

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: P911018

Luminaire Tested: DFN2DIP-HX4F0-120D060US850-FLLFLL

Issue Date: 11/21/2024

**Test Information**

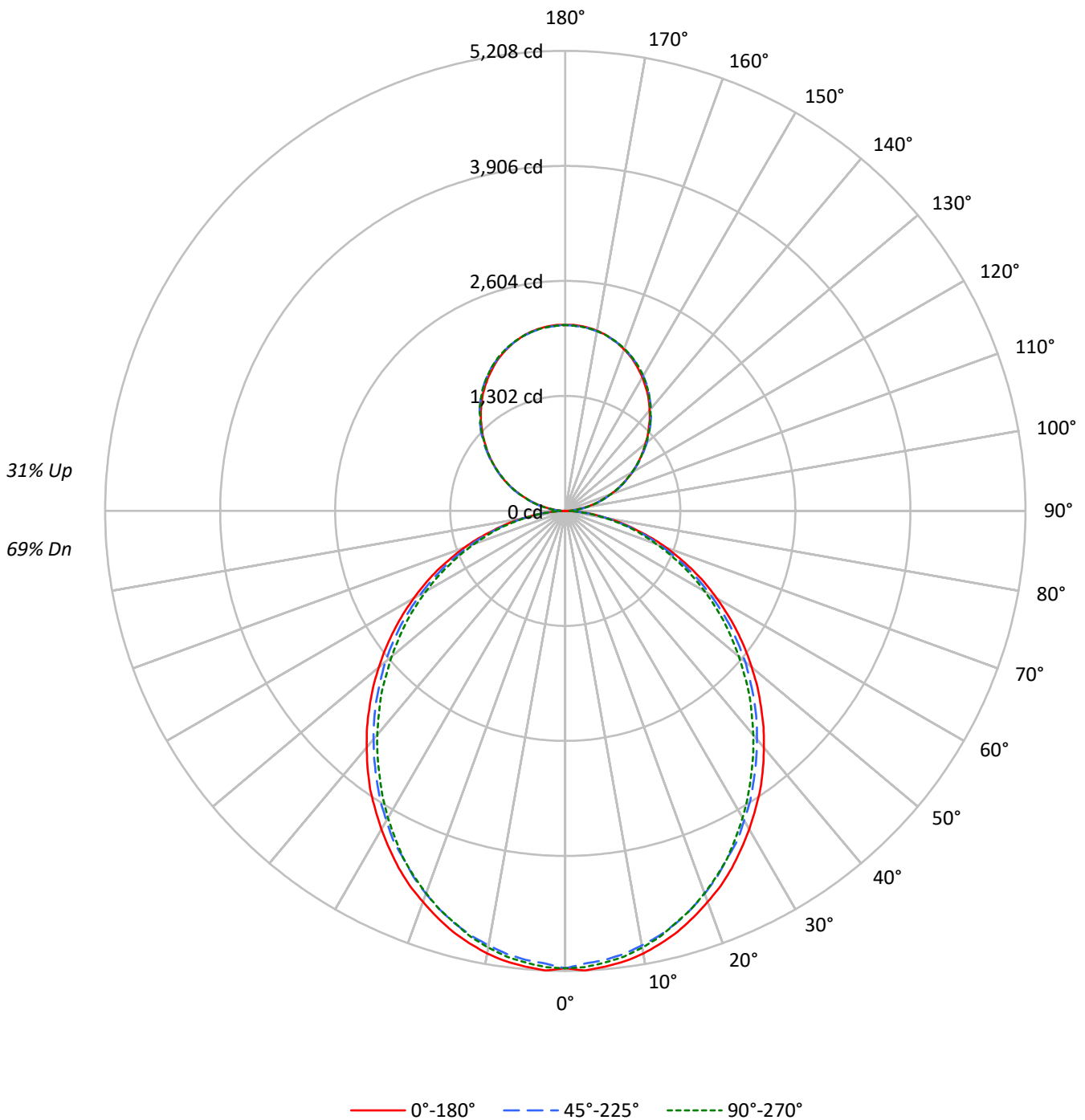
Test Method: LM-79-2019  
Report Number: P911018  
REPORT IS A COMBINATION OF REPORTS P899351 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-120D060US850-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 19063.7 lumens  
Efficiency: N/A  
Efficacy: 119.0 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): 160.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9954  
Total Harmonic Distortion (THDi): 0.076  
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 |    |    | 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   | 112 | 112 | 112 | 112 | 106 | 106 | 106 | 106 | 94 | 94 | 94 | 83 | 83 | 83 | 74 | 74 | 74 | 69 |    |    | 69 |
| 1   | 102 | 98  | 94  | 90  | 96  | 92  | 89  | 86  | 83 | 80 | 77 | 74 | 71 | 70 | 65 | 64 | 62 | 58 |    |    | 58 |
| 2   | 93  | 85  | 79  | 74  | 88  | 81  | 75  | 70  | 72 | 68 | 64 | 65 | 61 | 58 | 57 | 55 | 52 | 49 |    |    | 49 |
| 3   | 85  | 75  | 67  | 61  | 80  | 71  | 64  | 59  | 64 | 58 | 54 | 57 | 53 | 49 | 51 | 48 | 45 | 41 |    |    | 41 |
| 4   | 78  | 67  | 58  | 52  | 73  | 63  | 56  | 50  | 57 | 51 | 46 | 51 | 46 | 42 | 46 | 42 | 39 | 35 |    |    | 35 |
| 5   | 71  | 59  | 51  | 45  | 67  | 56  | 49  | 43  | 51 | 45 | 40 | 46 | 41 | 37 | 41 | 37 | 34 | 31 |    |    | 31 |
| 6   | 66  | 53  | 45  | 39  | 62  | 51  | 43  | 38  | 46 | 40 | 35 | 41 | 36 | 32 | 37 | 33 | 30 | 27 |    |    | 27 |
| 7   | 61  | 48  | 40  | 34  | 58  | 46  | 39  | 33  | 42 | 36 | 31 | 38 | 33 | 29 | 34 | 30 | 26 | 24 |    |    | 24 |
| 8   | 57  | 44  | 36  | 31  | 54  | 42  | 35  | 30  | 38 | 32 | 28 | 35 | 29 | 26 | 31 | 27 | 24 | 22 |    |    | 22 |
| 9   | 53  | 40  | 33  | 27  | 50  | 39  | 31  | 26  | 35 | 29 | 25 | 32 | 27 | 23 | 29 | 25 | 21 | 19 |    |    | 19 |
| 10  | 50  | 37  | 30  | 25  | 47  | 36  | 29  | 24  | 32 | 27 | 22 | 30 | 25 | 21 | 27 | 23 | 20 | 18 |    |    | 18 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3850 | 3850 | 3850 |
| 5°  | 3857 | 3797 | 3822 |
| 10° | 3826 | 3746 | 3771 |
| 15° | 3770 | 3685 | 3690 |
| 20° | 3694 | 3600 | 3608 |
| 25° | 3619 | 3498 | 3512 |
| 30° | 3524 | 3403 | 3391 |
| 35° | 3435 | 3291 | 3262 |
| 40° | 3325 | 3177 | 3140 |
| 45° | 3215 | 3064 | 3015 |
| 50° | 3095 | 2945 | 2870 |
| 55° | 2969 | 2807 | 2736 |
| 60° | 2827 | 2643 | 2584 |
| 65° | 2672 | 2474 | 2404 |
| 70° | 2475 | 2268 | 2211 |
| 75° | 2202 | 2021 | 2032 |
| 80° | 1873 | 1707 | 1690 |
| 85° | 1359 | 1163 | 1124 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 3215 cd/sqm



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 487.4   | 2.6       |
| 10°-20°   | 1371.3  | 7.2       |
| 20°-30°   | 2015.2  | 10.6      |
| 30°-40°   | 2340.6  | 12.3      |
| 40°-50°   | 2337.7  | 12.3      |
| 50°-60°   | 2038.4  | 10.7      |
| 60°-70°   | 1506.8  | 7.9       |
| 70°-80°   | 852.5   | 4.5       |
| 80°-90°   | 231.0   | 1.2       |
| 90°-100°  | 130.2   | 0.7       |
| 100°-110° | 413.7   | 2.2       |
| 110°-120° | 708.0   | 3.7       |
| 120°-130° | 931.2   | 4.9       |
| 130°-140° | 1045.3  | 5.5       |
| 140°-150° | 1025.0  | 5.4       |
| 150°-160° | 859.8   | 4.5       |
| 160°-170° | 570.2   | 3.0       |
| 170°-180° | 199.3   | 1.0       |
| 0°-30°    | 3873.9  | 20.3      |
| 0°-40°    | 6214.5  | 32.6      |
| 0°-60°    | 10590.5 | 55.6      |
| 0°-90°    | 13180.9 | 69.1      |
| 90°-120°  | 1252.0  | 6.6       |
| 90°-150°  | 4253.5  | 22.3      |
| 90°-180°  | 5883.0  | 30.9      |
| 0°-180°   | 19063.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5178 | 5178  | 5178 | 5178  | 5178 |      |
| 5°   | 5178 | 5159  | 5104 | 5143  | 5134 | 492  |
| 15°  | 4929 | 4900  | 4835 | 4855  | 4830 | 1388 |
| 25°  | 4461 | 4422  | 4337 | 4347  | 4337 | 2053 |
| 35°  | 3849 | 3799  | 3720 | 3690  | 3665 | 2404 |
| 45°  | 3132 | 3097  | 3022 | 2968  | 2948 | 2417 |
| 55°  | 2370 | 2340  | 2280 | 2221  | 2196 | 2119 |
| 65°  | 1599 | 1568  | 1519 | 1474  | 1449 | 1581 |
| 75°  | 836  | 827   | 801  | 772   | 782  | 893  |
| 85°  | 204  | 199   | 194  | 179   | 174  | 227  |
| 90°  | 2    | 23    | 62   | 58    | 60   | 18   |
| 95°  | 93   | 110   | 114  | 114   | 110  | 103  |
| 105° | 382  | 387   | 391  | 394   | 394  | 403  |
| 115° | 710  | 721   | 718  | 716   | 710  | 703  |
| 125° | 1034 | 1049  | 1044 | 1039  | 1037 | 924  |
| 135° | 1337 | 1356  | 1360 | 1358  | 1353 | 1033 |
| 145° | 1623 | 1636  | 1646 | 1648  | 1641 | 1014 |
| 155° | 1856 | 1861  | 1866 | 1875  | 1870 | 854  |
| 165° | 2019 | 2017  | 2017 | 2030  | 2021 | 569  |
| 175° | 2101 | 2096  | 2092 | 2104  | 2094 | 200  |
| 180° | 2104 | 2104  | 2104 | 2104  | 2104 |      |



TEST NUMBER: P911018

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5178.3 | 5178.3 | 5178.3 | 5178.3 | 5178.3 |
| 2.5°   | 5208.3 | 5183.5 | 5128.6 | 5178.3 | 5168.7 |
| 5°     | 5178.3 | 5158.6 | 5103.7 | 5143.3 | 5133.8 |
| 7.5°   | 5143.3 | 5113.7 | 5058.8 | 5099.0 | 5089.0 |
| 10°    | 5089.0 | 5054.0 | 4994.4 | 5034.0 | 5019.2 |
| 12.5°  | 5013.9 | 4984.3 | 4924.6 | 4949.5 | 4939.4 |
| 15°    | 4929.4 | 4899.8 | 4834.8 | 4854.9 | 4830.0 |
| 17.5°  | 4824.8 | 4795.2 | 4730.2 | 4755.1 | 4730.2 |
| 20°    | 4710.1 | 4680.5 | 4610.9 | 4625.6 | 4606.1 |
| 22.5°  | 4596.0 | 4551.1 | 4486.1 | 4486.1 | 4476.1 |
| 25°    | 4461.3 | 4421.7 | 4337.2 | 4346.7 | 4337.2 |
| 27.5°  | 4311.8 | 4277.0 | 4212.5 | 4197.7 | 4172.9 |
| 30°    | 4162.9 | 4122.7 | 4048.2 | 4033.4 | 4013.4 |
| 32.5°  | 4003.3 | 3973.8 | 3893.9 | 3863.9 | 3843.8 |
| 35°    | 3849.0 | 3799.4 | 3719.6 | 3689.5 | 3664.7 |
| 37.5°  | 3674.7 | 3629.9 | 3550.0 | 3515.2 | 3490.4 |
| 40°    | 3495.7 | 3455.5 | 3375.7 | 3331.3 | 3311.3 |
| 42.5°  | 3321.3 | 3281.2 | 3201.9 | 3151.8 | 3122.2 |
| 45°    | 3132.1 | 3097.3 | 3022.2 | 2967.9 | 2947.8 |
| 47.5°  | 2947.8 | 2912.9 | 2833.2 | 2778.3 | 2748.7 |
| 50°    | 2753.4 | 2728.6 | 2658.8 | 2589.1 | 2564.2 |
| 52.5°  | 2564.2 | 2529.4 | 2465.0 | 2410.0 | 2375.1 |
| 55°    | 2370.4 | 2340.3 | 2280.5 | 2220.9 | 2196.0 |
| 57.5°  | 2176.0 | 2151.1 | 2086.1 | 2026.5 | 2006.4 |
| 60°    | 1981.6 | 1962.0 | 1892.3 | 1837.4 | 1822.5 |
| 62.5°  | 1792.5 | 1757.5 | 1708.0 | 1658.3 | 1638.2 |
| 65°    | 1598.6 | 1568.5 | 1518.8 | 1473.9 | 1449.1 |
| 67.5°  | 1399.4 | 1374.1 | 1329.7 | 1294.9 | 1274.8 |
| 70°    | 1215.0 | 1194.9 | 1150.0 | 1115.2 | 1095.7 |
| 72.5°  | 1025.9 | 1005.9 | 981.0  | 946.2  | 931.3  |
| 75°    | 836.3  | 826.8  | 801.4  | 771.9  | 781.8  |
| 77.5°  | 667.2  | 647.1  | 637.1  | 622.3  | 607.5  |
| 80°    | 498.2  | 492.8  | 482.9  | 468.1  | 458.0  |
| 82.5°  | 338.6  | 338.6  | 333.9  | 313.8  | 313.8  |
| 85°    | 203.9  | 199.2  | 194.4  | 179.1  | 174.3  |
| 87.5°  | 89.8   | 79.7   | 69.8   | 54.9   | 49.7   |
| 90°    | 1.9    | 22.8   | 62.2   | 58.3   | 60.2   |
| 92.5°  | 39.4   | 53.3   | 55.2   | 57.1   | 57.1   |
| 95°    | 92.6   | 110.3  | 113.6  | 113.6  | 110.3  |
| 97.5°  | 154.2  | 170.7  | 177.7  | 177.7  | 177.7  |
| 100°   | 225.2  | 239.8  | 244.9  | 244.9  | 243.0  |
| 102.5° | 300.1  | 310.9  | 317.8  | 319.7  | 317.8  |
| 105°   | 381.9  | 387.0  | 390.8  | 394.0  | 394.0  |
| 107.5° | 463.1  | 470.8  | 470.8  | 472.0  | 463.1  |
| 110°   | 541.9  | 551.9  | 551.9  | 551.9  | 546.8  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 626.8  | 637.6  | 635.7  | 630.6  | 626.8  |
| 115°   | 710.5  | 720.7  | 717.5  | 715.6  | 710.5  |
| 117.5° | 793.7  | 807.7  | 798.7  | 793.7  | 788.6  |
| 120°   | 877.4  | 891.4  | 877.4  | 877.4  | 871.7  |
| 122.5° | 953.5  | 971.3  | 962.4  | 957.4  | 953.5  |
| 125°   | 1033.5 | 1049.3 | 1044.2 | 1038.6 | 1036.7 |
| 127.5° | 1111.6 | 1131.2 | 1124.2 | 1116.7 | 1111.6 |
| 130°   | 1184.5 | 1207.4 | 1204.2 | 1200.4 | 1193.4 |
| 132.5° | 1266.4 | 1284.1 | 1285.3 | 1276.5 | 1271.4 |
| 135°   | 1336.8 | 1356.4 | 1360.2 | 1358.3 | 1353.2 |
| 137.5° | 1415.4 | 1431.3 | 1434.5 | 1433.2 | 1425.6 |
| 140°   | 1484.6 | 1500.5 | 1509.3 | 1509.3 | 1502.4 |
| 142.5° | 1555.6 | 1571.5 | 1576.6 | 1578.4 | 1571.5 |
| 145°   | 1622.9 | 1635.6 | 1645.8 | 1647.6 | 1640.7 |
| 147.5° | 1683.1 | 1699.0 | 1706.6 | 1709.7 | 1702.8 |
| 150°   | 1745.3 | 1756.1 | 1763.1 | 1768.7 | 1763.1 |
| 152.5° | 1800.5 | 1811.3 | 1820.2 | 1827.2 | 1820.2 |
| 155°   | 1855.7 | 1860.8 | 1866.4 | 1875.4 | 1869.7 |
| 157.5° | 1903.3 | 1907.1 | 1910.3 | 1923.0 | 1914.1 |
| 160°   | 1945.9 | 1949.6 | 1951.5 | 1962.3 | 1954.7 |
| 162.5° | 1985.1 | 1985.1 | 1987.0 | 1999.1 | 1990.2 |
| 165°   | 2018.7 | 2016.8 | 2016.8 | 2029.6 | 2020.7 |
| 167.5° | 2049.2 | 2043.6 | 2043.6 | 2056.2 | 2047.3 |
| 170°   | 2072.1 | 2067.0 | 2065.1 | 2077.7 | 2067.0 |
| 172.5° | 2087.9 | 2082.8 | 2080.9 | 2093.6 | 2082.8 |
| 175°   | 2100.6 | 2095.6 | 2091.7 | 2104.4 | 2093.6 |
| 177.5° | 2107.5 | 2102.6 | 2098.7 | 2109.4 | 2098.7 |
| 180°   | 2104.4 | 2104.4 | 2104.4 | 2104.4 | 2104.4 |



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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 | 13.56            | 14.62 | 14.33 | 15.42 | 16.39 | 13.13          | 14.19 | 13.90 | 14.99 | 15.96 |
|                 | 3H   | 15.24            | 16.19 | 16.02 | 17.00 | 18.00 | 14.76          | 15.72 | 15.55 | 16.52 | 17.52 |
|                 | 4H   | 15.83            | 16.74 | 16.64 | 17.55 | 18.56 | 15.36          | 16.26 | 16.16 | 17.08 | 18.09 |
|                 | 6H   | 16.24            | 17.08 | 17.06 | 17.90 | 18.92 | 15.77          | 16.60 | 16.58 | 17.42 | 18.45 |
|                 | 8H   | 16.35            | 17.15 | 17.18 | 17.99 | 19.01 | 15.88          | 16.67 | 16.71 | 17.51 | 18.54 |
|                 | 12H  | 16.41            | 17.17 | 17.24 | 18.00 | 19.05 | 15.93          | 16.69 | 16.76 | 17.52 | 18.57 |
| 4H              | 2H   | 14.05            | 14.95 | 14.85 | 15.76 | 16.77 | 13.70          | 14.60 | 14.51 | 15.42 | 16.43 |
|                 | 3H   | 15.93            | 16.68 | 16.75 | 17.53 | 18.56 | 15.54          | 16.29 | 16.36 | 17.14 | 18.17 |
|                 | 4H   | 16.65            | 17.34 | 17.49 | 18.19 | 19.24 | 16.25          | 16.94 | 17.08 | 17.78 | 18.83 |
|                 | 6H   | 17.18            | 17.78 | 18.03 | 18.65 | 19.70 | 16.77          | 17.37 | 17.62 | 18.24 | 19.29 |
|                 | 8H   | 17.34            | 17.89 | 18.19 | 18.76 | 19.83 | 16.92          | 17.48 | 17.78 | 18.35 | 19.42 |
|                 | 12H  | 17.42            | 17.92 | 18.29 | 18.81 | 19.88 | 17.00          | 17.50 | 17.87 | 18.38 | 19.46 |
| 8H              | 4H   | 16.87            | 17.42 | 17.72 | 18.29 | 19.36 | 16.51          | 17.06 | 17.36 | 17.93 | 19.00 |
|                 | 6H   | 17.51            | 17.97 | 18.39 | 18.88 | 19.95 | 17.15          | 17.61 | 18.03 | 18.51 | 19.58 |
|                 | 8H   | 17.73            | 18.14 | 18.62 | 19.04 | 20.13 | 17.36          | 17.77 | 18.26 | 18.67 | 19.76 |
|                 | 12H  | 17.87            | 18.23 | 18.77 | 19.13 | 20.27 | 17.49          | 17.85 | 18.38 | 18.74 | 19.88 |
| 12H             | 4H   | 16.86            | 17.36 | 17.74 | 18.25 | 19.33 | 16.51          | 17.01 | 17.39 | 17.90 | 18.97 |
|                 | 6H   | 17.54            | 17.95 | 18.43 | 18.85 | 19.94 | 17.19          | 17.60 | 18.08 | 18.50 | 19.59 |
|                 | 8H   | 17.79            | 18.15 | 18.69 | 19.05 | 20.19 | 17.44          | 17.80 | 18.33 | 18.69 | 19.83 |