

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: P910498

Luminaire Tested: DFN2DIP-4P4F0-040D070US850-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P910498  
REPORT IS A COMBINATION OF REPORTS P899129 AND P895967  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P4F0-040D070US850-FLLFLL  
Description: 4 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

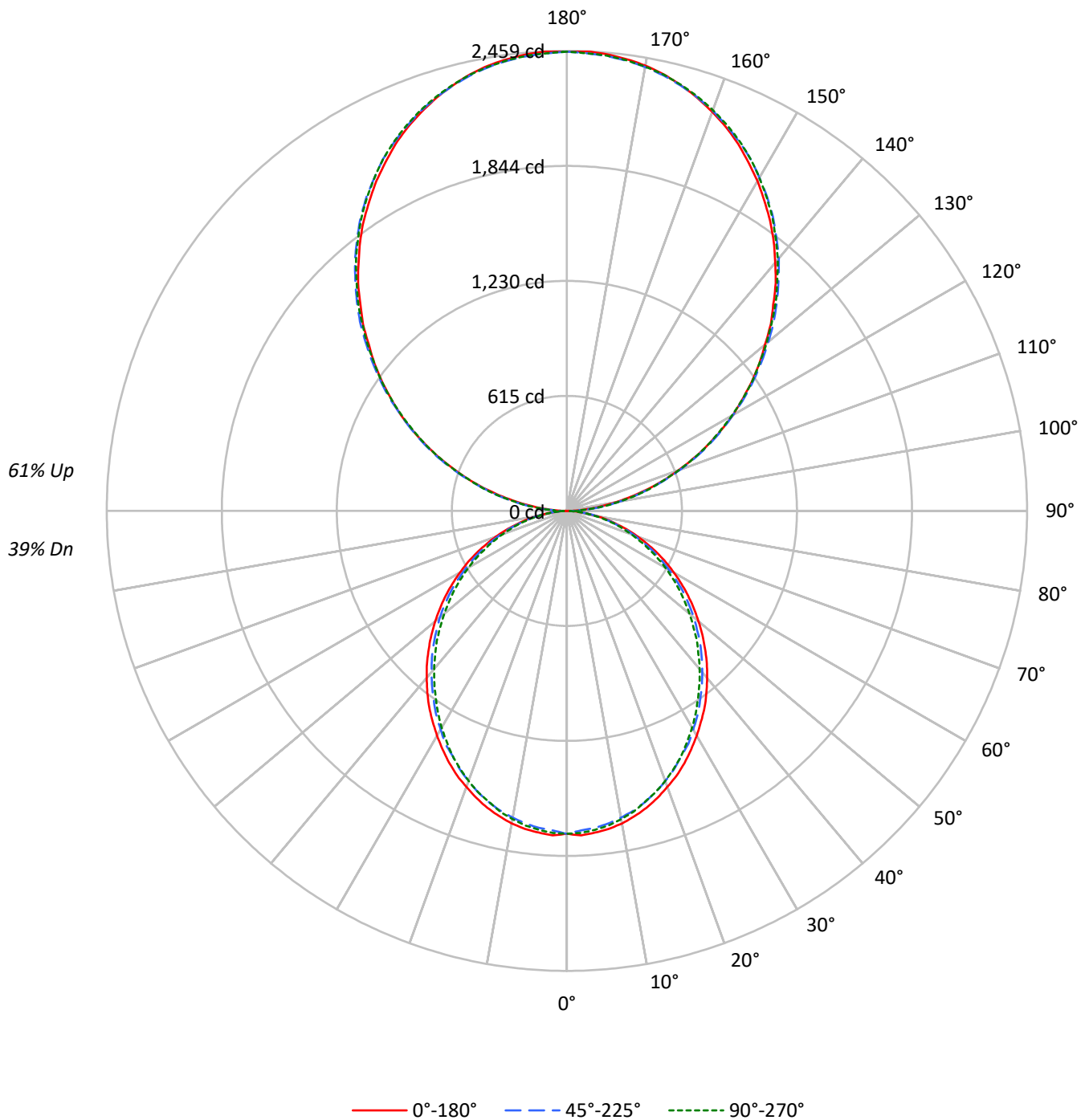
Lumens per Lamp: N/A  
Luminaire Lumens: 11261.9 lumens  
Efficiency: N/A  
Efficacy: 112.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 4.07' x L: 4.07' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 99.9  
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   | 105 | 105 | 105 | 105 | 95 | 95 | 95 | 95 | 77 | 77 | 77 | 61 | 61 | 61 | 46 | 46 | 46 |
| 1   | 95  | 91  | 87  | 84  | 86 | 83 | 80 | 77 | 68 | 65 | 63 | 54 | 52 | 51 | 41 | 40 | 39 |
| 2   | 87  | 79  | 73  | 68  | 79 | 72 | 67 | 63 | 59 | 56 | 52 | 47 | 45 | 42 | 36 | 34 | 33 |
| 3   | 79  | 70  | 63  | 57  | 72 | 64 | 58 | 53 | 52 | 48 | 44 | 42 | 38 | 36 | 32 | 30 | 28 |
| 4   | 72  | 62  | 54  | 48  | 65 | 56 | 50 | 44 | 46 | 41 | 37 | 37 | 33 | 31 | 28 | 26 | 24 |
| 5   | 66  | 55  | 47  | 41  | 60 | 50 | 43 | 38 | 41 | 36 | 32 | 33 | 29 | 26 | 26 | 23 | 21 |
| 6   | 61  | 49  | 41  | 36  | 55 | 45 | 38 | 33 | 37 | 32 | 28 | 30 | 26 | 23 | 23 | 20 | 18 |
| 7   | 56  | 44  | 37  | 31  | 51 | 41 | 34 | 29 | 34 | 28 | 25 | 27 | 23 | 20 | 21 | 18 | 16 |
| 8   | 52  | 40  | 33  | 27  | 47 | 37 | 30 | 26 | 31 | 26 | 22 | 25 | 21 | 18 | 19 | 17 | 15 |
| 9   | 49  | 37  | 29  | 24  | 44 | 34 | 27 | 23 | 28 | 23 | 19 | 23 | 19 | 16 | 18 | 15 | 13 |
| 10  | 45  | 34  | 26  | 22  | 41 | 31 | 25 | 20 | 26 | 21 | 18 | 21 | 17 | 15 | 17 | 14 | 12 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1120 | 1120 | 1120 |
| 5°  | 1122 | 1104 | 1112 |
| 10° | 1113 | 1090 | 1097 |
| 15° | 1096 | 1072 | 1074 |
| 20° | 1074 | 1048 | 1051 |
| 25° | 1052 | 1018 | 1023 |
| 30° | 1025 | 991  | 988  |
| 35° | 999  | 959  | 951  |
| 40° | 967  | 926  | 916  |
| 45° | 935  | 893  | 880  |
| 50° | 900  | 859  | 838  |
| 55° | 863  | 819  | 800  |
| 60° | 822  | 772  | 756  |
| 65° | 777  | 723  | 704  |
| 70° | 720  | 664  | 649  |
| 75° | 640  | 593  | 598  |
| 80° | 544  | 502  | 501  |
| 85° | 395  | 345  | 338  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1858 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 162.5   | 1.4       |
| 10°-20°   | 457.1   | 4.1       |
| 20°-30°   | 671.7   | 6.0       |
| 30°-40°   | 780.2   | 6.9       |
| 40°-50°   | 779.2   | 6.9       |
| 50°-60°   | 679.5   | 6.0       |
| 60°-70°   | 502.3   | 4.5       |
| 70°-80°   | 284.2   | 2.5       |
| 80°-90°   | 82.0    | 0.7       |
| 90°-100°  | 151.9   | 1.3       |
| 100°-110° | 482.7   | 4.3       |
| 110°-120° | 826.1   | 7.3       |
| 120°-130° | 1086.4  | 9.6       |
| 130°-140° | 1219.5  | 10.8      |
| 140°-150° | 1195.8  | 10.6      |
| 150°-160° | 1003.1  | 8.9       |
| 160°-170° | 665.3   | 5.9       |
| 170°-180° | 232.5   | 2.1       |
| 0°-30°    | 1291.3  | 11.5      |
| 0°-40°    | 2071.5  | 18.4      |
| 0°-60°    | 3530.2  | 31.3      |
| 0°-90°    | 4398.6  | 39.1      |
| 90°-120°  | 1460.7  | 13.0      |
| 90°-150°  | 4962.4  | 44.1      |
| 90°-180°  | 6863.0  | 60.9      |
| 0°-180°   | 11261.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1726 | 1726  | 1726 | 1726  | 1726 |      |
| 5°   | 1726 | 1720  | 1701 | 1714  | 1711 | 164  |
| 15°  | 1643 | 1633  | 1612 | 1618  | 1610 | 463  |
| 25°  | 1487 | 1474  | 1446 | 1449  | 1446 | 684  |
| 35°  | 1283 | 1266  | 1240 | 1230  | 1222 | 801  |
| 45°  | 1044 | 1032  | 1007 | 989   | 983  | 806  |
| 55°  | 790  | 780   | 760  | 740   | 732  | 706  |
| 65°  | 533  | 523   | 506  | 491   | 483  | 527  |
| 75°  | 279  | 276   | 267  | 257   | 261  | 298  |
| 85°  | 68   | 66    | 65   | 60    | 58   | 76   |
| 90°  | 2    | 27    | 72   | 68    | 70   | 11   |
| 95°  | 108  | 129   | 132  | 132   | 129  | 120  |
| 105° | 446  | 452   | 456  | 460   | 460  | 470  |
| 115° | 829  | 841   | 837  | 835   | 829  | 820  |
| 125° | 1206 | 1224  | 1218 | 1212  | 1210 | 1077 |
| 135° | 1560 | 1582  | 1587 | 1585  | 1579 | 1205 |
| 145° | 1893 | 1908  | 1920 | 1922  | 1914 | 1183 |
| 155° | 2165 | 2171  | 2178 | 2188  | 2181 | 997  |
| 165° | 2355 | 2353  | 2353 | 2368  | 2357 | 664  |
| 175° | 2451 | 2445  | 2440 | 2455  | 2443 | 233  |
| 180° | 2455 | 2455  | 2455 | 2455  | 2455 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1726.0 | 1726.0 | 1726.0 | 1726.0 | 1726.0 |
| 2.5°   | 1736.1 | 1727.8 | 1709.5 | 1726.0 | 1722.9 |
| 5°     | 1726.0 | 1719.5 | 1701.2 | 1714.4 | 1711.3 |
| 7.5°   | 1714.4 | 1704.5 | 1686.2 | 1699.7 | 1696.3 |
| 10°    | 1696.3 | 1684.7 | 1664.8 | 1678.0 | 1673.0 |
| 12.5°  | 1671.3 | 1661.4 | 1641.5 | 1649.9 | 1646.4 |
| 15°    | 1643.1 | 1633.2 | 1611.6 | 1618.3 | 1610.0 |
| 17.5°  | 1608.3 | 1598.4 | 1576.8 | 1585.0 | 1576.8 |
| 20°    | 1570.0 | 1560.1 | 1537.0 | 1541.8 | 1535.4 |
| 22.5°  | 1532.0 | 1517.0 | 1495.4 | 1495.4 | 1492.0 |
| 25°    | 1487.1 | 1473.9 | 1445.7 | 1448.9 | 1445.7 |
| 27.5°  | 1437.3 | 1425.6 | 1404.2 | 1399.2 | 1391.0 |
| 30°    | 1387.6 | 1374.3 | 1349.4 | 1344.4 | 1337.8 |
| 32.5°  | 1334.5 | 1324.6 | 1298.0 | 1288.0 | 1281.2 |
| 35°    | 1283.0 | 1266.5 | 1239.9 | 1229.9 | 1221.6 |
| 37.5°  | 1224.9 | 1209.9 | 1183.3 | 1171.8 | 1163.5 |
| 40°    | 1165.2 | 1151.8 | 1125.2 | 1110.4 | 1103.8 |
| 42.5°  | 1107.1 | 1093.7 | 1067.3 | 1050.6 | 1040.7 |
| 45°    | 1044.0 | 1032.5 | 1007.4 | 989.3  | 982.6  |
| 47.5°  | 982.6  | 970.9  | 944.4  | 926.1  | 916.3  |
| 50°    | 917.8  | 909.5  | 886.3  | 863.0  | 854.7  |
| 52.5°  | 854.7  | 843.2  | 821.7  | 803.4  | 791.7  |
| 55°    | 790.2  | 780.1  | 760.2  | 740.3  | 732.1  |
| 57.5°  | 725.3  | 717.1  | 695.3  | 675.5  | 668.8  |
| 60°    | 660.5  | 654.0  | 630.8  | 612.5  | 607.5  |
| 62.5°  | 597.5  | 585.9  | 569.4  | 552.7  | 546.1  |
| 65°    | 532.9  | 522.8  | 506.3  | 491.3  | 483.1  |
| 67.5°  | 466.4  | 458.0  | 443.3  | 431.6  | 425.0  |
| 70°    | 405.0  | 398.4  | 383.4  | 371.7  | 365.2  |
| 72.5°  | 342.0  | 335.3  | 327.0  | 315.4  | 310.4  |
| 75°    | 278.8  | 275.6  | 267.2  | 257.3  | 260.6  |
| 77.5°  | 222.4  | 215.7  | 212.4  | 207.4  | 202.5  |
| 80°    | 166.0  | 164.2  | 160.9  | 156.0  | 152.7  |
| 82.5°  | 112.9  | 112.9  | 111.3  | 104.6  | 104.6  |
| 85°    | 68.0   | 66.4   | 64.8   | 59.7   | 58.1   |
| 87.5°  | 29.9   | 26.6   | 23.3   | 18.3   | 16.5   |
| 90°    | 2.2    | 26.6   | 72.5   | 68.1   | 70.3   |
| 92.5°  | 45.9   | 62.2   | 64.4   | 66.7   | 66.7   |
| 95°    | 108.0  | 128.8  | 132.5  | 132.5  | 128.8  |
| 97.5°  | 179.9  | 199.1  | 207.3  | 207.3  | 207.3  |
| 100°   | 262.7  | 279.8  | 285.7  | 285.7  | 283.5  |
| 102.5° | 350.1  | 362.6  | 370.8  | 373.1  | 370.8  |
| 105°   | 445.6  | 451.5  | 455.9  | 459.7  | 459.7  |
| 107.5° | 540.3  | 549.2  | 549.2  | 550.7  | 540.3  |
| 110°   | 632.1  | 644.0  | 644.0  | 644.0  | 638.0  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 731.3  | 743.9  | 741.7  | 735.7  | 731.3  |
| 115°   | 829.0  | 840.8  | 837.2  | 835.0  | 829.0  |
| 117.5° | 925.9  | 942.2  | 931.9  | 925.9  | 920.0  |
| 120°   | 1023.6 | 1039.9 | 1023.6 | 1023.6 | 1017.0 |
| 122.5° | 1112.4 | 1133.2 | 1122.9 | 1116.9 | 1112.4 |
| 125°   | 1205.7 | 1224.2 | 1218.3 | 1211.7 | 1209.5 |
| 127.5° | 1296.8 | 1319.7 | 1311.6 | 1302.7 | 1296.8 |
| 130°   | 1381.9 | 1408.5 | 1404.9 | 1400.4 | 1392.2 |
| 132.5° | 1477.4 | 1498.1 | 1499.6 | 1489.3 | 1483.3 |
| 135°   | 1559.6 | 1582.4 | 1587.0 | 1584.7 | 1578.8 |
| 137.5° | 1651.3 | 1669.8 | 1673.5 | 1672.0 | 1663.2 |
| 140°   | 1732.0 | 1750.6 | 1760.9 | 1760.9 | 1752.8 |
| 142.5° | 1814.9 | 1833.4 | 1839.3 | 1841.5 | 1833.4 |
| 145°   | 1893.4 | 1908.1 | 1920.0 | 1922.2 | 1914.1 |
| 147.5° | 1963.7 | 1982.2 | 1991.1 | 1994.8 | 1986.7 |
| 150°   | 2036.2 | 2048.8 | 2057.0 | 2063.6 | 2057.0 |
| 152.5° | 2100.6 | 2113.2 | 2123.5 | 2131.7 | 2123.5 |
| 155°   | 2165.0 | 2170.9 | 2177.6 | 2187.9 | 2181.3 |
| 157.5° | 2220.6 | 2225.0 | 2228.6 | 2243.5 | 2233.1 |
| 160°   | 2270.1 | 2274.6 | 2276.8 | 2289.3 | 2280.4 |
| 162.5° | 2316.0 | 2316.0 | 2318.3 | 2332.2 | 2321.9 |
| 165°   | 2355.2 | 2353.0 | 2353.0 | 2367.8 | 2357.4 |
| 167.5° | 2390.8 | 2384.1 | 2384.1 | 2398.9 | 2388.6 |
| 170°   | 2417.4 | 2411.5 | 2409.3 | 2424.1 | 2411.5 |
| 172.5° | 2435.9 | 2429.9 | 2427.7 | 2442.6 | 2429.9 |
| 175°   | 2450.7 | 2444.8 | 2440.4 | 2455.1 | 2442.6 |
| 177.5° | 2458.9 | 2452.9 | 2448.5 | 2461.1 | 2448.5 |
| 180°   | 2455.1 | 2455.1 | 2455.1 | 2455.1 | 2455.1 |

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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 | 6.58             | 7.35  | 7.62  | 8.40  | 9.82  | 6.13           | 6.90  | 7.18  | 7.95  | 9.37  |
|                 | 3H   | 8.24             | 8.93  | 9.29  | 9.99  | 11.42 | 7.75           | 8.44  | 8.80  | 9.50  | 10.93 |
|                 | 4H   | 8.82             | 9.48  | 9.89  | 10.54 | 11.99 | 8.33           | 8.98  | 9.40  | 10.05 | 11.49 |
|                 | 6H   | 9.22             | 9.83  | 10.30 | 10.89 | 12.35 | 8.72           | 9.33  | 9.80  | 10.39 | 11.85 |
|                 | 8H   | 9.33             | 9.90  | 10.41 | 10.98 | 12.43 | 8.83           | 9.40  | 9.91  | 10.48 | 11.93 |
|                 | 12H  | 9.38             | 9.92  | 10.46 | 11.00 | 12.47 | 8.87           | 9.41  | 9.95  | 10.49 | 11.96 |
| 4H              | 2H   | 7.03             | 7.68  | 8.10  | 8.75  | 10.19 | 6.67           | 7.33  | 7.75  | 8.39  | 9.84  |
|                 | 3H   | 8.89             | 9.44  | 9.97  | 10.53 | 11.99 | 8.48           | 9.03  | 9.57  | 10.12 | 11.58 |
|                 | 4H   | 9.61             | 10.11 | 10.69 | 11.19 | 12.67 | 9.18           | 9.68  | 10.27 | 10.76 | 12.24 |
|                 | 6H   | 10.12            | 10.55 | 11.22 | 11.66 | 13.13 | 9.69           | 10.12 | 10.78 | 11.22 | 12.70 |
|                 | 8H   | 10.27            | 10.67 | 11.37 | 11.77 | 13.26 | 9.84           | 10.24 | 10.93 | 11.33 | 12.82 |
|                 | 12H  | 10.34            | 10.71 | 11.46 | 11.82 | 13.31 | 9.89           | 10.26 | 11.01 | 11.37 | 12.86 |
| 8H              | 4H   | 9.80             | 10.20 | 10.89 | 11.29 | 12.78 | 9.42           | 9.82  | 10.52 | 10.92 | 12.41 |
|                 | 6H   | 10.43            | 10.76 | 11.55 | 11.90 | 13.39 | 10.05          | 10.38 | 11.16 | 11.52 | 13.00 |
|                 | 8H   | 10.65            | 10.95 | 11.78 | 12.06 | 13.57 | 10.26          | 10.55 | 11.39 | 11.67 | 13.18 |
|                 | 12H  | 10.79            | 11.04 | 11.91 | 12.16 | 13.70 | 10.37          | 10.63 | 11.50 | 11.75 | 13.29 |
| 12H             | 4H   | 9.78             | 10.14 | 10.89 | 11.25 | 12.74 | 9.41           | 9.78  | 10.52 | 10.88 | 12.38 |
|                 | 6H   | 10.46            | 10.75 | 11.58 | 11.87 | 13.38 | 10.09          | 10.38 | 11.21 | 11.50 | 13.00 |
|                 | 8H   | 10.70            | 10.96 | 11.83 | 12.07 | 13.62 | 10.32          | 10.58 | 11.45 | 11.69 | 13.24 |

END OF REPORT