

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: P903178

Luminaire Tested: DFN2DIP-PN4F0-040D120US830-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P903178  
REPORT IS A COMBINATION OF REPORTS P899754 AND P896497  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-040D120US830-RLLFLL  
Description: 4 foot, Pentagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

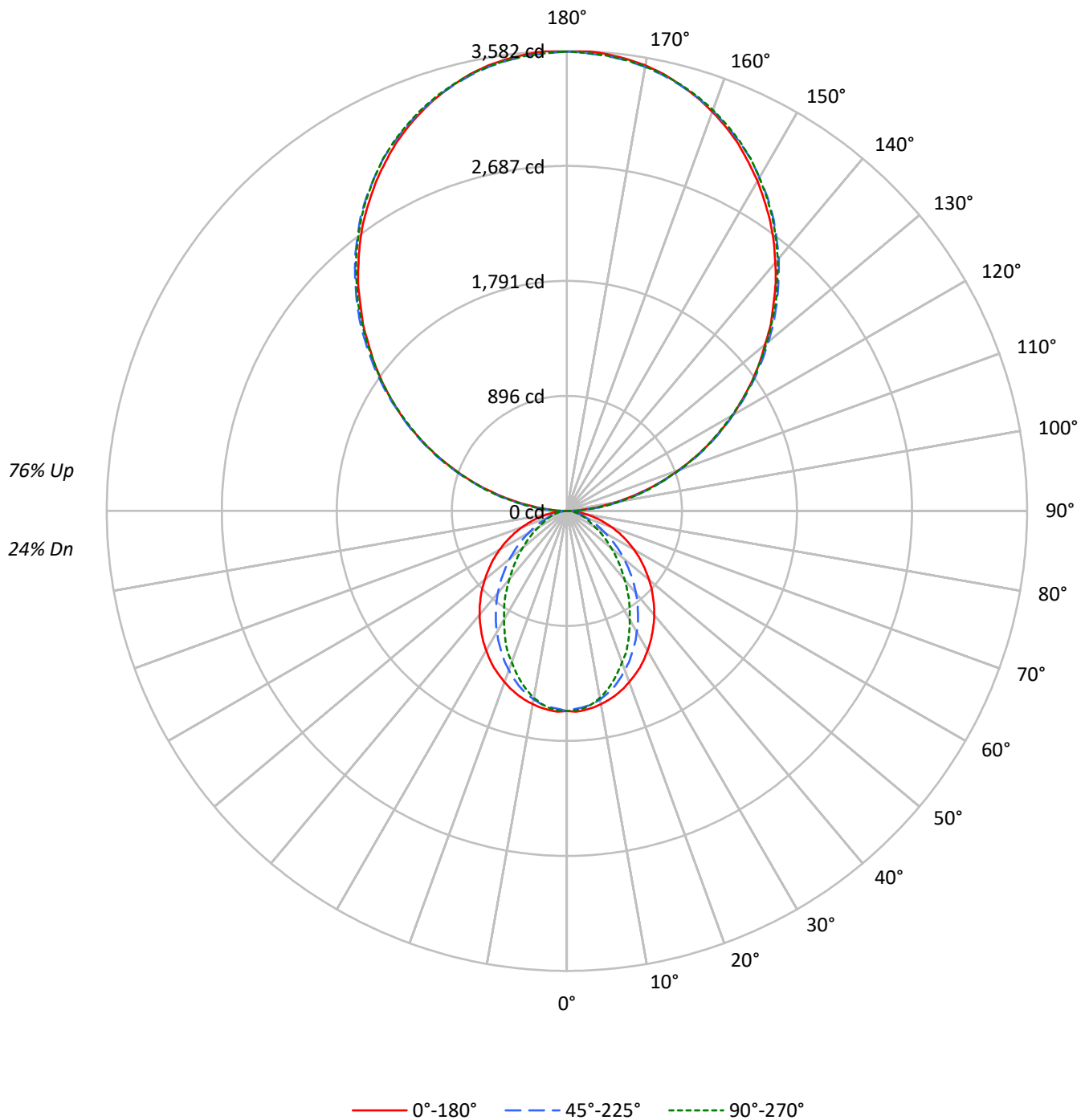
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 13214.4 lumens  
Efficiency: N/A  
Efficacy: 96.5 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-Indirect  
  
Input Watts (W): 136.9  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9968  
Total Harmonic Distortion (THDi): 0.064  
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 |
| RW  | 70  | 50  | 30  | 10  | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 101 | 101 | 101 | 101 | 90 | 90 | 90 | 90 | 69 | 69 | 69 | 50 | 50 | 50 | 33 | 33 | 33 |
| 1   | 92  | 88  | 85  | 81  | 82 | 79 | 76 | 73 | 61 | 59 | 57 | 44 | 43 | 42 | 29 | 28 | 28 |
| 2   | 84  | 77  | 71  | 67  | 75 | 69 | 64 | 60 | 53 | 50 | 47 | 39 | 37 | 35 | 26 | 25 | 24 |
| 3   | 77  | 68  | 61  | 56  | 68 | 61 | 55 | 50 | 47 | 43 | 40 | 35 | 32 | 30 | 23 | 22 | 20 |
| 4   | 70  | 60  | 53  | 47  | 62 | 54 | 48 | 43 | 42 | 38 | 34 | 31 | 28 | 26 | 21 | 19 | 18 |
| 5   | 64  | 54  | 46  | 40  | 57 | 48 | 42 | 37 | 38 | 33 | 29 | 28 | 25 | 22 | 19 | 17 | 16 |
| 6   | 59  | 48  | 40  | 35  | 53 | 43 | 37 | 32 | 34 | 29 | 26 | 25 | 22 | 20 | 17 | 15 | 14 |
| 7   | 55  | 43  | 36  | 30  | 49 | 39 | 32 | 28 | 31 | 26 | 23 | 23 | 20 | 17 | 16 | 14 | 12 |
| 8   | 51  | 39  | 32  | 27  | 45 | 35 | 29 | 24 | 28 | 23 | 20 | 21 | 18 | 16 | 14 | 12 | 11 |
| 9   | 47  | 36  | 29  | 24  | 42 | 32 | 26 | 22 | 25 | 21 | 18 | 19 | 16 | 14 | 13 | 11 | 10 |
| 10  | 44  | 33  | 26  | 21  | 39 | 29 | 23 | 19 | 23 | 19 | 16 | 18 | 15 | 13 | 12 | 10 | 9  |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1137 | 1137 | 1137 |
| 5°  | 1139 | 1120 | 1127 |
| 10° | 1128 | 1098 | 1090 |
| 15° | 1112 | 1062 | 1034 |
| 20° | 1092 | 1012 | 964  |
| 25° | 1071 | 956  | 897  |
| 30° | 1043 | 898  | 812  |
| 35° | 1015 | 837  | 738  |
| 40° | 987  | 773  | 652  |
| 45° | 954  | 702  | 574  |
| 50° | 920  | 631  | 498  |
| 55° | 885  | 554  | 425  |
| 60° | 844  | 474  | 350  |
| 65° | 797  | 393  | 315  |
| 70° | 740  | 317  | 286  |
| 75° | 668  | 280  | 261  |
| 80° | 564  | 235  | 227  |
| 85° | 393  | 158  | 172  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2802 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 146.0   | 1.1       |
| 10°-20°   | 400.9   | 3.0       |
| 20°-30°   | 562.8   | 4.3       |
| 30°-40°   | 613.5   | 4.6       |
| 40°-50°   | 563.9   | 4.3       |
| 50°-60°   | 442.9   | 3.4       |
| 60°-70°   | 288.3   | 2.2       |
| 70°-80°   | 148.4   | 1.1       |
| 80°-90°   | 48.0    | 0.4       |
| 90°-100°  | 221.3   | 1.7       |
| 100°-110° | 703.3   | 5.3       |
| 110°-120° | 1203.6  | 9.1       |
| 120°-130° | 1582.9  | 12.0      |
| 130°-140° | 1776.7  | 13.4      |
| 140°-150° | 1742.3  | 13.2      |
| 150°-160° | 1461.5  | 11.1      |
| 160°-170° | 969.3   | 7.3       |
| 170°-180° | 338.8   | 2.6       |
| 0°-30°    | 1109.8  | 8.4       |
| 0°-40°    | 1723.3  | 13.0      |
| 0°-60°    | 2730.1  | 20.7      |
| 0°-90°    | 3214.8  | 24.3      |
| 90°-120°  | 2128.2  | 16.1      |
| 90°-150°  | 7230.1  | 54.7      |
| 90°-180°  | 10000.0 | 75.7      |
| 0°-180°   | 13214.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1558 | 1558  | 1558 | 1558  | 1558 |      |
| 5°   | 1558 | 1551  | 1533 | 1546  | 1541 | 148  |
| 15°  | 1482 | 1466  | 1419 | 1392  | 1378 | 418  |
| 25°  | 1345 | 1300  | 1207 | 1149  | 1128 | 619  |
| 35°  | 1159 | 1087  | 963  | 874   | 843  | 726  |
| 45°  | 948  | 853   | 705  | 605   | 571  | 732  |
| 55°  | 721  | 611   | 458  | 374   | 347  | 644  |
| 65°  | 486  | 372   | 245  | 198   | 193  | 482  |
| 75°  | 259  | 161   | 113  | 103   | 102  | 274  |
| 85°  | 61   | 31    | 27   | 27    | 27   | 70   |
| 90°  | 3    | 39    | 106  | 99    | 102  | 13   |
| 95°  | 157  | 188   | 193  | 193   | 188  | 175  |
| 105° | 649  | 658   | 664  | 670   | 670  | 685  |
| 115° | 1208 | 1225  | 1220 | 1216  | 1208 | 1195 |
| 125° | 1757 | 1784  | 1775 | 1765  | 1762 | 1570 |
| 135° | 2272 | 2306  | 2312 | 2309  | 2300 | 1756 |
| 145° | 2758 | 2780  | 2797 | 2801  | 2789 | 1724 |
| 155° | 3154 | 3163  | 3173 | 3188  | 3178 | 1452 |
| 165° | 3432 | 3428  | 3428 | 3450  | 3435 | 968  |
| 175° | 3571 | 3562  | 3556 | 3577  | 3559 | 339  |
| 180° | 3577 | 3577  | 3577 | 3577  | 3577 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1558.2 | 1558.2 | 1558.2 | 1558.2 | 1558.2 |
| 2.5°   | 1565.3 | 1558.2 | 1542.7 | 1556.9 | 1554.0 |
| 5°     | 1558.2 | 1551.1 | 1532.8 | 1545.5 | 1541.3 |
| 7.5°   | 1545.5 | 1537.1 | 1517.4 | 1522.9 | 1515.9 |
| 10°    | 1528.6 | 1518.7 | 1490.5 | 1486.2 | 1477.9 |
| 12.5°  | 1507.5 | 1494.8 | 1456.6 | 1448.2 | 1432.7 |
| 15°    | 1482.1 | 1466.5 | 1418.6 | 1391.9 | 1377.8 |
| 17.5°  | 1452.5 | 1429.8 | 1370.6 | 1339.6 | 1317.0 |
| 20°    | 1418.6 | 1390.3 | 1319.8 | 1284.7 | 1253.6 |
| 22.5°  | 1382.0 | 1349.5 | 1267.6 | 1219.7 | 1198.7 |
| 25°    | 1345.3 | 1300.1 | 1207.0 | 1149.3 | 1128.0 |
| 27.5°  | 1301.7 | 1253.6 | 1150.7 | 1084.4 | 1051.9 |
| 30°    | 1255.1 | 1201.4 | 1088.5 | 1016.7 | 978.6  |
| 32.5°  | 1209.9 | 1145.0 | 1029.4 | 944.8  | 909.5  |
| 35°    | 1159.2 | 1087.2 | 963.2  | 874.3  | 843.2  |
| 37.5°  | 1109.8 | 1032.2 | 901.1  | 803.7  | 768.5  |
| 40°    | 1057.6 | 973.1  | 836.2  | 736.1  | 699.5  |
| 42.5°  | 1004.0 | 913.8  | 771.4  | 666.9  | 631.8  |
| 45°    | 947.6  | 853.1  | 705.1  | 604.9  | 571.1  |
| 47.5°  | 894.1  | 794.0  | 641.7  | 541.5  | 510.5  |
| 50°    | 834.8  | 734.7  | 579.6  | 482.2  | 452.7  |
| 52.5°  | 776.9  | 671.2  | 520.4  | 427.3  | 400.5  |
| 55°    | 720.6  | 610.6  | 458.3  | 373.7  | 346.9  |
| 57.5°  | 662.8  | 550.0  | 403.3  | 324.3  | 301.8  |
| 60°    | 603.5  | 490.7  | 345.4  | 273.6  | 251.1  |
| 62.5°  | 545.8  | 433.0  | 296.1  | 228.5  | 217.3  |
| 65°    | 486.5  | 372.2  | 245.3  | 197.5  | 193.1  |
| 67.5°  | 430.2  | 315.8  | 197.5  | 173.4  | 169.2  |
| 70°    | 370.9  | 260.9  | 163.5  | 149.5  | 143.7  |
| 72.5°  | 314.5  | 210.1  | 136.8  | 125.5  | 122.7  |
| 75°    | 259.4  | 160.7  | 112.8  | 102.9  | 101.6  |
| 77.5°  | 204.5  | 114.1  | 88.9   | 83.2   | 80.3   |
| 80°    | 153.6  | 81.8   | 67.6   | 62.1   | 62.1   |
| 82.5°  | 107.2  | 55.0   | 46.6   | 43.6   | 43.6   |
| 85°    | 60.6   | 31.0   | 26.8   | 26.8   | 26.8   |
| 87.5°  | 22.6   | 11.2   | 11.2   | 9.9    | 9.9    |
| 90°    | 3.2    | 38.8   | 105.7  | 99.2   | 102.5  |
| 92.5°  | 66.8   | 90.6   | 93.8   | 97.1   | 97.1   |
| 95°    | 157.4  | 187.7  | 193.0  | 193.0  | 187.7  |
| 97.5°  | 262.0  | 290.1  | 302.0  | 302.0  | 302.0  |
| 100°   | 382.9  | 407.6  | 416.2  | 416.2  | 413.0  |
| 102.5° | 510.1  | 528.4  | 540.3  | 543.6  | 540.3  |
| 105°   | 649.2  | 657.8  | 664.3  | 669.7  | 669.7  |
| 107.5° | 787.2  | 800.2  | 800.2  | 802.3  | 787.2  |
| 110°   | 921.0  | 938.2  | 938.2  | 938.2  | 929.6  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1065.4 | 1083.8 | 1080.5 | 1072.0 | 1065.4 |
| 115°   | 1207.8 | 1225.1 | 1219.6 | 1216.4 | 1207.8 |
| 117.5° | 1349.1 | 1372.8 | 1357.7 | 1349.1 | 1340.5 |
| 120°   | 1491.5 | 1515.1 | 1491.5 | 1491.5 | 1481.8 |
| 122.5° | 1620.9 | 1651.1 | 1636.0 | 1627.3 | 1620.9 |
| 125°   | 1756.7 | 1783.7 | 1775.1 | 1765.4 | 1762.1 |
| 127.5° | 1889.4 | 1922.8 | 1910.9 | 1898.0 | 1889.4 |
| 130°   | 2013.4 | 2052.2 | 2046.8 | 2040.3 | 2028.4 |
| 132.5° | 2152.5 | 2182.7 | 2184.8 | 2169.7 | 2161.2 |
| 135°   | 2272.2 | 2305.6 | 2312.2 | 2308.9 | 2300.3 |
| 137.5° | 2405.9 | 2432.9 | 2438.3 | 2436.1 | 2423.2 |
| 140°   | 2523.5 | 2550.4 | 2565.5 | 2565.5 | 2553.6 |
| 142.5° | 2644.3 | 2671.3 | 2679.8 | 2683.0 | 2671.3 |
| 145°   | 2758.5 | 2780.1 | 2797.4 | 2800.7 | 2788.8 |
| 147.5° | 2861.0 | 2887.9 | 2901.0 | 2906.3 | 2894.5 |
| 150°   | 2966.7 | 2985.0 | 2996.9 | 3006.6 | 2996.9 |
| 152.5° | 3060.5 | 3078.8 | 3094.0 | 3105.9 | 3094.0 |
| 155°   | 3154.3 | 3163.0 | 3172.7 | 3187.8 | 3178.1 |
| 157.5° | 3235.3 | 3241.7 | 3247.1 | 3268.6 | 3253.6 |
| 160°   | 3307.5 | 3314.0 | 3317.2 | 3335.6 | 3322.6 |
| 162.5° | 3374.3 | 3374.3 | 3377.6 | 3398.1 | 3383.0 |
| 165°   | 3431.5 | 3428.3 | 3428.3 | 3449.8 | 3434.7 |
| 167.5° | 3483.3 | 3473.6 | 3473.6 | 3495.1 | 3480.1 |
| 170°   | 3522.1 | 3513.4 | 3510.2 | 3531.8 | 3513.4 |
| 172.5° | 3549.0 | 3540.4 | 3537.2 | 3558.8 | 3540.4 |
| 175°   | 3570.6 | 3562.0 | 3555.6 | 3577.0 | 3558.8 |
| 177.5° | 3582.5 | 3573.8 | 3567.3 | 3585.7 | 3567.3 |
| 180°   | 3577.0 | 3577.0 | 3577.0 | 3577.0 | 3577.0 |

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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 | 4.52             | 5.17 | 5.67 | 6.31 | 7.91  | 0.48           | 1.14 | 1.64 | 2.28 | 3.87 |
|                 | 3H   | 6.18             | 6.77 | 7.35 | 7.92 | 9.53  | 1.66           | 2.24 | 2.82 | 3.39 | 5.00 |
|                 | 4H   | 6.79             | 7.34 | 7.96 | 8.49 | 10.11 | 2.10           | 2.66 | 3.27 | 3.80 | 5.42 |
|                 | 6H   | 7.20             | 7.71 | 8.38 | 8.86 | 10.49 | 2.41           | 2.93 | 3.59 | 4.07 | 5.70 |
|                 | 8H   | 7.32             | 7.81 | 8.50 | 8.98 | 10.60 | 2.50           | 2.99 | 3.68 | 4.15 | 5.77 |
|                 | 12H  | 7.38             | 7.84 | 8.56 | 9.00 | 10.64 | 2.54           | 3.00 | 3.72 | 4.16 | 5.80 |
| 4H              | 2H   | 4.51             | 5.07 | 5.69 | 6.22 | 7.84  | 1.06           | 1.61 | 2.23 | 2.76 | 4.38 |
|                 | 3H   | 6.33             | 6.79 | 7.51 | 7.97 | 9.60  | 2.39           | 2.86 | 3.57 | 4.03 | 5.66 |
|                 | 4H   | 7.02             | 7.45 | 8.20 | 8.61 | 10.25 | 2.93           | 3.36 | 4.12 | 4.52 | 6.17 |
|                 | 6H   | 7.53             | 7.89 | 8.71 | 9.07 | 10.71 | 3.34           | 3.71 | 4.53 | 4.89 | 6.53 |
|                 | 8H   | 7.70             | 8.04 | 8.89 | 9.21 | 10.87 | 3.47           | 3.81 | 4.66 | 4.99 | 6.64 |
|                 | 12H  | 7.79             | 8.10 | 8.99 | 9.28 | 10.94 | 3.53           | 3.84 | 4.73 | 5.02 | 6.68 |
| 8H              | 4H   | 6.97             | 7.31 | 8.16 | 8.49 | 10.14 | 3.20           | 3.54 | 4.39 | 4.72 | 6.37 |
|                 | 6H   | 7.53             | 7.82 | 8.74 | 9.03 | 10.68 | 3.72           | 4.00 | 4.92 | 5.21 | 6.86 |
|                 | 8H   | 7.75             | 8.00 | 8.96 | 9.19 | 10.86 | 3.91           | 4.15 | 5.12 | 5.35 | 7.02 |
|                 | 12H  | 7.89             | 8.10 | 9.10 | 9.29 | 10.99 | 4.02           | 4.23 | 5.23 | 5.43 | 7.13 |
| 12H             | 4H   | 6.92             | 7.23 | 8.12 | 8.41 | 10.07 | 3.20           | 3.51 | 4.40 | 4.69 | 6.35 |
|                 | 6H   | 7.51             | 7.75 | 8.72 | 8.95 | 10.62 | 3.77           | 4.01 | 4.98 | 5.20 | 6.88 |
|                 | 8H   | 7.72             | 7.94 | 8.94 | 9.13 | 10.83 | 3.97           | 4.18 | 5.18 | 5.38 | 7.08 |