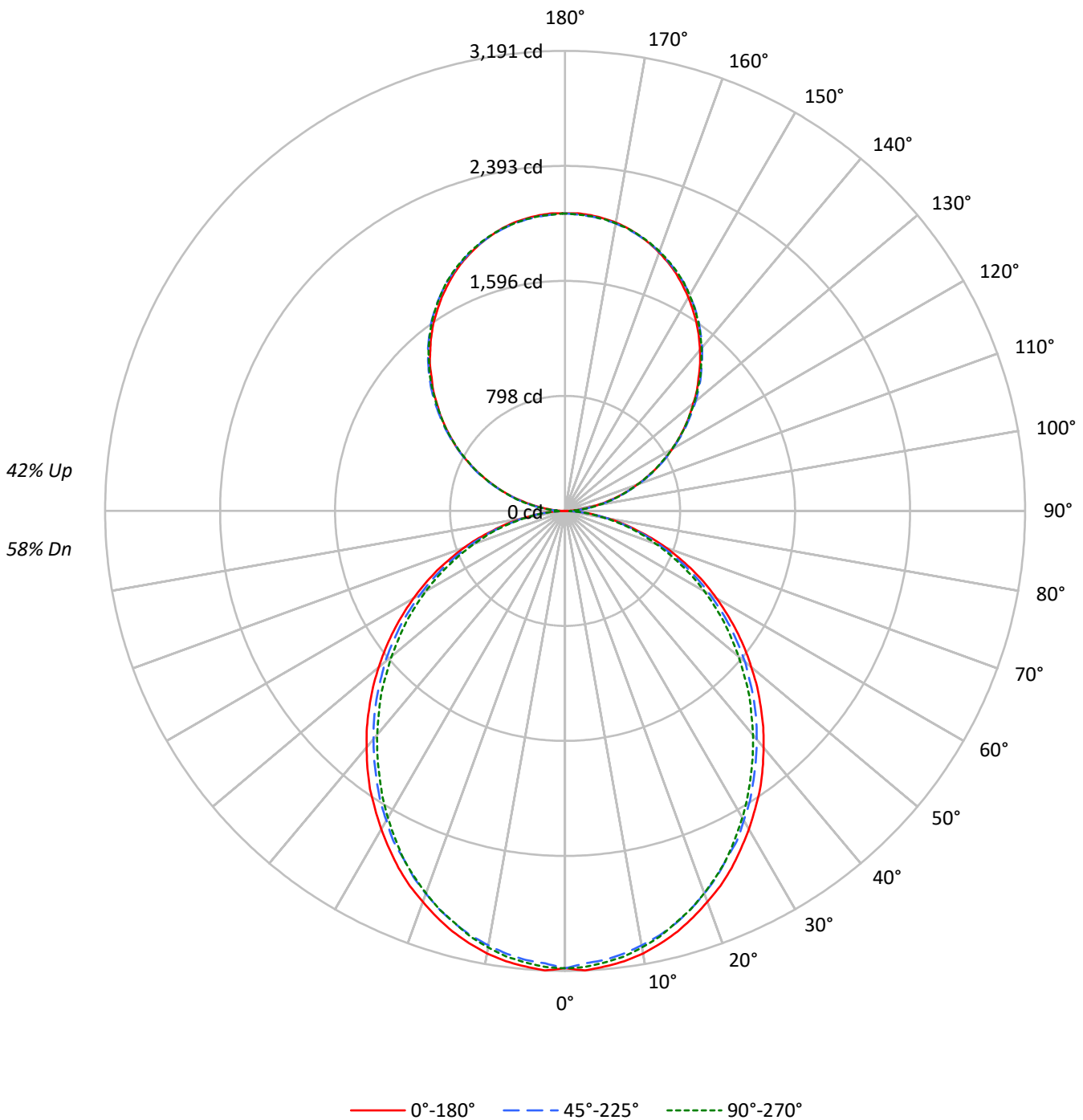
Test Method: LM-79-2019  
Report Number: P916442  
REPORT IS A COMBINATION OF REPORTS P899383 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-100D080US930-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 13843.8 lumens  
Efficiency: N/A  
Efficacy: 95.7 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): 144.7  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.946  
Total Harmonic Distortion (THDi): 0.132  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P916442  
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### Luminous Intensity Polar Plot





TEST NUMBER: P916442

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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     | 20 |    |    |    | 20 |    |    |    | 20 |    |    |    |    |
| RC  | 80  |     |     |     | 70  |     |     |     | 50 |    |    |    | 30 |    |    |    | 10 |    |    | 0  |    |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0  |
| RCR |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 109 | 109 | 109 | 109 | 102 | 102 | 102 | 102 | 88 | 88 | 88 | 75 | 75 | 75 | 64 | 64 | 64 | 58 |    |    | 58 |
| 1   | 100 | 95  | 91  | 88  | 93  | 89  | 86  | 82  | 77 | 75 | 72 | 66 | 65 | 63 | 56 | 55 | 54 | 49 |    |    | 49 |
| 2   | 91  | 83  | 77  | 72  | 84  | 78  | 72  | 68  | 68 | 64 | 60 | 58 | 55 | 52 | 50 | 47 | 45 | 41 |    |    | 41 |
| 3   | 83  | 73  | 66  | 60  | 77  | 69  | 62  | 57  | 60 | 55 | 50 | 52 | 48 | 44 | 44 | 41 | 39 | 35 |    |    | 35 |
| 4   | 76  | 65  | 57  | 51  | 70  | 61  | 54  | 48  | 53 | 47 | 43 | 46 | 42 | 38 | 39 | 36 | 33 | 30 |    |    | 30 |
| 5   | 70  | 58  | 50  | 43  | 65  | 54  | 47  | 41  | 48 | 42 | 37 | 41 | 37 | 33 | 35 | 32 | 29 | 26 |    |    | 26 |
| 6   | 64  | 52  | 44  | 38  | 60  | 49  | 41  | 36  | 43 | 37 | 32 | 37 | 33 | 29 | 32 | 29 | 26 | 23 |    |    | 23 |
| 7   | 59  | 47  | 39  | 33  | 55  | 44  | 37  | 32  | 39 | 33 | 29 | 34 | 29 | 26 | 29 | 26 | 23 | 20 |    |    | 20 |
| 8   | 55  | 43  | 35  | 29  | 51  | 40  | 33  | 28  | 36 | 30 | 26 | 31 | 26 | 23 | 27 | 23 | 20 | 18 |    |    | 18 |
| 9   | 51  | 39  | 31  | 26  | 48  | 37  | 30  | 25  | 33 | 27 | 23 | 29 | 24 | 21 | 25 | 21 | 18 | 16 |    |    | 16 |
| 10  | 48  | 36  | 28  | 24  | 45  | 34  | 27  | 23  | 30 | 25 | 21 | 27 | 22 | 19 | 23 | 19 | 17 | 15 |    |    | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2359 | 2359 | 2359 |
| 5°  | 2363 | 2326 | 2342 |
| 10° | 2344 | 2295 | 2310 |
| 15° | 2310 | 2258 | 2261 |
| 20° | 2263 | 2205 | 2210 |
| 25° | 2217 | 2143 | 2152 |
| 30° | 2159 | 2085 | 2077 |
| 35° | 2104 | 2016 | 1998 |
| 40° | 2037 | 1947 | 1923 |
| 45° | 1970 | 1877 | 1847 |
| 50° | 1896 | 1804 | 1758 |
| 55° | 1819 | 1720 | 1677 |
| 60° | 1732 | 1619 | 1583 |
| 65° | 1637 | 1516 | 1473 |
| 70° | 1516 | 1390 | 1354 |
| 75° | 1349 | 1238 | 1245 |
| 80° | 1148 | 1046 | 1036 |
| 85° | 833  | 713  | 689  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 1970 cd/sqm



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 298.6   | 2.2       |
| 10°-20°   | 840.1   | 6.1       |
| 20°-30°   | 1234.6  | 8.9       |
| 30°-40°   | 1433.9  | 10.4      |
| 40°-50°   | 1432.1  | 10.3      |
| 50°-60°   | 1248.8  | 9.0       |
| 60°-70°   | 923.1   | 6.7       |
| 70°-80°   | 522.3   | 3.8       |
| 80°-90°   | 143.7   | 1.0       |
| 90°-100°  | 127.6   | 0.9       |
| 100°-110° | 405.6   | 2.9       |
| 110°-120° | 694.1   | 5.0       |
| 120°-130° | 912.8   | 6.6       |
| 130°-140° | 1024.6  | 7.4       |
| 140°-150° | 1004.7  | 7.3       |
| 150°-160° | 842.8   | 6.1       |
| 160°-170° | 558.9   | 4.0       |
| 170°-180° | 195.4   | 1.4       |
| 0°-30°    | 2373.3  | 17.1      |
| 0°-40°    | 3807.2  | 27.5      |
| 0°-60°    | 6488.2  | 46.9      |
| 0°-90°    | 8077.3  | 58.3      |
| 90°-120°  | 1227.3  | 8.9       |
| 90°-150°  | 4169.4  | 30.1      |
| 90°-180°  | 5766.0  | 41.7      |
| 0°-180°   | 13843.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3172 | 3172  | 3172 | 3172  | 3172 |      |
| 5°   | 3172 | 3160  | 3127 | 3151  | 3145 | 301  |
| 15°  | 3020 | 3002  | 2962 | 2974  | 2959 | 851  |
| 25°  | 2733 | 2709  | 2657 | 2663  | 2657 | 1258 |
| 35°  | 2358 | 2328  | 2279 | 2260  | 2245 | 1473 |
| 45°  | 1919 | 1898  | 1852 | 1818  | 1806 | 1481 |
| 55°  | 1452 | 1434  | 1397 | 1361  | 1345 | 1298 |
| 65°  | 979  | 961   | 930  | 903   | 888  | 968  |
| 75°  | 512  | 506   | 491  | 473   | 479  | 547  |
| 85°  | 125  | 122   | 119  | 110   | 107  | 139  |
| 90°  | 2    | 22    | 61   | 57    | 59   | 13   |
| 95°  | 91   | 108   | 111  | 111   | 108  | 101  |
| 105° | 374  | 379   | 383  | 386   | 386  | 395  |
| 115° | 696  | 706   | 703  | 702   | 696  | 689  |
| 125° | 1013 | 1029  | 1024 | 1018  | 1016 | 905  |
| 135° | 1310 | 1330  | 1333 | 1332  | 1326 | 1013 |
| 145° | 1591 | 1603  | 1613 | 1615  | 1608 | 994  |
| 155° | 1819 | 1824  | 1830 | 1838  | 1833 | 837  |
| 165° | 1979 | 1977  | 1977 | 1989  | 1981 | 558  |
| 175° | 2059 | 2054  | 2050 | 2063  | 2052 | 196  |
| 180° | 2063 | 2063  | 2063 | 2063  | 2063 |      |



TEST NUMBER: P916442

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3172.4 | 3172.4 | 3172.4 | 3172.4 | 3172.4 |
| 2.5°   | 3190.8 | 3175.6 | 3141.9 | 3172.4 | 3166.5 |
| 5°     | 3172.4 | 3160.4 | 3126.8 | 3151.0 | 3145.2 |
| 7.5°   | 3151.0 | 3132.9 | 3099.2 | 3123.8 | 3117.7 |
| 10°    | 3117.7 | 3096.3 | 3059.7 | 3084.0 | 3075.0 |
| 12.5°  | 3071.7 | 3053.6 | 3017.0 | 3032.3 | 3026.1 |
| 15°    | 3019.9 | 3001.8 | 2962.0 | 2974.3 | 2959.1 |
| 17.5°  | 2955.9 | 2937.8 | 2897.9 | 2913.1 | 2897.9 |
| 20°    | 2885.6 | 2867.5 | 2824.8 | 2833.8 | 2821.8 |
| 22.5°  | 2815.7 | 2788.2 | 2748.4 | 2748.4 | 2742.3 |
| 25°    | 2733.2 | 2708.9 | 2657.1 | 2662.9 | 2657.1 |
| 27.5°  | 2641.6 | 2620.2 | 2580.7 | 2571.7 | 2556.4 |
| 30°    | 2550.3 | 2525.7 | 2480.1 | 2471.0 | 2458.7 |
| 32.5°  | 2452.6 | 2434.5 | 2385.6 | 2367.1 | 2354.8 |
| 35°    | 2358.1 | 2327.7 | 2278.8 | 2260.3 | 2245.1 |
| 37.5°  | 2251.3 | 2223.7 | 2174.9 | 2153.5 | 2138.3 |
| 40°    | 2141.5 | 2116.9 | 2068.1 | 2040.9 | 2028.6 |
| 42.5°  | 2034.7 | 2010.1 | 1961.6 | 1930.9 | 1912.8 |
| 45°    | 1918.9 | 1897.5 | 1851.5 | 1818.2 | 1806.0 |
| 47.5°  | 1806.0 | 1784.6 | 1735.7 | 1702.0 | 1683.9 |
| 50°    | 1686.9 | 1671.6 | 1628.9 | 1586.2 | 1571.0 |
| 52.5°  | 1571.0 | 1549.6 | 1510.1 | 1476.5 | 1455.1 |
| 55°    | 1452.2 | 1433.8 | 1397.2 | 1360.6 | 1345.4 |
| 57.5°  | 1333.1 | 1317.8 | 1278.1 | 1241.5 | 1229.2 |
| 60°    | 1214.0 | 1202.0 | 1159.3 | 1125.6 | 1116.6 |
| 62.5°  | 1098.1 | 1076.8 | 1046.4 | 1015.9 | 1003.6 |
| 65°    | 979.3  | 960.9  | 930.5  | 902.9  | 887.8  |
| 67.5°  | 857.4  | 841.8  | 814.6  | 793.3  | 781.0  |
| 70°    | 744.4  | 732.1  | 704.6  | 683.2  | 671.2  |
| 72.5°  | 628.5  | 616.2  | 601.0  | 579.7  | 570.5  |
| 75°    | 512.3  | 506.5  | 491.0  | 472.9  | 479.0  |
| 77.5°  | 408.8  | 396.5  | 390.3  | 381.2  | 372.2  |
| 80°    | 305.2  | 302.0  | 295.8  | 286.7  | 280.6  |
| 82.5°  | 207.5  | 207.5  | 204.6  | 192.2  | 192.2  |
| 85°    | 124.9  | 122.1  | 119.1  | 109.7  | 106.8  |
| 87.5°  | 55.0   | 48.8   | 42.7   | 33.7   | 30.4   |
| 90°    | 1.9    | 22.4   | 61.0   | 57.2   | 59.1   |
| 92.5°  | 38.6   | 52.3   | 54.1   | 55.9   | 55.9   |
| 95°    | 90.8   | 108.2  | 111.3  | 111.3  | 108.2  |
| 97.5°  | 151.2  | 167.3  | 174.1  | 174.1  | 174.1  |
| 100°   | 220.8  | 235.1  | 240.0  | 240.0  | 238.1  |
| 102.5° | 294.2  | 304.8  | 311.5  | 313.4  | 311.5  |
| 105°   | 374.4  | 379.4  | 383.1  | 386.2  | 386.2  |
| 107.5° | 454.0  | 461.5  | 461.5  | 462.7  | 454.0  |
| 110°   | 531.1  | 541.0  | 541.0  | 541.0  | 536.1  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 614.4  | 625.0  | 623.1  | 618.2  | 614.4  |
| 115°   | 696.5  | 706.5  | 703.4  | 701.5  | 696.5  |
| 117.5° | 778.0  | 791.7  | 782.9  | 778.0  | 773.0  |
| 120°   | 860.1  | 873.8  | 860.1  | 860.1  | 854.4  |
| 122.5° | 934.7  | 952.1  | 943.4  | 938.4  | 934.7  |
| 125°   | 1013.0 | 1028.6 | 1023.6 | 1018.0 | 1016.2 |
| 127.5° | 1089.6 | 1108.8 | 1102.0 | 1094.5 | 1089.6 |
| 130°   | 1161.1 | 1183.4 | 1180.3 | 1176.6 | 1169.8 |
| 132.5° | 1241.3 | 1258.7 | 1260.0 | 1251.2 | 1246.3 |
| 135°   | 1310.3 | 1329.6 | 1333.3 | 1331.5 | 1326.5 |
| 137.5° | 1387.4 | 1403.0 | 1406.1 | 1404.8 | 1397.3 |
| 140°   | 1455.2 | 1470.7 | 1479.4 | 1479.4 | 1472.6 |
| 142.5° | 1524.9 | 1540.4 | 1545.4 | 1547.3 | 1540.4 |
| 145°   | 1590.8 | 1603.2 | 1613.1 | 1615.0 | 1608.2 |
| 147.5° | 1649.8 | 1665.4 | 1672.8 | 1676.0 | 1669.2 |
| 150°   | 1710.8 | 1721.3 | 1728.2 | 1733.8 | 1728.2 |
| 152.5° | 1764.9 | 1775.5 | 1784.2 | 1791.0 | 1784.2 |
| 155°   | 1819.0 | 1824.0 | 1829.6 | 1838.3 | 1832.7 |
| 157.5° | 1865.6 | 1869.4 | 1872.5 | 1884.9 | 1876.2 |
| 160°   | 1907.3 | 1911.1 | 1912.9 | 1923.5 | 1916.0 |
| 162.5° | 1945.9 | 1945.9 | 1947.7 | 1959.6 | 1950.8 |
| 165°   | 1978.8 | 1976.9 | 1976.9 | 1989.4 | 1980.7 |
| 167.5° | 2008.7 | 2003.1 | 2003.1 | 2015.5 | 2006.8 |
| 170°   | 2031.1 | 2026.1 | 2024.2 | 2036.7 | 2026.1 |
| 172.5° | 2046.6 | 2041.7 | 2039.8 | 2052.2 | 2041.7 |
| 175°   | 2059.0 | 2054.1 | 2050.3 | 2062.8 | 2052.2 |
| 177.5° | 2065.9 | 2060.9 | 2057.2 | 2067.8 | 2057.2 |
| 180°   | 2062.8 | 2062.8 | 2062.8 | 2062.8 | 2062.8 |



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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 | 10.99            | 11.93 | 11.87 | 12.83 | 13.98 | 10.56          | 11.50 | 11.44 | 12.40 | 13.55 |
|                 | 3H   | 12.66            | 13.50 | 13.55 | 14.41 | 15.59 | 12.18          | 13.03 | 13.08 | 13.94 | 15.11 |
|                 | 4H   | 13.25            | 14.05 | 14.16 | 14.97 | 16.15 | 12.78          | 13.57 | 13.69 | 14.49 | 15.67 |
|                 | 6H   | 13.65            | 14.39 | 14.58 | 15.31 | 16.51 | 13.18          | 13.91 | 14.10 | 14.84 | 16.03 |
|                 | 8H   | 13.76            | 14.46 | 14.69 | 15.40 | 16.60 | 13.29          | 13.99 | 14.21 | 14.93 | 16.12 |
|                 | 12H  | 13.81            | 14.48 | 14.75 | 15.42 | 16.64 | 13.33          | 14.00 | 14.27 | 14.93 | 16.15 |
| 4H              | 2H   | 11.46            | 12.26 | 12.38 | 13.18 | 14.36 | 11.12          | 11.92 | 12.03 | 12.83 | 14.02 |
|                 | 3H   | 13.34            | 14.00 | 14.26 | 14.95 | 16.15 | 12.94          | 13.61 | 13.87 | 14.56 | 15.76 |
|                 | 4H   | 14.05            | 14.66 | 14.99 | 15.61 | 16.83 | 13.65          | 14.26 | 14.58 | 15.20 | 16.42 |
|                 | 6H   | 14.58            | 15.10 | 15.52 | 16.07 | 17.29 | 14.17          | 14.69 | 15.11 | 15.66 | 16.88 |
|                 | 8H   | 14.73            | 15.22 | 15.68 | 16.18 | 17.42 | 14.31          | 14.81 | 15.27 | 15.77 | 17.00 |
|                 | 12H  | 14.81            | 15.25 | 15.78 | 16.23 | 17.47 | 14.38          | 14.83 | 15.35 | 15.80 | 17.05 |
| 8H              | 4H   | 14.26            | 14.75 | 15.21 | 15.71 | 16.95 | 13.90          | 14.39 | 14.85 | 15.35 | 16.59 |
|                 | 6H   | 14.89            | 15.30 | 15.87 | 16.30 | 17.54 | 14.53          | 14.94 | 15.51 | 15.94 | 17.18 |
|                 | 8H   | 15.12            | 15.48 | 16.10 | 16.47 | 17.72 | 14.75          | 15.11 | 15.73 | 16.10 | 17.35 |
|                 | 12H  | 15.25            | 15.57 | 16.24 | 16.55 | 17.85 | 14.87          | 15.18 | 15.86 | 16.17 | 17.47 |
| 12H             | 4H   | 14.25            | 14.69 | 15.22 | 15.67 | 16.91 | 13.90          | 14.34 | 14.87 | 15.32 | 16.56 |
|                 | 6H   | 14.93            | 15.29 | 15.91 | 16.28 | 17.53 | 14.57          | 14.93 | 15.56 | 15.92 | 17.18 |
|                 | 8H   | 15.17            | 15.49 | 16.16 | 16.47 | 17.77 | 14.81          | 15.13 | 15.80 | 16.12 | 17.42 |