

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: P921631

Luminaire Tested: DFN2DIP-HX3F0-030D070US940-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P921631  
REPORT IS A COMBINATION OF REPORTS P900777 AND P897645  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX3F0-030D070US940-FLLONL  
Description: 3 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

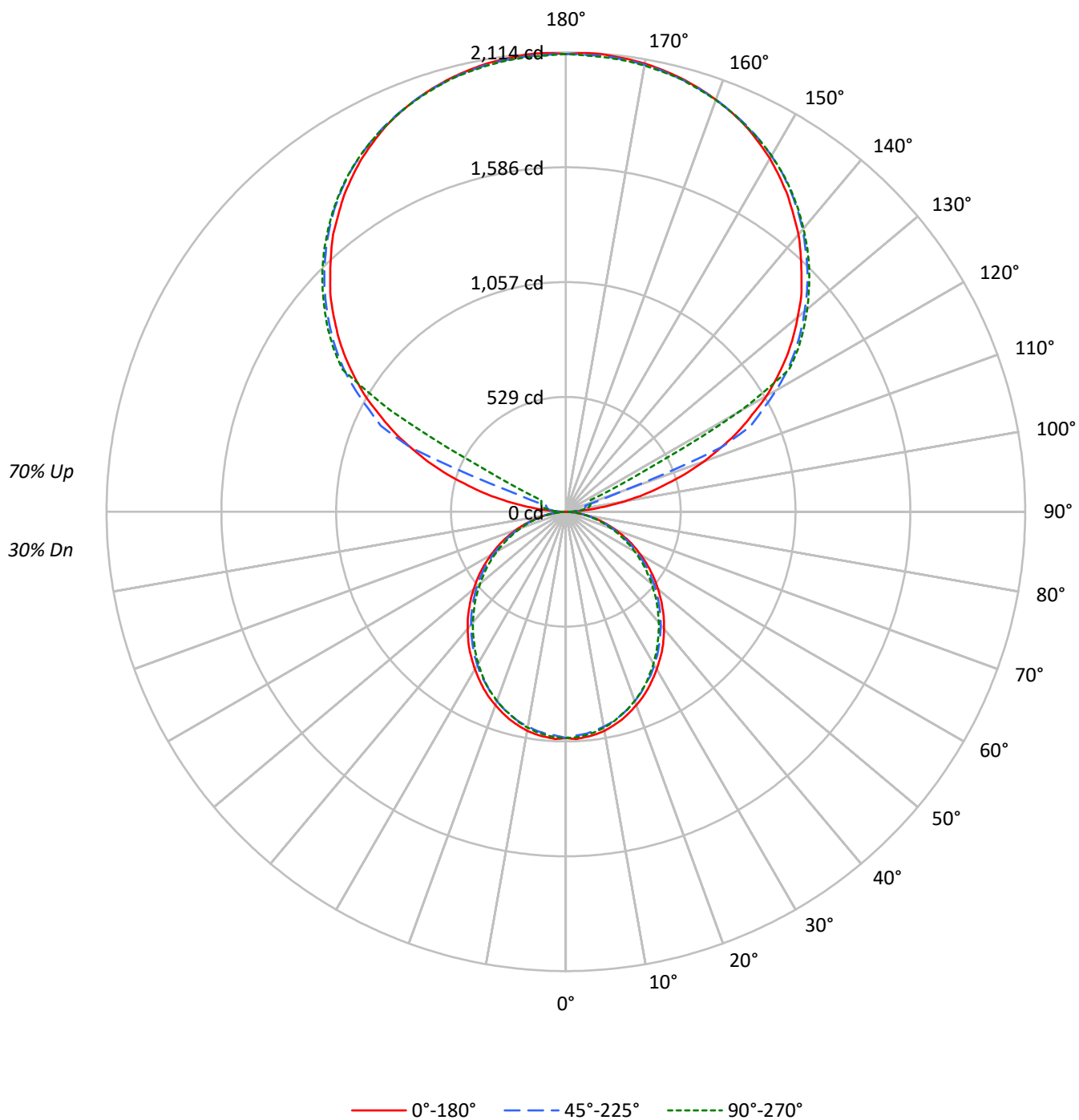
Lumens per Lamp: N/A  
Luminaire Lumens: 8828.0 lumens  
Efficiency: N/A  
Efficacy: 114.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 2.84' x L: 3.28' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 77.1  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.983  
Total Harmonic Distortion (THDi): 0.073  
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   | 102 | 102 | 102 | 102 | 92 | 92 | 92 | 92 | 72 | 72 | 72 | 54 | 54 | 54 | 38 | 38 | 38 |
| 1   | 93  | 89  | 85  | 82  | 84 | 80 | 77 | 74 | 63 | 61 | 59 | 48 | 46 | 45 | 33 | 33 | 32 |
| 2   | 85  | 78  | 72  | 67  | 76 | 70 | 65 | 61 | 55 | 52 | 49 | 42 | 40 | 38 | 29 | 28 | 27 |
| 3   | 77  | 68  | 61  | 56  | 69 | 62 | 56 | 51 | 49 | 45 | 41 | 37 | 34 | 32 | 26 | 24 | 23 |
| 4   | 71  | 60  | 53  | 47  | 63 | 54 | 48 | 43 | 43 | 39 | 35 | 33 | 30 | 27 | 23 | 21 | 20 |
| 5   | 65  | 54  | 46  | 40  | 58 | 48 | 42 | 37 | 39 | 34 | 30 | 29 | 26 | 23 | 21 | 19 | 17 |
| 6   | 60  | 48  | 40  | 35  | 53 | 43 | 37 | 32 | 35 | 30 | 26 | 27 | 23 | 20 | 19 | 17 | 15 |
| 7   | 55  | 43  | 35  | 30  | 49 | 39 | 32 | 28 | 31 | 26 | 23 | 24 | 21 | 18 | 17 | 15 | 13 |
| 8   | 51  | 39  | 32  | 26  | 46 | 35 | 29 | 24 | 28 | 24 | 20 | 22 | 19 | 16 | 16 | 14 | 12 |
| 9   | 47  | 36  | 28  | 23  | 42 | 32 | 26 | 22 | 26 | 21 | 18 | 20 | 17 | 14 | 15 | 12 | 11 |
| 10  | 44  | 32  | 26  | 21  | 40 | 30 | 23 | 19 | 24 | 19 | 16 | 19 | 15 | 13 | 14 | 11 | 10 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1206 | 1206 | 1206 |
| 5°  | 1207 | 1188 | 1196 |
| 10° | 1197 | 1171 | 1179 |
| 15° | 1179 | 1151 | 1153 |
| 20° | 1154 | 1123 | 1127 |
| 25° | 1130 | 1091 | 1096 |
| 30° | 1100 | 1060 | 1057 |
| 35° | 1071 | 1024 | 1017 |
| 40° | 1036 | 988  | 978  |
| 45° | 1001 | 951  | 938  |
| 50° | 962  | 913  | 892  |
| 55° | 922  | 868  | 849  |
| 60° | 876  | 816  | 800  |
| 65° | 827  | 761  | 742  |
| 70° | 763  | 694  | 680  |
| 75° | 675  | 614  | 622  |
| 80° | 569  | 512  | 512  |
| 85° | 404  | 339  | 332  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1350 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 98.0   | 1.1       |
| 10°-20°   | 275.6  | 3.1       |
| 20°-30°   | 405.1  | 4.6       |
| 30°-40°   | 470.5  | 5.3       |
| 40°-50°   | 469.9  | 5.3       |
| 50°-60°   | 409.8  | 4.6       |
| 60°-70°   | 302.9  | 3.4       |
| 70°-80°   | 171.4  | 1.9       |
| 80°-90°   | 48.9   | 0.6       |
| 90°-100°  | 69.5   | 0.8       |
| 100°-110° | 259.0  | 2.9       |
| 110°-120° | 686.8  | 7.8       |
| 120°-130° | 1139.1 | 12.9      |
| 130°-140° | 1209.9 | 13.7      |
| 140°-150° | 1124.5 | 12.7      |
| 150°-160° | 904.1  | 10.2      |
| 160°-170° | 582.6  | 6.6       |
| 170°-180° | 200.5  | 2.3       |
| 0°-30°    | 778.7  | 8.8       |
| 0°-40°    | 1249.2 | 14.2      |
| 0°-60°    | 2128.9 | 24.1      |
| 0°-90°    | 2652.1 | 30.0      |
| 90°-120°  | 1015.2 | 11.5      |
| 90°-150°  | 4488.7 | 50.8      |
| 90°-180°  | 6176.0 | 70.0      |
| 0°-180°   | 8828.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1041 | 1041  | 1041 | 1041  | 1041 |      |
| 5°   | 1041 | 1037  | 1026 | 1034  | 1032 | 99   |
| 15°  | 991  | 985   | 972  | 976   | 971  | 279  |
| 25°  | 897  | 889   | 872  | 874   | 872  | 413  |
| 35°  | 774  | 764   | 748  | 742   | 737  | 483  |
| 45°  | 630  | 623   | 608  | 597   | 592  | 486  |
| 55°  | 476  | 470   | 458  | 446   | 442  | 426  |
| 65°  | 321  | 315   | 305  | 296   | 291  | 318  |
| 75°  | 168  | 166   | 161  | 155   | 157  | 179  |
| 85°  | 41   | 40    | 39   | 36    | 35   | 46   |
| 90°  | 1    | 18    | 30   | 38    | 41   | 8    |
| 95°  | 99   | 49    | 59   | 67    | 66   | 117  |
| 105° | 463  | 509   | 93   | 110   | 116  | 495  |
| 115° | 876  | 902   | 940  | 235   | 125  | 863  |
| 125° | 1239 | 1259  | 1288 | 1299  | 1303 | 1105 |
| 135° | 1534 | 1558  | 1572 | 1587  | 1584 | 1185 |
| 145° | 1779 | 1777  | 1803 | 1814  | 1806 | 1113 |
| 155° | 1959 | 1945  | 1963 | 1972  | 1960 | 903  |
| 165° | 2064 | 2055  | 2059 | 2070  | 2059 | 583  |
| 175° | 2111 | 2100  | 2104 | 2114  | 2099 | 201  |
| 180° | 2107 | 2107  | 2107 | 2107  | 2107 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1040.9 | 1040.9 | 1040.9 | 1040.9 | 1040.9 |
| 2.5°   | 1047.0 | 1042.0 | 1030.9 | 1040.9 | 1039.0 |
| 5°     | 1040.9 | 1037.0 | 1025.9 | 1033.9 | 1032.0 |
| 7.5°   | 1033.9 | 1028.0 | 1016.9 | 1025.0 | 1023.0 |
| 10°    | 1023.0 | 1015.9 | 1004.0 | 1011.9 | 1009.0 |
| 12.5°  | 1007.9 | 1001.9 | 990.0  | 994.9  | 992.9  |
| 15°    | 990.9  | 985.0  | 971.9  | 975.9  | 970.9  |
| 17.5°  | 969.8  | 963.9  | 950.8  | 955.8  | 950.8  |
| 20°    | 946.8  | 940.8  | 926.8  | 929.8  | 925.9  |
| 22.5°  | 923.9  | 914.9  | 901.8  | 901.8  | 899.7  |
| 25°    | 896.8  | 888.9  | 871.8  | 873.8  | 871.8  |
| 27.5°  | 866.7  | 859.7  | 846.8  | 843.8  | 838.8  |
| 30°    | 836.8  | 828.8  | 813.8  | 810.7  | 806.7  |
| 32.5°  | 804.8  | 798.8  | 782.7  | 776.7  | 772.7  |
| 35°    | 773.7  | 763.7  | 747.7  | 741.6  | 736.6  |
| 37.5°  | 738.7  | 729.7  | 713.6  | 706.6  | 701.6  |
| 40°    | 702.7  | 694.6  | 678.6  | 669.7  | 665.7  |
| 42.5°  | 667.6  | 659.6  | 643.6  | 633.6  | 627.6  |
| 45°    | 629.6  | 622.6  | 607.5  | 596.6  | 592.5  |
| 47.5°  | 592.5  | 585.6  | 569.5  | 558.5  | 552.5  |
| 50°    | 553.5  | 548.5  | 534.5  | 520.5  | 515.5  |
| 52.5°  | 515.5  | 508.5  | 495.5  | 484.5  | 477.4  |
| 55°    | 476.5  | 470.5  | 458.4  | 446.5  | 441.5  |
| 57.5°  | 437.4  | 432.4  | 419.4  | 407.3  | 403.3  |
| 60°    | 398.3  | 394.4  | 380.4  | 369.3  | 366.4  |
| 62.5°  | 360.3  | 353.3  | 343.3  | 333.3  | 329.3  |
| 65°    | 321.4  | 315.3  | 305.3  | 296.3  | 291.3  |
| 67.5°  | 281.3  | 276.3  | 267.2  | 260.3  | 256.3  |
| 70°    | 244.2  | 240.2  | 231.2  | 224.2  | 220.3  |
| 72.5°  | 206.3  | 202.2  | 197.2  | 190.2  | 187.3  |
| 75°    | 168.1  | 166.2  | 161.1  | 155.2  | 157.2  |
| 77.5°  | 134.1  | 130.1  | 128.0  | 125.1  | 122.2  |
| 80°    | 100.1  | 99.1   | 97.0   | 94.1   | 92.1   |
| 82.5°  | 68.0   | 68.0   | 67.1   | 63.0   | 63.0   |
| 85°    | 41.0   | 40.0   | 39.1   | 36.0   | 35.0   |
| 87.5°  | 18.0   | 16.1   | 14.0   | 11.1   | 10.0   |
| 90°    | 1.4    | 18.3   | 30.4   | 38.2   | 41.1   |
| 92.5°  | 38.2   | 32.0   | 36.6   | 39.7   | 41.1   |
| 95°    | 99.0   | 48.7   | 59.4   | 67.1   | 65.5   |
| 97.5°  | 178.3  | 53.4   | 77.7   | 82.4   | 83.8   |
| 100°   | 269.9  | 61.0   | 86.9   | 99.0   | 102.1  |
| 102.5° | 370.3  | 367.5  | 90.0   | 106.6  | 111.3  |
| 105°   | 463.4  | 509.2  | 93.0   | 109.7  | 115.8  |
| 107.5° | 571.6  | 609.7  | 96.1   | 112.8  | 119.0  |
| 110°   | 675.4  | 707.2  | 266.8  | 114.4  | 120.4  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 772.9  | 800.2  | 774.4  | 117.3  | 122.0  |
| 115°   | 876.5  | 902.3  | 940.5  | 234.8  | 125.1  |
| 117.5° | 966.4  | 996.8  | 1022.9 | 804.8  | 405.5  |
| 120°   | 1067.0 | 1089.8 | 1117.4 | 1135.7 | 929.9  |
| 122.5° | 1152.3 | 1176.7 | 1207.4 | 1216.4 | 1218.0 |
| 125°   | 1239.2 | 1259.1 | 1288.1 | 1298.8 | 1303.2 |
| 127.5° | 1318.5 | 1339.8 | 1362.8 | 1378.0 | 1379.5 |
| 130°   | 1393.2 | 1417.6 | 1434.3 | 1451.2 | 1449.7 |
| 132.5° | 1469.4 | 1489.3 | 1506.0 | 1519.7 | 1518.3 |
| 135°   | 1533.5 | 1557.9 | 1571.6 | 1586.9 | 1583.9 |
| 137.5° | 1600.4 | 1618.8 | 1634.1 | 1649.4 | 1644.8 |
| 140°   | 1666.0 | 1678.3 | 1695.0 | 1708.7 | 1701.1 |
| 142.5° | 1721.0 | 1731.7 | 1751.4 | 1763.5 | 1756.0 |
| 145°   | 1779.0 | 1777.4 | 1803.2 | 1813.9 | 1806.3 |
| 147.5° | 1829.1 | 1824.6 | 1850.5 | 1858.1 | 1852.1 |
| 150°   | 1877.9 | 1867.3 | 1891.8 | 1900.8 | 1893.2 |
| 152.5° | 1919.0 | 1906.9 | 1929.8 | 1938.9 | 1928.3 |
| 155°   | 1958.7 | 1945.1 | 1963.4 | 1972.5 | 1960.3 |
| 157.5° | 1990.7 | 1978.6 | 1992.3 | 2003.0 | 1990.7 |
| 160°   | 2018.3 | 2009.0 | 2018.3 | 2027.3 | 2016.6 |
| 162.5° | 2042.6 | 2033.5 | 2041.0 | 2051.7 | 2038.0 |
| 165°   | 2063.9 | 2054.9 | 2059.3 | 2070.0 | 2059.3 |
| 167.5° | 2080.7 | 2071.4 | 2076.2 | 2086.9 | 2073.1 |
| 170°   | 2094.4 | 2085.3 | 2088.3 | 2099.0 | 2085.3 |
| 172.5° | 2103.5 | 2094.4 | 2097.6 | 2108.2 | 2094.4 |
| 175°   | 2111.1 | 2100.4 | 2103.5 | 2114.2 | 2099.0 |
| 177.5° | 2114.2 | 2103.5 | 2105.1 | 2115.9 | 2102.0 |
| 180°   | 2106.6 | 2106.6 | 2106.6 | 2106.6 | 2106.6 |

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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 | 5.67             | 6.38  | 6.78  | 7.48  | 9.01  | 5.24           | 5.95 | 6.35  | 7.05  | 8.58  |
|                 | 3H   | 7.31             | 7.94  | 8.43  | 9.06  | 10.61 | 6.84           | 7.48 | 7.96  | 8.59  | 10.14 |
|                 | 4H   | 7.89             | 8.49  | 9.02  | 9.60  | 11.16 | 7.42           | 8.02 | 8.55  | 9.13  | 10.69 |
|                 | 6H   | 8.27             | 8.83  | 9.41  | 9.94  | 11.51 | 7.80           | 8.36 | 8.94  | 9.47  | 11.04 |
|                 | 8H   | 8.37             | 8.90  | 9.51  | 10.03 | 11.59 | 7.90           | 8.43 | 9.04  | 9.56  | 11.12 |
|                 | 12H  | 8.41             | 8.91  | 9.55  | 10.04 | 11.62 | 7.93           | 8.43 | 9.08  | 9.56  | 11.14 |
| 4H              | 2H   | 6.11             | 6.71  | 7.25  | 7.83  | 9.38  | 5.77           | 6.37 | 6.90  | 7.48  | 9.04  |
|                 | 3H   | 7.95             | 8.45  | 9.10  | 9.60  | 11.16 | 7.56           | 8.06 | 8.71  | 9.21  | 10.77 |
|                 | 4H   | 8.65             | 9.12  | 9.80  | 10.25 | 11.83 | 8.25           | 8.71 | 9.40  | 9.85  | 11.43 |
|                 | 6H   | 9.15             | 9.55  | 10.31 | 10.70 | 12.28 | 8.75           | 9.14 | 9.90  | 10.30 | 11.87 |
|                 | 8H   | 9.30             | 9.66  | 10.45 | 10.81 | 12.40 | 8.89           | 9.26 | 10.04 | 10.40 | 11.99 |
|                 | 12H  | 9.36             | 9.69  | 10.53 | 10.85 | 12.45 | 8.94           | 9.28 | 10.11 | 10.43 | 12.03 |
| 8H              | 4H   | 8.84             | 9.20  | 9.99  | 10.35 | 11.94 | 8.48           | 8.85 | 9.63  | 9.99  | 11.58 |
|                 | 6H   | 9.45             | 9.76  | 10.62 | 10.94 | 12.53 | 9.09           | 9.40 | 10.26 | 10.58 | 12.17 |
|                 | 8H   | 9.66             | 9.93  | 10.84 | 11.10 | 12.71 | 9.30           | 9.57 | 10.48 | 10.73 | 12.34 |
|                 | 12H  | 9.78             | 10.02 | 10.96 | 11.18 | 12.82 | 9.40           | 9.64 | 10.59 | 10.80 | 12.44 |
| 12H             | 4H   | 8.81             | 9.15  | 9.98  | 10.30 | 11.90 | 8.46           | 8.80 | 9.63  | 9.95  | 11.55 |
|                 | 6H   | 9.48             | 9.74  | 10.66 | 10.91 | 12.52 | 9.13           | 9.40 | 10.31 | 10.56 | 12.17 |
|                 | 8H   | 9.71             | 9.94  | 10.89 | 11.10 | 12.75 | 9.35           | 9.59 | 10.53 | 10.75 | 12.39 |

END OF REPORT