

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: P909860

Luminaire Tested: DFN2DIP-TR3F0-040D070US840-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P909860  
REPORT IS A COMBINATION OF REPORTS P900330 AND P897195  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR3F0-040D070US840-RLLFLL  
Description: 3 foot, Triangle Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

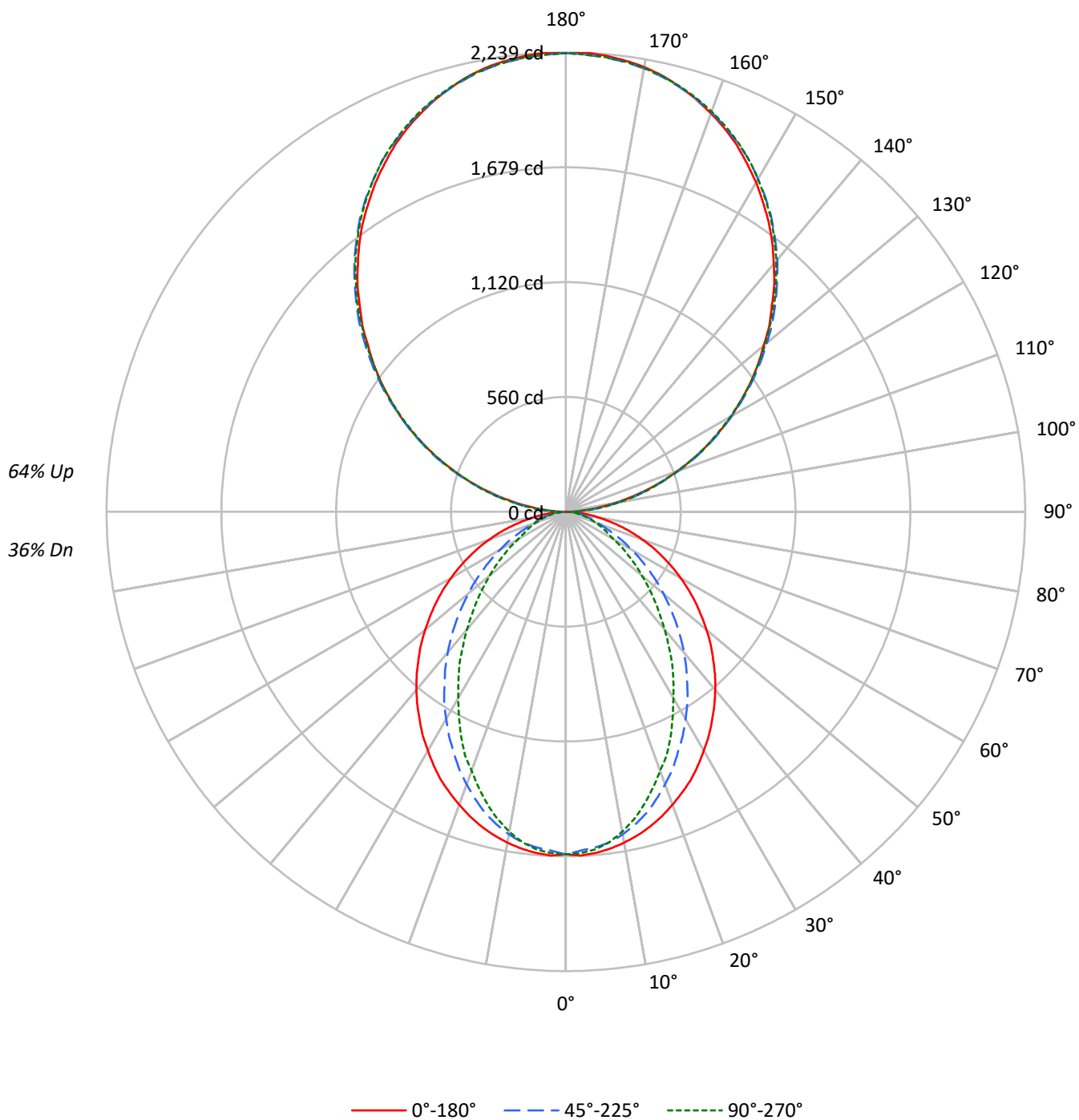
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 9689.7 lumens  
Efficiency: N/A  
Efficacy: 109.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 2.74' x L: 3.16' x H: 0.1')  
CIE Type: Semi-Indirect  
  
Input Watts (W): 88.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9951  
Total Harmonic Distortion (THDi): 0.07  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P909860

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### Luminous Intensity Polar Plot



TEST NUMBER: P909860

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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   | 104 | 104 | 104 | 104 | 94 | 94 | 94 | 94 | 75 | 75 | 75 | 58 | 58 | 58 | 43 | 43 | 43 |
| 1   | 95  | 91  | 87  | 84  | 86 | 82 | 79 | 76 | 66 | 64 | 62 | 52 | 50 | 49 | 38 | 37 | 37 |
| 2   | 87  | 80  | 74  | 69  | 78 | 72 | 67 | 63 | 59 | 55 | 52 | 46 | 44 | 42 | 34 | 33 | 31 |
| 3   | 79  | 70  | 63  | 58  | 71 | 64 | 58 | 53 | 52 | 48 | 44 | 41 | 38 | 36 | 31 | 29 | 27 |
| 4   | 73  | 62  | 55  | 49  | 65 | 57 | 50 | 45 | 46 | 42 | 38 | 37 | 33 | 31 | 27 | 25 | 24 |
| 5   | 67  | 56  | 48  | 42  | 60 | 51 | 44 | 39 | 42 | 37 | 33 | 33 | 29 | 27 | 25 | 23 | 21 |
| 6   | 61  | 50  | 42  | 37  | 55 | 46 | 39 | 34 | 37 | 32 | 29 | 30 | 26 | 24 | 23 | 20 | 18 |
| 7   | 57  | 45  | 37  | 32  | 51 | 41 | 35 | 30 | 34 | 29 | 25 | 27 | 24 | 21 | 21 | 18 | 17 |
| 8   | 53  | 41  | 33  | 28  | 48 | 38 | 31 | 26 | 31 | 26 | 23 | 25 | 21 | 19 | 19 | 17 | 15 |
| 9   | 49  | 37  | 30  | 25  | 44 | 34 | 28 | 24 | 28 | 24 | 20 | 23 | 19 | 17 | 18 | 15 | 14 |
| 10  | 46  | 34  | 27  | 23  | 42 | 31 | 25 | 21 | 26 | 21 | 18 | 21 | 18 | 15 | 16 | 14 | 12 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2080 | 2080 | 2080 |
| 5°  | 2083 | 2046 | 2059 |
| 10° | 2061 | 2004 | 1991 |
| 15° | 2031 | 1936 | 1886 |
| 20° | 1993 | 1843 | 1758 |
| 25° | 1953 | 1739 | 1634 |
| 30° | 1900 | 1633 | 1477 |
| 35° | 1848 | 1519 | 1340 |
| 40° | 1796 | 1401 | 1183 |
| 45° | 1734 | 1270 | 1040 |
| 50° | 1671 | 1138 | 901  |
| 55° | 1605 | 998  | 767  |
| 60° | 1528 | 851  | 630  |
| 65° | 1439 | 702  | 566  |
| 70° | 1332 | 564  | 510  |
| 75° | 1197 | 493  | 461  |
| 80° | 1001 | 408  | 396  |
| 85° | 681  | 264  | 289  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2181 cd/sqm

TEST NUMBER: P909860

CATALOG NUMBER: DFN2DIP-TR3F0-040D070US840-RLLFLL

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 156.5  | 1.6       |
| 10°-20°   | 429.5  | 4.4       |
| 20°-30°   | 603.0  | 6.2       |
| 30°-40°   | 657.4  | 6.8       |
| 40°-50°   | 604.2  | 6.2       |
| 50°-60°   | 474.5  | 4.9       |
| 60°-70°   | 308.9  | 3.2       |
| 70°-80°   | 159.0  | 1.6       |
| 80°-90°   | 46.9   | 0.5       |
| 90°-100°  | 138.3  | 1.4       |
| 100°-110° | 439.6  | 4.5       |
| 110°-120° | 752.2  | 7.8       |
| 120°-130° | 989.3  | 10.2      |
| 130°-140° | 1110.5 | 11.5      |
| 140°-150° | 1088.9 | 11.2      |
| 150°-160° | 913.5  | 9.4       |
| 160°-170° | 605.8  | 6.3       |
| 170°-180° | 211.7  | 2.2       |
| 0°-30°    | 1189.0 | 12.3      |
| 0°-40°    | 1846.4 | 19.1      |
| 0°-60°    | 2925.1 | 30.2      |
| 0°-90°    | 3439.9 | 35.5      |
| 90°-120°  | 1330.1 | 13.7      |
| 90°-150°  | 4518.8 | 46.6      |
| 90°-180°  | 6250.0 | 64.5      |
| 0°-180°   | 9689.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1670 | 1670  | 1670 | 1670  | 1670 |      |
| 5°   | 1670 | 1662  | 1642 | 1656  | 1651 | 158  |
| 15°  | 1588 | 1571  | 1520 | 1491  | 1476 | 447  |
| 25°  | 1441 | 1393  | 1293 | 1231  | 1209 | 663  |
| 35°  | 1242 | 1165  | 1032 | 937   | 903  | 777  |
| 45°  | 1015 | 914   | 756  | 648   | 612  | 784  |
| 55°  | 772  | 654   | 491  | 400   | 372  | 690  |
| 65°  | 521  | 399   | 263  | 212   | 207  | 517  |
| 75°  | 278  | 172   | 121  | 110   | 109  | 294  |
| 85°  | 65   | 33    | 29   | 29    | 29   | 75   |
| 90°  | 2    | 24    | 66   | 62    | 64   | 10   |
| 95°  | 98   | 117   | 121  | 121   | 117  | 109  |
| 105° | 406  | 411   | 415  | 419   | 419  | 428  |
| 115° | 755  | 766   | 762  | 760   | 755  | 747  |
| 125° | 1098 | 1115  | 1109 | 1103  | 1101 | 981  |
| 135° | 1420 | 1441  | 1445 | 1443  | 1438 | 1098 |
| 145° | 1724 | 1738  | 1748 | 1750  | 1743 | 1077 |
| 155° | 1972 | 1977  | 1983 | 1992  | 1986 | 907  |
| 165° | 2145 | 2143  | 2143 | 2156  | 2147 | 605  |
| 175° | 2232 | 2226  | 2222 | 2236  | 2224 | 212  |
| 180° | 2236 | 2236  | 2236 | 2236  | 2236 |      |

TEST NUMBER: P909860

CATALOG NUMBER: DFN2DIP-TR3F0-040D070US840-RLLFLL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1669.5 | 1669.5 | 1669.5 | 1669.5 | 1669.5 |
| 2.5°   | 1677.1 | 1669.5 | 1652.8 | 1668.1 | 1665.0 |
| 5°     | 1669.5 | 1661.9 | 1642.2 | 1655.9 | 1651.4 |
| 7.5°   | 1655.9 | 1646.9 | 1625.8 | 1631.6 | 1624.2 |
| 10°    | 1637.8 | 1627.2 | 1597.0 | 1592.4 | 1583.5 |
| 12.5°  | 1615.2 | 1601.5 | 1560.6 | 1551.7 | 1535.0 |
| 15°    | 1587.9 | 1571.2 | 1519.9 | 1491.3 | 1476.2 |
| 17.5°  | 1556.2 | 1532.0 | 1468.4 | 1435.3 | 1411.1 |
| 20°    | 1519.9 | 1489.7 | 1414.1 | 1376.4 | 1343.1 |
| 22.5°  | 1480.7 | 1445.9 | 1358.2 | 1306.9 | 1284.3 |
| 25°    | 1441.4 | 1393.0 | 1293.2 | 1231.4 | 1208.6 |
| 27.5°  | 1394.6 | 1343.1 | 1232.8 | 1161.9 | 1127.0 |
| 30°    | 1344.7 | 1287.2 | 1166.3 | 1089.3 | 1048.5 |
| 32.5°  | 1296.4 | 1226.8 | 1103.0 | 1012.3 | 974.4  |
| 35°    | 1242.0 | 1164.9 | 1032.0 | 936.8  | 903.4  |
| 37.5°  | 1189.1 | 1105.9 | 965.4  | 861.1  | 823.4  |
| 40°    | 1133.2 | 1042.6 | 896.0  | 788.7  | 749.4  |
| 42.5°  | 1075.7 | 979.1  | 826.5  | 714.6  | 676.9  |
| 45°    | 1015.3 | 914.0  | 755.5  | 648.1  | 611.9  |
| 47.5°  | 958.0  | 850.7  | 687.5  | 580.2  | 546.9  |
| 50°    | 894.4  | 787.2  | 621.0  | 516.6  | 485.0  |
| 52.5°  | 832.4  | 719.1  | 557.5  | 457.8  | 429.1  |
| 55°    | 772.0  | 654.2  | 491.0  | 400.4  | 371.7  |
| 57.5°  | 710.1  | 589.3  | 432.1  | 347.5  | 323.4  |
| 60°    | 646.6  | 525.7  | 370.1  | 293.2  | 269.0  |
| 62.5°  | 584.8  | 463.9  | 317.2  | 244.8  | 232.8  |
| 65°    | 521.3  | 398.8  | 262.9  | 211.6  | 206.9  |
| 67.5°  | 460.9  | 338.4  | 211.6  | 185.8  | 181.3  |
| 70°    | 397.4  | 279.5  | 175.2  | 160.2  | 154.0  |
| 72.5°  | 337.0  | 225.1  | 146.5  | 134.5  | 131.5  |
| 75°    | 277.9  | 172.2  | 120.9  | 110.3  | 108.9  |
| 77.5°  | 219.1  | 122.3  | 95.2   | 89.2   | 86.0   |
| 80°    | 164.6  | 87.7   | 72.4   | 66.6   | 66.6   |
| 82.5°  | 114.8  | 59.0   | 49.9   | 46.8   | 46.8   |
| 85°    | 64.9   | 33.2   | 28.7   | 28.7   | 28.7   |
| 87.5°  | 24.2   | 12.0   | 12.0   | 10.6   | 10.6   |
| 90°    | 2.0    | 24.2   | 66.0   | 62.0   | 64.0   |
| 92.5°  | 41.8   | 56.7   | 58.7   | 60.7   | 60.7   |
| 95°    | 98.4   | 117.2  | 120.7  | 120.7  | 117.2  |
| 97.5°  | 163.8  | 181.3  | 188.7  | 188.7  | 188.7  |
| 100°   | 239.2  | 254.8  | 260.1  | 260.1  | 258.1  |
| 102.5° | 318.8  | 330.2  | 337.7  | 339.7  | 337.7  |
| 105°   | 405.8  | 411.1  | 415.2  | 418.6  | 418.6  |
| 107.5° | 492.0  | 500.1  | 500.1  | 501.5  | 492.0  |
| 110°   | 575.6  | 586.4  | 586.4  | 586.4  | 581.0  |

TEST NUMBER: P909860

CATALOG NUMBER: DFN2DIP-TR3F0-040D070US840-RLLFLL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 665.9  | 677.4  | 675.4  | 669.9  | 665.9  |
| 115°   | 754.9  | 765.7  | 762.3  | 760.3  | 754.9  |
| 117.5° | 843.1  | 858.0  | 848.6  | 843.1  | 837.8  |
| 120°   | 932.1  | 947.0  | 932.1  | 932.1  | 926.0  |
| 122.5° | 1013.0 | 1031.9 | 1022.5 | 1017.0 | 1013.0 |
| 125°   | 1097.9 | 1114.8 | 1109.4 | 1103.4 | 1101.4 |
| 127.5° | 1180.8 | 1201.7 | 1194.4 | 1186.3 | 1180.8 |
| 130°   | 1258.4 | 1282.6 | 1279.3 | 1275.3 | 1267.8 |
| 132.5° | 1345.3 | 1364.2 | 1365.5 | 1356.1 | 1350.7 |
| 135°   | 1420.2 | 1441.0 | 1445.1 | 1443.0 | 1437.6 |
| 137.5° | 1503.7 | 1520.6 | 1523.9 | 1522.6 | 1514.5 |
| 140°   | 1577.2 | 1594.1 | 1603.5 | 1603.5 | 1596.1 |
| 142.5° | 1652.6 | 1669.5 | 1674.9 | 1676.9 | 1669.5 |
| 145°   | 1724.1 | 1737.6 | 1748.4 | 1750.4 | 1743.0 |
| 147.5° | 1788.2 | 1805.0 | 1813.1 | 1816.4 | 1809.1 |
| 150°   | 1854.2 | 1865.6 | 1873.1 | 1879.2 | 1873.1 |
| 152.5° | 1912.8 | 1924.3 | 1933.7 | 1941.2 | 1933.7 |
| 155°   | 1971.5 | 1976.8 | 1983.0 | 1992.4 | 1986.3 |
| 157.5° | 2022.1 | 2026.1 | 2029.4 | 2043.0 | 2033.5 |
| 160°   | 2067.2 | 2071.2 | 2073.3 | 2084.7 | 2076.6 |
| 162.5° | 2109.0 | 2109.0 | 2111.0 | 2123.7 | 2114.4 |
| 165°   | 2144.7 | 2142.6 | 2142.6 | 2156.2 | 2146.7 |
| 167.5° | 2177.1 | 2171.0 | 2171.0 | 2184.4 | 2175.0 |
| 170°   | 2201.3 | 2196.0 | 2193.9 | 2207.4 | 2196.0 |
| 172.5° | 2218.2 | 2212.7 | 2210.7 | 2224.2 | 2212.7 |
| 175°   | 2231.6 | 2226.2 | 2222.2 | 2235.6 | 2224.2 |
| 177.5° | 2239.1 | 2233.6 | 2229.6 | 2241.1 | 2229.6 |
| 180°   | 2235.6 | 2235.6 | 2235.6 | 2235.6 | 2235.6 |

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CATALOG NUMBER: DFN2DIP-TR3F0-040D070US840-RLLFLL

**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 | 8.11             | 8.84  | 9.19  | 9.91  | 11.38 | 4.09           | 4.81 | 5.17 | 5.89 | 7.35  |
|                 | 3H   | 9.77             | 10.42 | 10.86 | 11.50 | 12.99 | 5.26           | 5.91 | 6.35 | 6.99 | 8.48  |
|                 | 4H   | 10.37            | 10.98 | 11.47 | 12.07 | 13.56 | 5.70           | 6.32 | 6.80 | 7.40 | 8.89  |
|                 | 6H   | 10.78            | 11.34 | 11.88 | 12.43 | 13.93 | 6.02           | 6.58 | 7.12 | 7.67 | 9.17  |
|                 | 8H   | 10.90            | 11.43 | 12.01 | 12.54 | 14.03 | 6.10           | 6.64 | 7.21 | 7.74 | 9.24  |
|                 | 12H  | 10.95            | 11.46 | 12.06 | 12.56 | 14.08 | 6.14           | 6.65 | 7.25 | 7.74 | 9.26  |
| 4H              | 2H   | 8.11             | 8.73  | 9.22  | 9.81  | 11.30 | 4.66           | 5.28 | 5.77 | 6.36 | 7.85  |
|                 | 3H   | 9.92             | 10.43 | 11.03 | 11.55 | 13.05 | 6.00           | 6.51 | 7.11 | 7.62 | 9.12  |
|                 | 4H   | 10.60            | 11.07 | 11.72 | 12.17 | 13.70 | 6.54           | 7.01 | 7.65 | 8.11 | 9.63  |
|                 | 6H   | 11.10            | 11.51 | 12.23 | 12.63 | 14.15 | 6.95           | 7.35 | 8.07 | 8.47 | 9.99  |
|                 | 8H   | 11.27            | 11.65 | 12.39 | 12.76 | 14.30 | 7.07           | 7.44 | 8.19 | 8.56 | 10.09 |
|                 | 12H  | 11.36            | 11.70 | 12.50 | 12.83 | 14.36 | 7.13           | 7.47 | 8.26 | 8.59 | 10.13 |
| 8H              | 4H   | 10.56            | 10.94 | 11.69 | 12.05 | 13.59 | 6.80           | 7.18 | 7.93 | 8.30 | 9.83  |
|                 | 6H   | 11.12            | 11.42 | 12.26 | 12.58 | 14.11 | 7.31           | 7.62 | 8.45 | 8.78 | 10.31 |
|                 | 8H   | 11.33            | 11.60 | 12.47 | 12.73 | 14.28 | 7.50           | 7.77 | 8.65 | 8.91 | 10.46 |
|                 | 12H  | 11.45            | 11.69 | 12.60 | 12.83 | 14.41 | 7.61           | 7.85 | 8.76 | 8.98 | 10.57 |
| 12H             | 4H   | 10.51            | 10.85 | 11.65 | 11.98 | 13.51 | 6.80           | 7.14 | 7.94 | 8.27 | 9.81  |
|                 | 6H   | 11.09            | 11.36 | 12.24 | 12.50 | 14.05 | 7.36           | 7.63 | 8.51 | 8.77 | 10.32 |
|                 | 8H   | 11.30            | 11.54 | 12.45 | 12.67 | 14.26 | 7.56           | 7.80 | 8.71 | 8.93 | 10.52 |

END OF REPORT