

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: P916336

Luminaire Tested: DFN2DIP-HX4F0-040D090US930-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P916336  
REPORT IS A COMBINATION OF REPORTS P899389 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-040D090US930-FLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

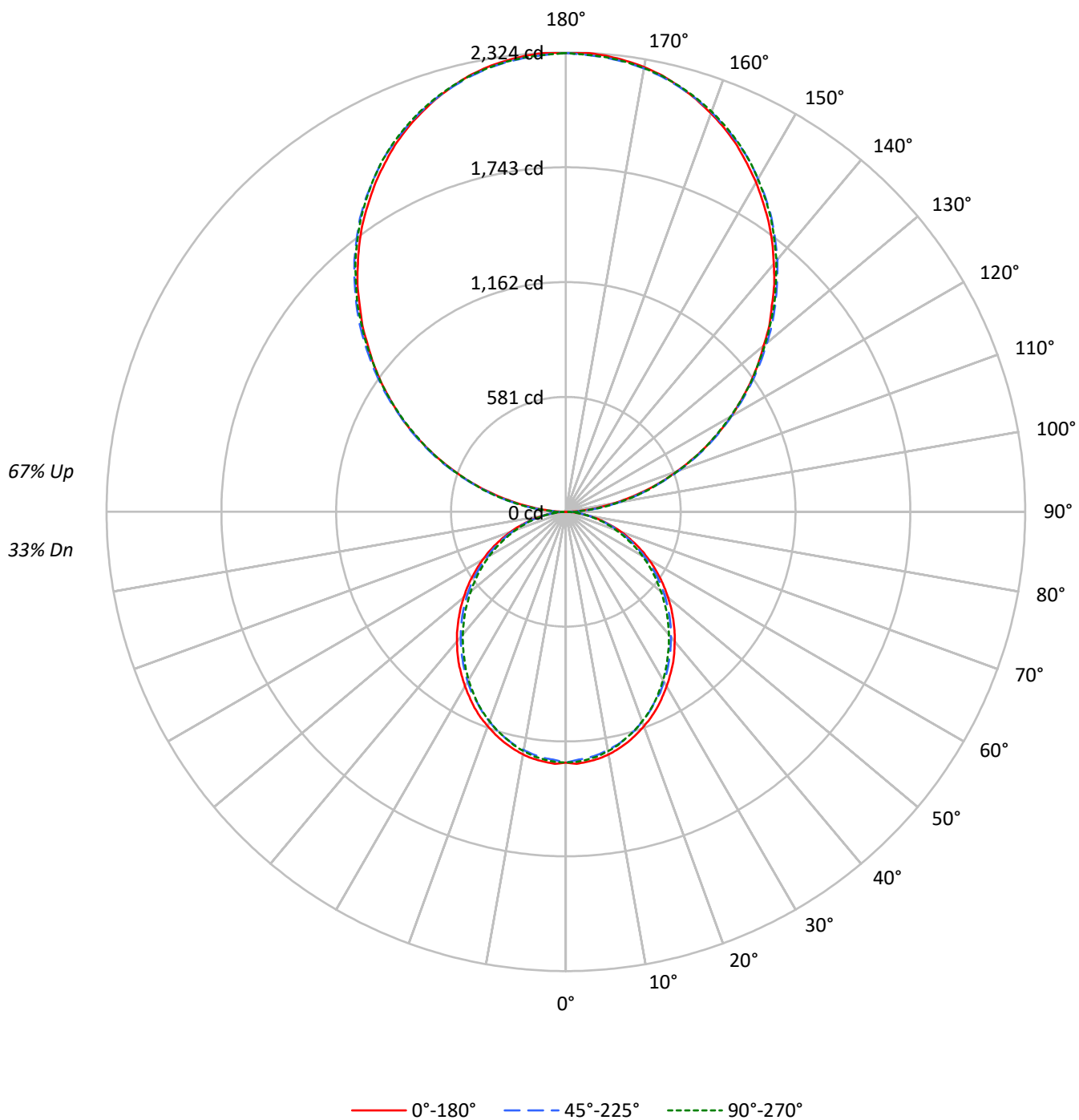
Lumens per Lamp: N/A  
Luminaire Lumens: 9722.4 lumens  
Efficiency: N/A  
Efficacy: 115.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 84.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9977  
Total Harmonic Distortion (THDi): 0.049  
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



TEST NUMBER: P916336

CATALOG NUMBER: DFN2DIP-HX4F0-040D090US930-FLLFL

**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   | 103 | 103 | 103 | 103 | 93 | 93 | 93 | 93 | 74 | 74 | 74 | 57 | 57 | 57 | 41 | 41 | 41 |
| 1   | 94  | 90  | 86  | 83  | 85 | 81 | 78 | 75 | 65 | 63 | 61 | 50 | 48 | 47 | 36 | 35 | 34 |
| 2   | 86  | 78  | 72  | 67  | 77 | 71 | 66 | 62 | 57 | 53 | 50 | 44 | 41 | 39 | 32 | 30 | 29 |
| 3   | 78  | 69  | 62  | 56  | 70 | 62 | 56 | 51 | 50 | 46 | 42 | 39 | 36 | 33 | 28 | 26 | 25 |
| 4   | 71  | 61  | 53  | 47  | 64 | 55 | 49 | 43 | 44 | 40 | 36 | 34 | 31 | 28 | 25 | 23 | 21 |
| 5   | 65  | 54  | 46  | 40  | 59 | 49 | 42 | 37 | 40 | 35 | 31 | 31 | 27 | 25 | 23 | 20 | 18 |
| 6   | 60  | 48  | 41  | 35  | 54 | 44 | 37 | 32 | 36 | 31 | 27 | 28 | 24 | 21 | 20 | 18 | 16 |
| 7   | 56  | 44  | 36  | 30  | 50 | 40 | 33 | 28 | 32 | 27 | 23 | 25 | 22 | 19 | 19 | 16 | 14 |
| 8   | 51  | 39  | 32  | 27  | 46 | 36 | 29 | 25 | 29 | 24 | 21 | 23 | 19 | 17 | 17 | 15 | 13 |
| 9   | 48  | 36  | 29  | 24  | 43 | 33 | 26 | 22 | 27 | 22 | 18 | 21 | 18 | 15 | 16 | 13 | 12 |
| 10  | 45  | 33  | 26  | 21  | 40 | 30 | 24 | 20 | 25 | 20 | 17 | 19 | 16 | 14 | 15 | 12 | 11 |

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

|     | 0°  | 45° | 90° |
|-----|-----|-----|-----|
| 0°  | 944 | 944 | 944 |
| 5°  | 945 | 930 | 937 |
| 10° | 938 | 918 | 924 |
| 15° | 924 | 903 | 904 |
| 20° | 905 | 882 | 884 |
| 25° | 887 | 857 | 861 |
| 30° | 864 | 834 | 831 |
| 35° | 842 | 806 | 799 |
| 40° | 815 | 779 | 769 |
| 45° | 788 | 751 | 739 |
| 50° | 758 | 722 | 703 |
| 55° | 728 | 688 | 671 |
| 60° | 693 | 648 | 633 |
| 65° | 655 | 606 | 589 |
| 70° | 606 | 556 | 542 |
| 75° | 540 | 495 | 498 |
| 80° | 459 | 418 | 414 |
| 85° | 333 | 285 | 275 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1748 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 119.4  | 1.2       |
| 10°-20°   | 336.0  | 3.5       |
| 20°-30°   | 493.8  | 5.1       |
| 30°-40°   | 573.6  | 5.9       |
| 40°-50°   | 572.9  | 5.9       |
| 50°-60°   | 499.5  | 5.1       |
| 60°-70°   | 369.3  | 3.8       |
| 70°-80°   | 208.9  | 2.1       |
| 80°-90°   | 61.7   | 0.6       |
| 90°-100°  | 143.6  | 1.5       |
| 100°-110° | 456.3  | 4.7       |
| 110°-120° | 780.8  | 8.0       |
| 120°-130° | 1026.9 | 10.6      |
| 130°-140° | 1152.6 | 11.9      |
| 140°-150° | 1130.3 | 11.6      |
| 150°-160° | 948.2  | 9.8       |
| 160°-170° | 628.8  | 6.5       |
| 170°-180° | 219.8  | 2.3       |
| 0°-30°    | 949.3  | 9.8       |
| 0°-40°    | 1522.9 | 15.7      |
| 0°-60°    | 2595.3 | 26.7      |
| 0°-90°    | 3235.2 | 33.3      |
| 90°-120°  | 1380.7 | 14.2      |
| 90°-150°  | 4690.5 | 48.2      |
| 90°-180°  | 6487.0 | 66.7      |
| 0°-180°   | 9722.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1269 | 1269  | 1269 | 1269  | 1269 |      |
| 5°   | 1269 | 1264  | 1251 | 1260  | 1258 | 120  |
| 15°  | 1208 | 1201  | 1185 | 1190  | 1184 | 340  |
| 25°  | 1093 | 1084  | 1063 | 1065  | 1063 | 503  |
| 35°  | 943  | 931   | 912  | 904   | 898  | 589  |
| 45°  | 768  | 759   | 741  | 727   | 722  | 592  |
| 55°  | 581  | 574   | 559  | 544   | 538  | 519  |
| 65°  | 392  | 384   | 372  | 361   | 355  | 387  |
| 75°  | 205  | 203   | 196  | 189   | 192  | 219  |
| 85°  | 50   | 49    | 48   | 44    | 43   | 56   |
| 90°  | 2    | 25    | 69   | 64    | 66   | 10   |
| 95°  | 102  | 122   | 125  | 125   | 122  | 114  |
| 105° | 421  | 427   | 431  | 434   | 434  | 444  |
| 115° | 784  | 795   | 791  | 789   | 784  | 775  |
| 125° | 1140 | 1157  | 1152 | 1145  | 1143 | 1018 |
| 135° | 1474 | 1496  | 1500 | 1498  | 1492 | 1139 |
| 145° | 1790 | 1804  | 1815 | 1817  | 1809 | 1118 |
| 155° | 2046 | 2052  | 2058 | 2068  | 2062 | 942  |
| 165° | 2226 | 2224  | 2224 | 2238  | 2228 | 628  |
| 175° | 2316 | 2311  | 2307 | 2321  | 2309 | 220  |
| 180° | 2321 | 2321  | 2321 | 2321  | 2321 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1268.9 | 1268.9 | 1268.9 | 1268.9 | 1268.9 |
| 2.5°   | 1276.3 | 1270.2 | 1256.8 | 1268.9 | 1266.6 |
| 5°     | 1268.9 | 1264.1 | 1250.7 | 1260.4 | 1258.1 |
| 7.5°   | 1260.4 | 1253.1 | 1239.7 | 1249.5 | 1247.1 |
| 10°    | 1247.1 | 1238.5 | 1223.9 | 1233.6 | 1230.0 |
| 12.5°  | 1228.7 | 1221.4 | 1206.8 | 1212.9 | 1210.4 |
| 15°    | 1207.9 | 1200.7 | 1184.8 | 1189.7 | 1183.6 |
| 17.5°  | 1182.3 | 1175.1 | 1159.2 | 1165.2 | 1159.2 |
| 20°    | 1154.2 | 1147.0 | 1129.9 | 1133.5 | 1128.8 |
| 22.5°  | 1126.3 | 1115.2 | 1099.3 | 1099.3 | 1096.9 |
| 25°    | 1093.2 | 1083.5 | 1062.8 | 1065.2 | 1062.8 |
| 27.5°  | 1056.6 | 1048.1 | 1032.3 | 1028.7 | 1022.6 |
| 30°    | 1020.1 | 1010.3 | 992.1  | 988.4  | 983.5  |
| 32.5°  | 981.0  | 973.8  | 954.2  | 946.9  | 941.9  |
| 35°    | 943.2  | 931.1  | 911.5  | 904.2  | 898.1  |
| 37.5°  | 900.5  | 889.5  | 869.9  | 861.4  | 855.3  |
| 40°    | 856.6  | 846.8  | 827.2  | 816.4  | 811.5  |
| 42.5°  | 813.9  | 804.0  | 784.6  | 772.3  | 765.1  |
| 45°    | 767.5  | 759.0  | 740.6  | 727.3  | 722.4  |
| 47.5°  | 722.4  | 713.8  | 694.3  | 680.9  | 673.6  |
| 50°    | 674.7  | 668.6  | 651.6  | 634.5  | 628.4  |
| 52.5°  | 628.4  | 619.9  | 604.1  | 590.6  | 582.0  |
| 55°    | 580.9  | 573.5  | 558.9  | 544.2  | 538.2  |
| 57.5°  | 533.2  | 527.2  | 511.2  | 496.6  | 491.7  |
| 60°    | 485.6  | 480.8  | 463.7  | 450.3  | 446.6  |
| 62.5°  | 439.3  | 430.7  | 418.6  | 406.3  | 401.5  |
| 65°    | 391.8  | 384.3  | 372.2  | 361.2  | 355.1  |
| 67.5°  | 342.9  | 336.7  | 325.9  | 317.3  | 312.4  |
| 70°    | 297.7  | 292.9  | 281.8  | 273.3  | 268.5  |
| 72.5°  | 251.4  | 246.5  | 240.4  | 231.9  | 228.2  |
| 75°    | 205.0  | 202.6  | 196.4  | 189.1  | 191.6  |
| 77.5°  | 163.5  | 158.6  | 156.1  | 152.5  | 148.9  |
| 80°    | 122.1  | 120.7  | 118.3  | 114.7  | 112.3  |
| 82.5°  | 83.0   | 83.0   | 81.9   | 76.9   | 76.9   |
| 85°    | 50.0   | 48.8   | 47.6   | 43.9   | 42.7   |
| 87.5°  | 22.0   | 19.6   | 17.1   | 13.5   | 12.1   |
| 90°    | 2.1    | 25.2   | 68.6   | 64.3   | 66.4   |
| 92.5°  | 43.4   | 58.8   | 60.9   | 62.9   | 62.9   |
| 95°    | 102.2  | 121.7  | 125.2  | 125.2  | 121.7  |
| 97.5°  | 170.0  | 188.2  | 195.9  | 195.9  | 195.9  |
| 100°   | 248.3  | 264.5  | 270.0  | 270.0  | 268.0  |
| 102.5° | 330.9  | 342.8  | 350.5  | 352.6  | 350.5  |
| 105°   | 421.2  | 426.7  | 431.0  | 434.5  | 434.5  |
| 107.5° | 510.7  | 519.1  | 519.1  | 520.5  | 510.7  |
| 110°   | 597.5  | 608.7  | 608.7  | 608.7  | 603.1  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 691.2  | 703.1  | 701.0  | 695.4  | 691.2  |
| 115°   | 783.6  | 794.8  | 791.2  | 789.2  | 783.6  |
| 117.5° | 875.2  | 890.6  | 880.8  | 875.2  | 869.6  |
| 120°   | 967.6  | 982.9  | 967.6  | 967.6  | 961.2  |
| 122.5° | 1051.5 | 1071.1 | 1061.4 | 1055.7 | 1051.5 |
| 125°   | 1139.7 | 1157.2 | 1151.6 | 1145.2 | 1143.2 |
| 127.5° | 1225.7 | 1247.4 | 1239.7 | 1231.3 | 1225.7 |
| 130°   | 1306.2 | 1331.4 | 1327.9 | 1323.6 | 1316.0 |
| 132.5° | 1396.4 | 1416.0 | 1417.4 | 1407.6 | 1402.1 |
| 135°   | 1474.1 | 1495.7 | 1500.0 | 1497.9 | 1492.3 |
| 137.5° | 1560.8 | 1578.3 | 1581.8 | 1580.5 | 1572.1 |
| 140°   | 1637.1 | 1654.6 | 1664.3 | 1664.3 | 1656.7 |
| 142.5° | 1715.5 | 1732.9 | 1738.5 | 1740.7 | 1732.9 |
| 145°   | 1789.7 | 1803.6 | 1814.8 | 1816.9 | 1809.2 |
| 147.5° | 1856.1 | 1873.6 | 1882.0 | 1885.5 | 1877.8 |
| 150°   | 1924.7 | 1936.6 | 1944.2 | 1950.5 | 1944.2 |
| 152.5° | 1985.5 | 1997.4 | 2007.2 | 2014.9 | 2007.2 |
| 155°   | 2046.4 | 2051.9 | 2058.3 | 2068.1 | 2061.8 |
| 157.5° | 2098.8 | 2103.1 | 2106.6 | 2120.5 | 2110.7 |
| 160°   | 2145.7 | 2149.9 | 2152.1 | 2163.9 | 2155.5 |
| 162.5° | 2189.1 | 2189.1 | 2191.2 | 2204.5 | 2194.7 |
| 165°   | 2226.2 | 2224.1 | 2224.1 | 2238.1 | 2228.3 |
| 167.5° | 2259.8 | 2253.5 | 2253.5 | 2267.4 | 2257.6 |
| 170°   | 2285.0 | 2279.3 | 2277.3 | 2291.2 | 2279.3 |
| 172.5° | 2302.4 | 2296.9 | 2294.7 | 2308.8 | 2296.9 |
| 175°   | 2316.4 | 2310.8 | 2306.6 | 2320.7 | 2308.8 |
| 177.5° | 2324.1 | 2318.5 | 2314.3 | 2326.2 | 2314.3 |
| 180°   | 2320.7 | 2320.7 | 2320.7 | 2320.7 | 2320.7 |

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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 | 5.28             | 6.01 | 6.37  | 7.10  | 8.59  | 4.85           | 5.58 | 5.94  | 6.67  | 8.16  |
|                 | 3H   | 6.93             | 7.59 | 8.03  | 8.68  | 10.19 | 6.46           | 7.11 | 7.56  | 8.21  | 9.72  |
|                 | 4H   | 7.52             | 8.14 | 8.62  | 9.23  | 10.75 | 7.04           | 7.66 | 8.15  | 8.76  | 10.27 |
|                 | 6H   | 7.91             | 8.48 | 9.03  | 9.58  | 11.11 | 7.43           | 8.00 | 8.55  | 9.10  | 10.63 |
|                 | 8H   | 8.01             | 8.55 | 9.13  | 9.67  | 11.19 | 7.54           | 8.08 | 8.66  | 9.19  | 10.71 |
|                 | 12H  | 8.06             | 8.57 | 9.18  | 9.68  | 11.22 | 7.57           | 8.09 | 8.70  | 9.20  | 10.74 |
| 4H              | 2H   | 5.73             | 6.35 | 6.84  | 7.45  | 8.96  | 5.38           | 6.00 | 6.50  | 7.10  | 8.62  |
|                 | 3H   | 7.58             | 8.10 | 8.71  | 9.22  | 10.75 | 7.19           | 7.71 | 8.31  | 8.83  | 10.36 |
|                 | 4H   | 8.29             | 8.77 | 9.42  | 9.88  | 11.43 | 7.89           | 8.36 | 9.01  | 9.48  | 11.02 |
|                 | 6H   | 8.80             | 9.21 | 9.93  | 10.35 | 11.88 | 8.39           | 8.80 | 9.52  | 9.94  | 11.47 |
|                 | 8H   | 8.95             | 9.33 | 10.08 | 10.46 | 12.01 | 8.54           | 8.92 | 9.67  | 10.04 | 11.60 |
|                 | 12H  | 9.02             | 9.36 | 10.16 | 10.50 | 12.06 | 8.59           | 8.94 | 9.74  | 10.08 | 11.64 |
| 8H              | 4H   | 8.48             | 8.86 | 9.61  | 9.99  | 11.54 | 8.12           | 8.50 | 9.25  | 9.63  | 11.18 |
|                 | 6H   | 9.11             | 9.42 | 10.26 | 10.59 | 12.14 | 8.74           | 9.06 | 9.90  | 10.23 | 11.78 |
|                 | 8H   | 9.33             | 9.60 | 10.49 | 10.75 | 12.32 | 8.96           | 9.23 | 10.12 | 10.38 | 11.95 |
|                 | 12H  | 9.45             | 9.69 | 10.62 | 10.84 | 12.45 | 9.07           | 9.31 | 10.23 | 10.46 | 12.06 |
| 12H             | 4H   | 8.46             | 8.80 | 9.61  | 9.94  | 11.50 | 8.11           | 8.45 | 9.26  | 9.59  | 11.15 |
|                 | 6H   | 9.14             | 9.41 | 10.29 | 10.56 | 12.13 | 8.78           | 9.06 | 9.94  | 10.21 | 11.78 |
|                 | 8H   | 9.37             | 9.61 | 10.54 | 10.76 | 12.37 | 9.01           | 9.26 | 10.18 | 10.40 | 12.01 |

END OF REPORT