

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: P921390

Luminaire Tested: DFN2DIP-4P4F0-030D080US940-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P921390  
REPORT IS A COMBINATION OF REPORTS P899139 AND P895967  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P4F0-030D080US940-FLLFLL  
Description: 4 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

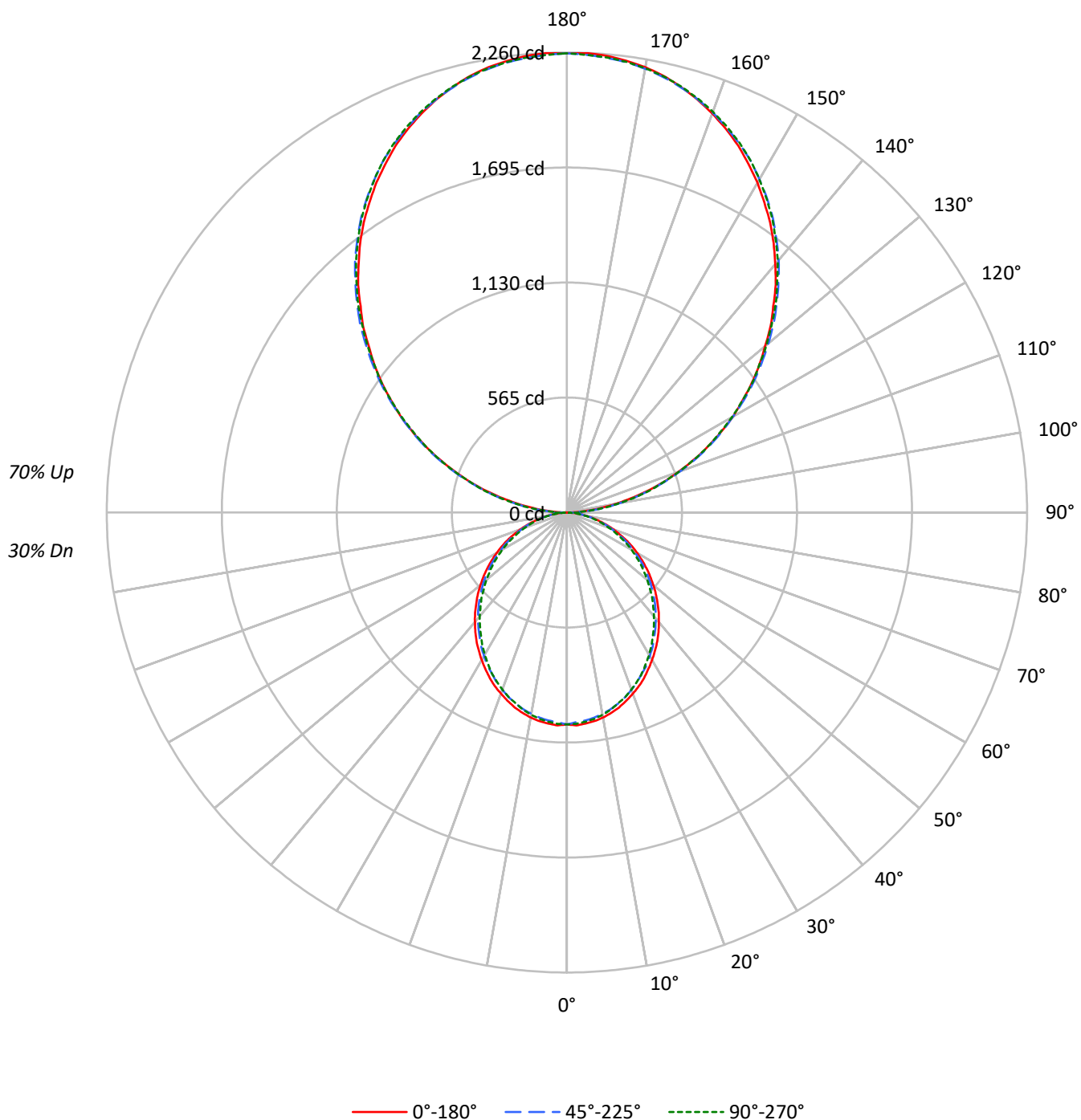
Lumens per Lamp: N/A  
Luminaire Lumens: 8961.7 lumens  
Efficiency: N/A  
Efficacy: 88.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 4.07' x L: 4.07' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 101.2  
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 | 37 | 37 | 37 |
| 1   | 93  | 89  | 85  | 82  | 83 | 80 | 77 | 74 | 63 | 61 | 59 | 47 | 46 | 45 | 33 | 32 | 32 |
| 2   | 85  | 78  | 72  | 67  | 76 | 70 | 65 | 61 | 55 | 52 | 49 | 42 | 39 | 37 | 29 | 28 | 27 |
| 3   | 77  | 68  | 61  | 56  | 69 | 61 | 55 | 51 | 49 | 44 | 41 | 37 | 34 | 32 | 26 | 24 | 23 |
| 4   | 71  | 60  | 53  | 47  | 63 | 54 | 48 | 43 | 43 | 38 | 35 | 33 | 30 | 27 | 23 | 21 | 19 |
| 5   | 65  | 54  | 46  | 40  | 58 | 48 | 42 | 37 | 38 | 34 | 30 | 29 | 26 | 23 | 21 | 19 | 17 |
| 6   | 60  | 48  | 40  | 34  | 53 | 43 | 37 | 32 | 35 | 30 | 26 | 26 | 23 | 20 | 19 | 17 | 15 |
| 7   | 55  | 43  | 35  | 30  | 49 | 39 | 32 | 28 | 31 | 26 | 23 | 24 | 20 | 18 | 17 | 15 | 13 |
| 8   | 51  | 39  | 32  | 26  | 46 | 35 | 29 | 24 | 28 | 24 | 20 | 22 | 18 | 16 | 16 | 13 | 12 |
| 9   | 47  | 35  | 28  | 23  | 42 | 32 | 26 | 22 | 26 | 21 | 18 | 20 | 17 | 14 | 14 | 12 | 11 |
| 10  | 44  | 32  | 25  | 21  | 40 | 29 | 23 | 19 | 24 | 19 | 16 | 18 | 15 | 13 | 13 | 11 | 10 |

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

|     | 0°  | 45° | 90° |
|-----|-----|-----|-----|
| 0°  | 675 | 675 | 675 |
| 5°  | 676 | 666 | 671 |
| 10° | 671 | 657 | 662 |
| 15° | 661 | 647 | 648 |
| 20° | 648 | 632 | 634 |
| 25° | 635 | 614 | 617 |
| 30° | 618 | 598 | 596 |
| 35° | 602 | 578 | 574 |
| 40° | 583 | 558 | 552 |
| 45° | 564 | 539 | 531 |
| 50° | 543 | 518 | 505 |
| 55° | 521 | 494 | 482 |
| 60° | 496 | 466 | 456 |
| 65° | 469 | 436 | 425 |
| 70° | 434 | 400 | 391 |
| 75° | 386 | 357 | 361 |
| 80° | 328 | 303 | 302 |
| 85° | 238 | 208 | 203 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1707 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  | 4.5       |
| 30°-40°   | 470.5  | 5.3       |
| 40°-50°   | 469.9  | 5.2       |
| 50°-60°   | 409.8  | 4.6       |
| 60°-70°   | 302.9  | 3.4       |
| 70°-80°   | 171.4  | 1.9       |
| 80°-90°   | 51.6   | 0.6       |
| 90°-100°  | 139.6  | 1.6       |
| 100°-110° | 443.6  | 4.9       |
| 110°-120° | 759.1  | 8.5       |
| 120°-130° | 998.3  | 11.1      |
| 130°-140° | 1120.6 | 12.5      |
| 140°-150° | 1098.9 | 12.3      |
| 150°-160° | 921.8  | 10.3      |
| 160°-170° | 611.3  | 6.8       |
| 170°-180° | 213.7  | 2.4       |
| 0°-30°    | 778.7  | 8.7       |
| 0°-40°    | 1249.2 | 13.9      |
| 0°-60°    | 2128.9 | 23.8      |
| 0°-90°    | 2654.8 | 29.6      |
| 90°-120°  | 1342.3 | 15.0      |
| 90°-150°  | 4560.1 | 50.9      |
| 90°-180°  | 6307.0 | 70.4      |
| 0°-180°   | 8961.7 | 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°  | 2    | 24    | 67   | 63    | 65   | 9    |
| 95°  | 99   | 118   | 122  | 122   | 118  | 111  |
| 105° | 410  | 415   | 419  | 422   | 422  | 432  |
| 115° | 762  | 773   | 769  | 767   | 762  | 753  |
| 125° | 1108 | 1125  | 1120 | 1113  | 1111 | 990  |
| 135° | 1433 | 1454  | 1458 | 1456  | 1451 | 1108 |
| 145° | 1740 | 1754  | 1764 | 1766  | 1759 | 1087 |
| 155° | 1990 | 1995  | 2001 | 2010  | 2004 | 916  |
| 165° | 2164 | 2162  | 2162 | 2176  | 2166 | 611  |
| 175° | 2252 | 2247  | 2242 | 2256  | 2244 | 214  |
| 180° | 2256 | 2256  | 2256 | 2256  | 2256 |      |

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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°    | 2.1    | 24.5   | 66.7   | 62.6   | 64.6   |
| 92.5°  | 42.2   | 57.2   | 59.2   | 61.2   | 61.2   |
| 95°    | 99.3   | 118.3  | 121.7  | 121.7  | 118.3  |
| 97.5°  | 165.3  | 183.0  | 190.5  | 190.5  | 190.5  |
| 100°   | 241.5  | 257.1  | 262.5  | 262.5  | 260.5  |
| 102.5° | 321.7  | 333.3  | 340.7  | 342.8  | 340.7  |
| 105°   | 409.5  | 414.9  | 419.0  | 422.4  | 422.4  |
| 107.5° | 496.5  | 504.7  | 504.7  | 506.0  | 496.5  |
| 110°   | 580.9  | 591.7  | 591.7  | 591.7  | 586.3  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 672.0  | 683.6  | 681.5  | 676.1  | 672.0  |
| 115°   | 761.8  | 772.7  | 769.3  | 767.2  | 761.8  |
| 117.5° | 850.9  | 865.9  | 856.3  | 850.9  | 845.4  |
| 120°   | 940.7  | 955.6  | 940.7  | 940.7  | 934.5  |
| 122.5° | 1022.3 | 1041.3 | 1031.8 | 1026.4 | 1022.3 |
| 125°   | 1108.0 | 1125.0 | 1119.5 | 1113.4 | 1111.4 |
| 127.5° | 1191.7 | 1212.7 | 1205.2 | 1197.1 | 1191.7 |
| 130°   | 1269.9 | 1294.3 | 1290.9 | 1286.9 | 1279.4 |
| 132.5° | 1357.6 | 1376.6 | 1378.0 | 1368.5 | 1363.1 |
| 135°   | 1433.1 | 1454.2 | 1458.3 | 1456.3 | 1450.8 |
| 137.5° | 1517.4 | 1534.5 | 1537.8 | 1536.5 | 1528.3 |
| 140°   | 1591.6 | 1608.6 | 1618.1 | 1618.1 | 1610.6 |
| 142.5° | 1667.8 | 1684.8 | 1690.2 | 1692.3 | 1684.8 |
| 145°   | 1739.9 | 1753.5 | 1764.3 | 1766.4 | 1758.9 |
| 147.5° | 1804.5 | 1821.5 | 1829.6 | 1833.1 | 1825.6 |
| 150°   | 1871.2 | 1882.7 | 1890.2 | 1896.3 | 1890.2 |
| 152.5° | 1930.3 | 1941.9 | 1951.4 | 1958.9 | 1951.4 |
| 155°   | 1989.5 | 1994.9 | 2001.1 | 2010.5 | 2004.5 |
| 157.5° | 2040.5 | 2044.6 | 2048.0 | 2061.5 | 2052.1 |
| 160°   | 2086.1 | 2090.2 | 2092.2 | 2103.7 | 2095.6 |
| 162.5° | 2128.2 | 2128.2 | 2130.3 | 2143.2 | 2133.7 |
| 165°   | 2164.3 | 2162.2 | 2162.2 | 2175.9 | 2166.3 |
| 167.5° | 2196.9 | 2190.8 | 2190.8 | 2204.4 | 2194.9 |
| 170°   | 2221.4 | 2216.0 | 2213.9 | 2227.6 | 2216.0 |
| 172.5° | 2238.5 | 2233.0 | 2231.0 | 2244.5 | 2233.0 |
| 175°   | 2252.0 | 2246.6 | 2242.5 | 2256.1 | 2244.5 |
| 177.5° | 2259.5 | 2254.1 | 2250.0 | 2261.6 | 2250.0 |
| 180°   | 2256.1 | 2256.1 | 2256.1 | 2256.1 | 2256.1 |

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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 | 3.66             | 4.36 | 4.77 | 5.47 | 7.01  | 3.21           | 3.92 | 4.33 | 5.03 | 6.56  |
|                 | 3H   | 5.31             | 5.94 | 6.43 | 7.06 | 8.61  | 4.82           | 5.45 | 5.94 | 6.57 | 8.12  |
|                 | 4H   | 5.90             | 6.49 | 7.03 | 7.61 | 9.17  | 5.40           | 6.00 | 6.53 | 7.12 | 8.68  |
|                 | 6H   | 6.29             | 6.84 | 7.43 | 7.96 | 9.53  | 5.79           | 6.34 | 6.93 | 7.46 | 9.03  |
|                 | 8H   | 6.39             | 6.92 | 7.54 | 8.05 | 9.62  | 5.89           | 6.42 | 7.04 | 7.55 | 9.11  |
|                 | 12H  | 6.44             | 6.94 | 7.59 | 8.07 | 9.65  | 5.93           | 6.43 | 7.08 | 7.56 | 9.14  |
| 4H              | 2H   | 4.10             | 4.70 | 5.24 | 5.82 | 7.37  | 3.75           | 4.34 | 4.89 | 5.46 | 7.02  |
|                 | 3H   | 5.96             | 6.46 | 7.10 | 7.60 | 9.17  | 5.55           | 6.05 | 6.70 | 7.19 | 8.76  |
|                 | 4H   | 6.67             | 7.13 | 7.82 | 8.26 | 9.85  | 6.25           | 6.71 | 7.40 | 7.84 | 9.43  |
|                 | 6H   | 7.18             | 7.58 | 8.34 | 8.73 | 10.31 | 6.75           | 7.14 | 7.90 | 8.30 | 9.88  |
|                 | 8H   | 7.33             | 7.70 | 8.48 | 8.85 | 10.44 | 6.89           | 7.26 | 8.05 | 8.41 | 10.01 |
|                 | 12H  | 7.40             | 7.73 | 8.57 | 8.89 | 10.49 | 6.95           | 7.28 | 8.12 | 8.44 | 10.04 |
| 8H              | 4H   | 6.86             | 7.22 | 8.01 | 8.37 | 9.97  | 6.48           | 6.85 | 7.63 | 7.99 | 9.59  |
|                 | 6H   | 7.49             | 7.79 | 8.66 | 8.98 | 10.57 | 7.10           | 7.41 | 8.28 | 8.60 | 10.19 |
|                 | 8H   | 7.71             | 7.97 | 8.89 | 9.14 | 10.75 | 7.32           | 7.58 | 8.50 | 8.75 | 10.36 |
|                 | 12H  | 7.84             | 8.07 | 9.02 | 9.23 | 10.88 | 7.43           | 7.66 | 8.61 | 8.82 | 10.47 |
| 12H             | 4H   | 6.83             | 7.17 | 8.00 | 8.33 | 9.93  | 6.47           | 6.80 | 7.64 | 7.96 | 9.56  |
|                 | 6H   | 7.52             | 7.78 | 8.69 | 8.95 | 10.56 | 7.14           | 7.41 | 8.32 | 8.58 | 10.19 |
|                 | 8H   | 7.75             | 7.99 | 8.94 | 9.15 | 10.80 | 7.37           | 7.61 | 8.56 | 8.77 | 10.42 |

END OF REPORT