

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: P922498

Luminaire Tested: DFN2DIP-PN4F0-110D050US940-RLLFLL

Issue Date: 11/21/2024

**Test Information**

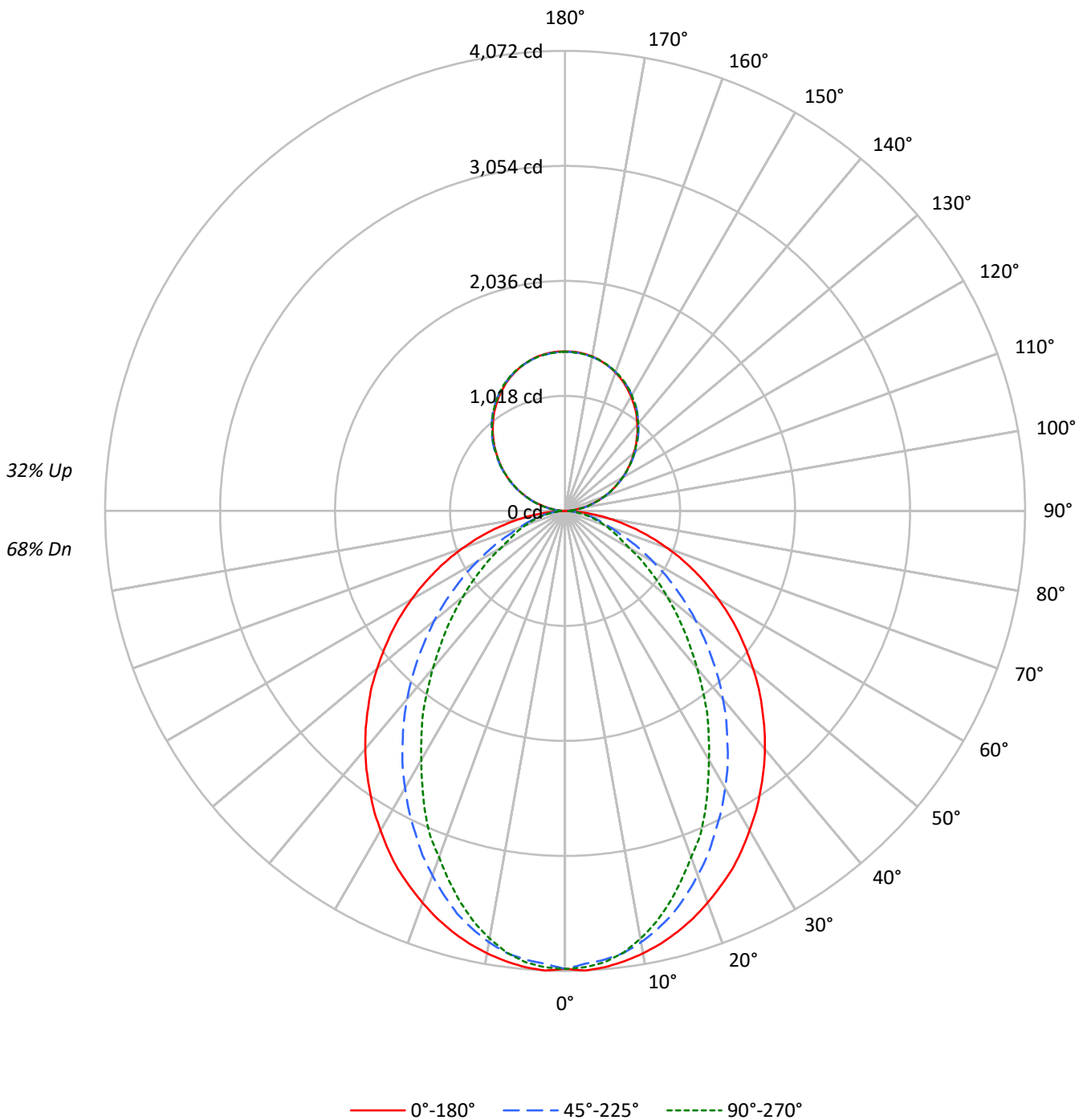
Test Method: LM-79-2019  
Report Number: P922498  
REPORT IS A COMBINATION OF REPORTS P899642 AND P896497  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-110D050US940-RLLFLL  
Description: 4 foot, Pentagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 12283.3 lumens  
Efficiency: N/A  
Efficacy: 80.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: Semi-Direct  
  
Input Watts (W): 151.9  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.996  
Total Harmonic Distortion (THDi): 0.064  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P922498  
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### Luminous Intensity Polar Plot





TEST NUMBER: P922498

CATALOG NUMBER: DFN2DIP-PN4F0-110D050US940-RLFL

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

|     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 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   | 111 | 111 | 111 | 111 | 105 | 105 | 105 | 105 | 93 | 93 | 93 | 82 | 82 | 82 | 73 | 73 | 73 | 68 |    |    |    | 68 |
| 1   | 102 | 98  | 94  | 91  | 97  | 93  | 90  | 87  | 83 | 80 | 78 | 74 | 72 | 70 | 65 | 64 | 63 | 59 |    |    |    | 59 |
| 2   | 94  | 87  | 81  | 76  | 88  | 82  | 77  | 72  | 73 | 69 | 66 | 66 | 62 | 60 | 58 | 56 | 54 | 50 |    |    |    | 50 |
| 3   | 86  | 77  | 70  | 64  | 81  | 73  | 66  | 61  | 65 | 60 | 56 | 59 | 55 | 51 | 52 | 49 | 47 | 43 |    |    |    | 43 |
| 4   | 79  | 68  | 61  | 55  | 74  | 65  | 58  | 53  | 59 | 53 | 49 | 53 | 48 | 45 | 47 | 44 | 41 | 38 |    |    |    | 38 |
| 5   | 73  | 61  | 53  | 47  | 69  | 58  | 51  | 46  | 53 | 47 | 42 | 48 | 43 | 39 | 43 | 39 | 36 | 33 |    |    |    | 33 |
| 6   | 68  | 56  | 47  | 42  | 64  | 53  | 46  | 40  | 48 | 42 | 37 | 43 | 38 | 35 | 39 | 35 | 32 | 29 |    |    |    | 29 |
| 7   | 63  | 50  | 42  | 37  | 59  | 48  | 41  | 36  | 44 | 38 | 33 | 40 | 35 | 31 | 36 | 32 | 29 | 26 |    |    |    | 26 |
| 8   | 58  | 46  | 38  | 33  | 55  | 44  | 37  | 32  | 40 | 34 | 30 | 37 | 32 | 28 | 33 | 29 | 26 | 24 |    |    |    | 24 |
| 9   | 55  | 42  | 35  | 30  | 52  | 40  | 34  | 29  | 37 | 31 | 27 | 34 | 29 | 25 | 31 | 27 | 24 | 22 |    |    |    | 22 |
| 10  | 51  | 39  | 32  | 27  | 48  | 37  | 31  | 26  | 34 | 29 | 25 | 31 | 27 | 23 | 29 | 25 | 22 | 20 |    |    |    | 20 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2959 | 2959 | 2959 |
| 5°  | 2964 | 2913 | 2931 |
| 10° | 2935 | 2856 | 2837 |
| 15° | 2894 | 2762 | 2690 |
| 20° | 2841 | 2632 | 2509 |
| 25° | 2786 | 2487 | 2335 |
| 30° | 2713 | 2337 | 2113 |
| 35° | 2641 | 2177 | 1919 |
| 40° | 2567 | 2011 | 1696 |
| 45° | 2482 | 1826 | 1494 |
| 50° | 2394 | 1640 | 1296 |
| 55° | 2302 | 1441 | 1107 |
| 60° | 2196 | 1233 | 911  |
| 65° | 2073 | 1022 | 821  |
| 70° | 1925 | 824  | 744  |
| 75° | 1739 | 728  | 678  |
| 80° | 1469 | 612  | 590  |
| 85° | 1024 | 410  | 447  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 2482 cd/sqm



TEST NUMBER: P922498

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 379.9   | 3.1       |
| 10°-20°   | 1043.0  | 8.5       |
| 20°-30°   | 1464.4  | 11.9      |
| 30°-40°   | 1596.2  | 13.0      |
| 40°-50°   | 1467.1  | 11.9      |
| 50°-60°   | 1152.2  | 9.4       |
| 60°-70°   | 750.0   | 6.1       |
| 70°-80°   | 386.0   | 3.1       |
| 80°-90°   | 102.6   | 0.8       |
| 90°-100°  | 87.3    | 0.7       |
| 100°-110° | 277.2   | 2.3       |
| 110°-120° | 474.5   | 3.9       |
| 120°-130° | 624.0   | 5.1       |
| 130°-140° | 700.4   | 5.7       |
| 140°-150° | 686.8   | 5.6       |
| 150°-160° | 576.1   | 4.7       |
| 160°-170° | 382.1   | 3.1       |
| 170°-180° | 133.5   | 1.1       |
| 0°-30°    | 2887.3  | 23.5      |
| 0°-40°    | 4483.6  | 36.5      |
| 0°-60°    | 7102.9  | 57.8      |
| 0°-90°    | 8341.5  | 67.9      |
| 90°-120°  | 838.9   | 6.8       |
| 90°-150°  | 2850.1  | 23.2      |
| 90°-180°  | 3942.0  | 32.1      |
| 0°-180°   | 12283.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4054 | 4054  | 4054 | 4054  | 4054 |      |
| 5°   | 4054 | 4036  | 3988 | 4021  | 4010 | 384  |
| 15°  | 3856 | 3815  | 3691 | 3621  | 3584 | 1087 |
| 25°  | 3500 | 3382  | 3140 | 2990  | 2935 | 1610 |
| 35°  | 3016 | 2829  | 2506 | 2275  | 2194 | 1888 |
| 45°  | 2466 | 2220  | 1834 | 1574  | 1486 | 1904 |
| 55°  | 1875 | 1588  | 1192 | 972   | 903  | 1675 |
| 65°  | 1266 | 968   | 638  | 514   | 502  | 1255 |
| 75°  | 675  | 418   | 294  | 268   | 264  | 714  |
| 85°  | 158  | 81    | 70   | 70    | 70   | 181  |
| 90°  | 1    | 15    | 42   | 39    | 40   | 12   |
| 95°  | 62   | 74    | 76   | 76    | 74   | 69   |
| 105° | 256  | 259   | 262  | 264   | 264  | 270  |
| 115° | 476  | 483   | 481  | 480   | 476  | 471  |
| 125° | 692  | 703   | 700  | 696   | 695  | 619  |
| 135° | 896  | 909   | 911  | 910   | 907  | 692  |
| 145° | 1087 | 1096  | 1103 | 1104  | 1099 | 679  |
| 155° | 1243 | 1247  | 1251 | 1257  | 1253 | 572  |
| 165° | 1353 | 1351  | 1351 | 1360  | 1354 | 382  |
| 175° | 1408 | 1404  | 1402 | 1410  | 1403 | 134  |
| 180° | 1410 | 1410  | 1410 | 1410  | 1410 |      |



TEST NUMBER: P922498

CATALOG NUMBER: DFN2DIP-PN4F0-110D050US940-RLFL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4054.0 | 4054.0 | 4054.0 | 4054.0 | 4054.0 |
| 2.5°   | 4072.3 | 4054.0 | 4013.5 | 4050.5 | 4043.1 |
| 5°     | 4054.0 | 4035.7 | 3987.8 | 4020.9 | 4010.0 |
| 7.5°   | 4020.9 | 3999.1 | 3947.7 | 3962.1 | 3943.8 |
| 10°    | 3976.9 | 3951.2 | 3878.0 | 3866.7 | 3845.0 |
| 12.5°  | 3922.0 | 3888.9 | 3789.7 | 3767.8 | 3727.3 |
| 15°    | 3855.8 | 3815.4 | 3690.8 | 3621.1 | 3584.5 |
| 17.5°  | 3778.8 | 3720.0 | 3565.9 | 3485.2 | 3426.5 |
| 20°    | 3690.8 | 3617.2 | 3433.9 | 3342.4 | 3261.4 |
| 22.5°  | 3595.5 | 3510.9 | 3298.1 | 3173.5 | 3118.6 |
| 25°    | 3500.1 | 3382.5 | 3140.4 | 2990.2 | 2934.9 |
| 27.5°  | 3386.4 | 3261.4 | 2993.7 | 2821.2 | 2736.7 |
| 30°    | 3265.4 | 3125.6 | 2832.2 | 2645.3 | 2546.0 |
| 32.5°  | 3147.8 | 2978.8 | 2678.3 | 2458.1 | 2366.2 |
| 35°    | 3015.9 | 2828.6 | 2506.0 | 2274.8 | 2193.8 |
| 37.5°  | 2887.4 | 2685.4 | 2344.4 | 2091.0 | 1999.6 |
| 40°    | 2751.6 | 2531.7 | 2175.5 | 1915.0 | 1819.7 |
| 42.5°  | 2612.2 | 2377.5 | 2007.0 | 1735.3 | 1643.8 |
| 45°    | 2465.5 | 2219.5 | 1834.5 | 1573.7 | 1485.8 |
| 47.5°  | 2326.1 | 2065.7 | 1669.5 | 1408.6 | 1328.1 |
| 50°    | 2171.9 | 1911.6 | 1508.0 | 1254.5 | 1177.9 |
| 52.5°  | 2021.3 | 1746.1 | 1353.8 | 1111.7 | 1042.0 |
| 55°    | 1874.6 | 1588.5 | 1192.2 | 972.3  | 902.7  |
| 57.5°  | 1724.4 | 1430.8 | 1049.4 | 843.9  | 785.1  |
| 60°    | 1570.2 | 1276.8 | 898.8  | 711.9  | 653.2  |
| 62.5°  | 1420.0 | 1126.5 | 770.3  | 594.4  | 565.2  |
| 65°    | 1265.8 | 968.4  | 638.4  | 513.8  | 502.5  |
| 67.5°  | 1119.1 | 821.7  | 513.8  | 451.1  | 440.2  |
| 70°    | 964.9  | 678.9  | 425.4  | 388.9  | 374.1  |
| 72.5°  | 818.1  | 546.5  | 355.8  | 326.5  | 319.1  |
| 75°    | 674.9  | 418.0  | 293.5  | 267.8  | 264.3  |
| 77.5°  | 532.1  | 297.0  | 231.2  | 216.4  | 209.0  |
| 80°    | 399.8  | 212.9  | 175.9  | 161.6  | 161.6  |
| 82.5°  | 278.7  | 143.2  | 121.1  | 113.7  | 113.7  |
| 85°    | 157.7  | 80.6   | 69.6   | 69.6   | 69.6   |
| 87.5°  | 58.8   | 29.2   | 29.2   | 25.7   | 25.7   |
| 90°    | 1.2    | 15.3   | 41.6   | 39.1   | 40.4   |
| 92.5°  | 26.4   | 35.7   | 37.0   | 38.3   | 38.3   |
| 95°    | 62.1   | 74.0   | 76.1   | 76.1   | 74.0   |
| 97.5°  | 103.3  | 114.3  | 119.0  | 119.0  | 119.0  |
| 100°   | 150.9  | 160.7  | 164.1  | 164.1  | 162.8  |
| 102.5° | 201.1  | 208.3  | 212.9  | 214.3  | 212.9  |
| 105°   | 255.9  | 259.3  | 261.9  | 263.9  | 263.9  |
| 107.5° | 310.3  | 315.4  | 315.4  | 316.3  | 310.3  |
| 110°   | 363.0  | 369.9  | 369.9  | 369.9  | 366.4  |



TEST NUMBER: P922498

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 420.0  | 427.2  | 426.0  | 422.6  | 420.0  |
| 115°   | 476.1  | 483.0  | 480.8  | 479.6  | 476.1  |
| 117.5° | 531.8  | 541.2  | 535.2  | 531.8  | 528.4  |
| 120°   | 587.9  | 597.3  | 587.9  | 587.9  | 584.1  |
| 122.5° | 638.9  | 650.9  | 644.9  | 641.5  | 638.9  |
| 125°   | 692.5  | 703.1  | 699.7  | 695.9  | 694.6  |
| 127.5° | 744.8  | 758.0  | 753.3  | 748.1  | 744.8  |
| 130°   | 793.7  | 809.0  | 806.8  | 804.3  | 799.6  |
| 132.5° | 848.6  | 860.4  | 861.3  | 855.3  | 851.9  |
| 135°   | 895.7  | 908.8  | 911.4  | 910.2  | 906.8  |
| 137.5° | 948.4  | 959.0  | 961.2  | 960.3  | 955.2  |
| 140°   | 994.7  | 1005.4 | 1011.3 | 1011.3 | 1006.7 |
| 142.5° | 1042.3 | 1053.0 | 1056.4 | 1057.7 | 1053.0 |
| 145°   | 1087.4 | 1095.9 | 1102.7 | 1104.0 | 1099.3 |
| 147.5° | 1127.8 | 1138.4 | 1143.5 | 1145.7 | 1140.9 |
| 150°   | 1169.5 | 1176.7 | 1181.3 | 1185.2 | 1181.3 |
| 152.5° | 1206.5 | 1213.7 | 1219.6 | 1224.3 | 1219.6 |
| 155°   | 1243.4 | 1246.8 | 1250.6 | 1256.6 | 1252.8 |
| 157.5° | 1275.3 | 1277.8 | 1280.0 | 1288.5 | 1282.5 |
| 160°   | 1303.8 | 1306.4 | 1307.6 | 1314.8 | 1309.7 |
| 162.5° | 1330.2 | 1330.2 | 1331.4 | 1339.5 | 1333.6 |
| 165°   | 1352.7 | 1351.4 | 1351.4 | 1359.9 | 1354.0 |
| 167.5° | 1373.1 | 1369.2 | 1369.2 | 1377.8 | 1371.8 |
| 170°   | 1388.4 | 1385.0 | 1383.8 | 1392.2 | 1385.0 |
| 172.5° | 1399.0 | 1395.6 | 1394.4 | 1402.8 | 1395.6 |
| 175°   | 1407.6 | 1404.1 | 1401.6 | 1410.1 | 1402.8 |
| 177.5° | 1412.2 | 1408.8 | 1406.2 | 1413.5 | 1406.2 |
| 180°   | 1410.1 | 1410.1 | 1410.1 | 1410.1 | 1410.1 |



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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 | 12.45            | 13.45 | 13.25 | 14.26 | 15.26 | 8.42           | 9.42  | 9.21  | 10.23 | 11.22 |
|                 | 3H   | 14.14            | 15.04 | 14.95 | 15.86 | 16.88 | 9.62           | 10.51 | 10.43 | 11.34 | 12.36 |
|                 | 4H   | 14.76            | 15.61 | 15.59 | 16.44 | 17.47 | 10.08          | 10.92 | 10.90 | 11.75 | 12.78 |
|                 | 6H   | 15.20            | 15.97 | 16.03 | 16.81 | 17.86 | 10.41          | 11.19 | 11.24 | 12.02 | 13.07 |
|                 | 8H   | 15.33            | 16.07 | 16.17 | 16.92 | 17.97 | 10.50          | 11.24 | 11.35 | 12.10 | 13.15 |
|                 | 12H  | 15.40            | 16.10 | 16.25 | 16.95 | 18.02 | 10.55          | 11.26 | 11.40 | 12.11 | 13.18 |
| 4H              | 2H   | 12.49            | 13.34 | 13.32 | 14.16 | 15.20 | 9.03           | 9.88  | 9.86  | 10.71 | 11.74 |
|                 | 3H   | 14.34            | 15.04 | 15.18 | 15.90 | 16.95 | 10.40          | 11.10 | 11.24 | 11.96 | 13.01 |
|                 | 4H   | 15.04            | 15.68 | 15.89 | 16.54 | 17.61 | 10.96          | 11.59 | 11.81 | 12.45 | 13.53 |
|                 | 6H   | 15.57            | 16.12 | 16.44 | 17.00 | 18.08 | 11.39          | 11.94 | 12.25 | 12.82 | 13.90 |
|                 | 8H   | 15.75            | 16.26 | 16.62 | 17.14 | 18.23 | 11.52          | 12.03 | 12.39 | 12.91 | 14.00 |
|                 | 12H  | 15.85            | 16.31 | 16.74 | 17.21 | 18.31 | 11.59          | 12.05 | 12.48 | 12.95 | 14.05 |
| 8H              | 4H   | 15.02            | 15.53 | 15.89 | 16.41 | 17.51 | 11.25          | 11.76 | 12.12 | 12.64 | 13.74 |
|                 | 6H   | 15.60            | 16.02 | 16.49 | 16.94 | 18.03 | 11.78          | 12.20 | 12.68 | 13.12 | 14.22 |
|                 | 8H   | 15.81            | 16.19 | 16.72 | 17.11 | 18.22 | 11.97          | 12.35 | 12.88 | 13.26 | 14.37 |
|                 | 12H  | 15.96            | 16.29 | 16.87 | 17.20 | 18.36 | 12.10          | 12.43 | 13.01 | 13.33 | 14.50 |
| 12H             | 4H   | 14.98            | 15.44 | 15.87 | 16.34 | 17.44 | 11.26          | 11.73 | 12.15 | 12.62 | 13.72 |
|                 | 6H   | 15.57            | 15.95 | 16.48 | 16.86 | 17.97 | 11.83          | 12.20 | 12.74 | 13.12 | 14.23 |
|                 | 8H   | 15.80            | 16.13 | 16.71 | 17.04 | 18.20 | 12.05          | 12.38 | 12.96 | 13.28 | 14.45 |