

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: P921835

Luminaire Tested: DFN2DIP-HX4F0-060D120US940-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P921835  
REPORT IS A COMBINATION OF REPORTS P899448 AND P896188  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-060D120US940-RLLFLL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

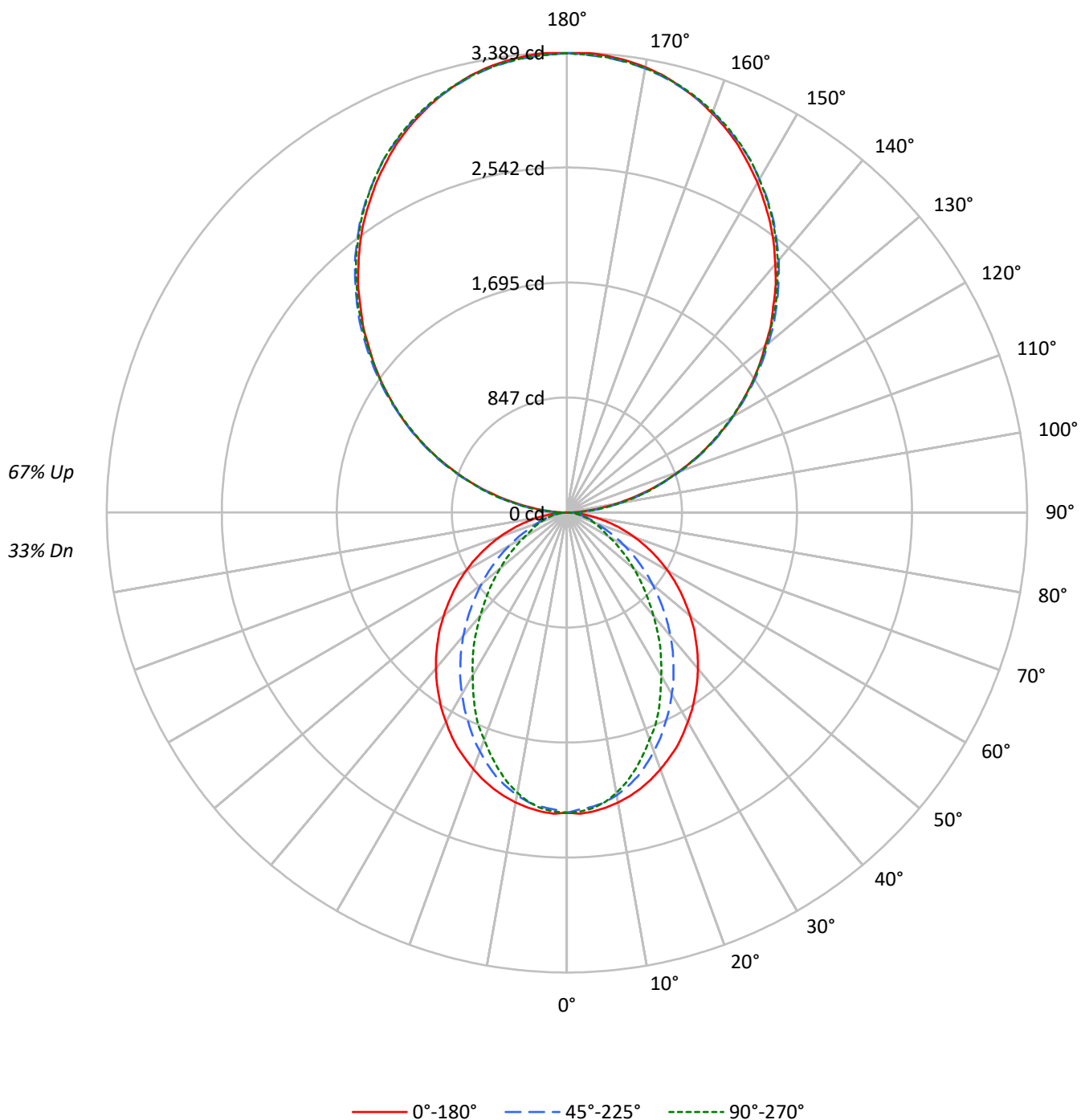
Lumens per Lamp: N/A  
Luminaire Lumens: 14017.7 lumens  
Efficiency: N/A  
Efficacy: 110.0 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 127.4  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.099  
Total Harmonic Distortion (THDi): 0.979  
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: P921835

CATALOG NUMBER: DFN2DIP-HX4F0-060D120US940-RLLFLL

**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 | 56 | 56 | 56 | 40 | 40 | 40 |
| 1   | 94  | 90  | 86  | 83  | 85 | 81 | 78 | 75 | 65 | 63 | 61 | 50 | 48 | 47 | 36 | 35 | 34 |
| 2   | 86  | 79  | 73  | 68  | 77 | 71 | 67 | 62 | 57 | 54 | 51 | 44 | 42 | 40 | 32 | 31 | 29 |
| 3   | 79  | 70  | 63  | 57  | 71 | 63 | 57 | 52 | 51 | 46 | 43 | 39 | 36 | 34 | 29 | 27 | 25 |
| 4   | 72  | 62  | 54  | 49  | 65 | 56 | 50 | 45 | 45 | 41 | 37 | 35 | 32 | 29 | 26 | 24 | 22 |
| 5   | 66  | 55  | 47  | 42  | 59 | 50 | 43 | 38 | 40 | 36 | 32 | 32 | 28 | 26 | 23 | 21 | 19 |
| 6   | 61  | 49  | 42  | 36  | 55 | 45 | 38 | 33 | 36 | 32 | 28 | 29 | 25 | 23 | 21 | 19 | 17 |
| 7   | 56  | 45  | 37  | 32  | 51 | 41 | 34 | 29 | 33 | 28 | 25 | 26 | 23 | 20 | 19 | 17 | 15 |
| 8   | 52  | 40  | 33  | 28  | 47 | 37 | 30 | 26 | 30 | 25 | 22 | 24 | 20 | 18 | 18 | 16 | 14 |
| 9   | 49  | 37  | 30  | 25  | 44 | 34 | 27 | 23 | 28 | 23 | 20 | 22 | 19 | 16 | 17 | 14 | 13 |
| 10  | 45  | 34  | 27  | 22  | 41 | 31 | 25 | 21 | 25 | 21 | 18 | 20 | 17 | 15 | 15 | 13 | 11 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1644 | 1644 | 1644 |
| 5°  | 1647 | 1618 | 1629 |
| 10° | 1631 | 1587 | 1576 |
| 15° | 1608 | 1534 | 1494 |
| 20° | 1579 | 1462 | 1393 |
| 25° | 1549 | 1381 | 1296 |
| 30° | 1508 | 1298 | 1173 |
| 35° | 1468 | 1209 | 1065 |
| 40° | 1427 | 1117 | 941  |
| 45° | 1380 | 1014 | 829  |
| 50° | 1332 | 911  | 719  |
| 55° | 1281 | 800  | 613  |
| 60° | 1222 | 685  | 505  |
| 65° | 1154 | 567  | 455  |
| 70° | 1072 | 458  | 412  |
| 75° | 969  | 404  | 375  |
| 80° | 820  | 339  | 325  |
| 85° | 573  | 227  | 245  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2551 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 207.2   | 1.5       |
| 10°-20°   | 568.9   | 4.1       |
| 20°-30°   | 798.7   | 5.7       |
| 30°-40°   | 870.7   | 6.2       |
| 40°-50°   | 800.3   | 5.7       |
| 50°-60°   | 628.5   | 4.5       |
| 60°-70°   | 409.1   | 2.9       |
| 70°-80°   | 210.6   | 1.5       |
| 80°-90°   | 63.4    | 0.5       |
| 90°-100°  | 209.4   | 1.5       |
| 100°-110° | 665.4   | 4.7       |
| 110°-120° | 1138.7  | 8.1       |
| 120°-130° | 1497.5  | 10.7      |
| 130°-140° | 1680.9  | 12.0      |
| 140°-150° | 1648.3  | 11.8      |
| 150°-160° | 1382.7  | 9.9       |
| 160°-170° | 917.0   | 6.5       |
| 170°-180° | 320.5   | 2.3       |
| 0°-30°    | 1574.9  | 11.2      |
| 0°-40°    | 2445.6  | 17.4      |
| 0°-60°    | 3874.3  | 27.6      |
| 0°-90°    | 4557.3  | 32.5      |
| 90°-120°  | 2013.4  | 14.4      |
| 90°-150°  | 6840.1  | 48.8      |
| 90°-180°  | 9460.0  | 67.5      |
| 0°-180°   | 14017.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2211 | 2211  | 2211 | 2211  | 2211 |      |
| 5°   | 2211 | 2201  | 2175 | 2193  | 2187 | 210  |
| 15°  | 2103 | 2081  | 2013 | 1975  | 1955 | 593  |
| 25°  | 1909 | 1845  | 1713 | 1631  | 1601 | 878  |
| 35°  | 1645 | 1543  | 1367 | 1241  | 1197 | 1030 |
| 45°  | 1345 | 1211  | 1001 | 858   | 810  | 1039 |
| 55°  | 1022 | 866   | 650  | 530   | 492  | 914  |
| 65°  | 690  | 528   | 348  | 280   | 274  | 685  |
| 75°  | 368  | 228   | 160  | 146   | 144  | 389  |
| 85°  | 86   | 44    | 38   | 38    | 38   | 99   |
| 90°  | 3    | 37    | 100  | 94    | 97   | 14   |
| 95°  | 149  | 178   | 183  | 183   | 178  | 166  |
| 105° | 614  | 622   | 628  | 634   | 634  | 648  |
| 115° | 1143 | 1159  | 1154 | 1151  | 1143 | 1130 |
| 125° | 1662 | 1688  | 1679 | 1670  | 1667 | 1485 |
| 135° | 2150 | 2181  | 2188 | 2184  | 2176 | 1662 |
| 145° | 2610 | 2630  | 2646 | 2650  | 2638 | 1631 |
| 155° | 2984 | 2992  | 3002 | 3016  | 3007 | 1374 |
| 165° | 3246 | 3243  | 3243 | 3264  | 3250 | 916  |
| 175° | 3378 | 3370  | 3364 | 3384  | 3367 | 321  |
| 180° | 3384 | 3384  | 3384 | 3384  | 3384 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2211.3 | 2211.3 | 2211.3 | 2211.3 | 2211.3 |
| 2.5°   | 2221.3 | 2211.3 | 2189.1 | 2209.3 | 2205.3 |
| 5°     | 2211.3 | 2201.3 | 2175.1 | 2193.3 | 2187.3 |
| 7.5°   | 2193.3 | 2181.3 | 2153.3 | 2161.1 | 2151.2 |
| 10°    | 2169.2 | 2155.2 | 2115.3 | 2109.2 | 2097.2 |
| 12.5°  | 2139.3 | 2121.2 | 2067.1 | 2055.2 | 2033.1 |
| 15°    | 2103.2 | 2081.1 | 2013.1 | 1975.1 | 1955.2 |
| 17.5°  | 2061.2 | 2029.1 | 1945.0 | 1901.0 | 1869.0 |
| 20°    | 2013.1 | 1973.0 | 1873.0 | 1823.1 | 1779.0 |
| 22.5°  | 1961.1 | 1915.0 | 1798.9 | 1731.0 | 1701.0 |
| 25°    | 1909.2 | 1845.0 | 1713.0 | 1631.0 | 1600.9 |
| 27.5°  | 1847.2 | 1779.0 | 1632.9 | 1538.8 | 1492.8 |
| 30°    | 1781.1 | 1704.9 | 1544.8 | 1442.9 | 1388.7 |
| 32.5°  | 1717.0 | 1624.9 | 1461.0 | 1340.8 | 1290.7 |
| 35°    | 1645.0 | 1542.9 | 1366.9 | 1240.7 | 1196.6 |
| 37.5°  | 1574.9 | 1464.7 | 1278.8 | 1140.6 | 1090.7 |
| 40°    | 1500.8 | 1380.9 | 1186.6 | 1044.5 | 992.6  |
| 42.5°  | 1424.9 | 1296.8 | 1094.7 | 946.5  | 896.6  |
| 45°    | 1344.8 | 1210.6 | 1000.7 | 858.4  | 810.4  |
| 47.5°  | 1268.8 | 1126.8 | 910.6  | 768.4  | 724.4  |
| 50°    | 1184.7 | 1042.7 | 822.5  | 684.3  | 642.5  |
| 52.5°  | 1102.5 | 952.4  | 738.4  | 606.4  | 568.4  |
| 55°    | 1022.5 | 866.5  | 650.3  | 530.4  | 492.3  |
| 57.5°  | 940.6  | 780.4  | 572.4  | 460.3  | 428.2  |
| 60°    | 856.5  | 696.4  | 490.3  | 388.3  | 356.2  |
| 62.5°  | 774.5  | 614.5  | 420.2  | 324.2  | 308.3  |
| 65°    | 690.5  | 528.2  | 348.2  | 280.3  | 274.1  |
| 67.5°  | 610.4  | 448.2  | 280.3  | 246.1  | 240.1  |
| 70°    | 526.3  | 370.2  | 232.0  | 212.1  | 204.0  |
| 72.5°  | 446.3  | 298.1  | 194.0  | 178.2  | 174.1  |
| 75°    | 368.2  | 228.0  | 160.1  | 146.1  | 144.2  |
| 77.5°  | 290.3  | 162.0  | 126.1  | 118.1  | 114.0  |
| 80°    | 218.0  | 116.1  | 95.9   | 88.1   | 88.1   |
| 82.5°  | 152.0  | 78.1   | 66.0   | 62.0   | 62.0   |
| 85°    | 86.0   | 44.0   | 38.0   | 38.0   | 38.0   |
| 87.5°  | 32.1   | 16.0   | 16.0   | 14.0   | 14.0   |
| 90°    | 3.0    | 36.7   | 100.0  | 93.9   | 96.9   |
| 92.5°  | 63.2   | 85.7   | 88.7   | 91.8   | 91.8   |
| 95°    | 148.9  | 177.5  | 182.6  | 182.6  | 177.5  |
| 97.5°  | 247.9  | 274.5  | 285.7  | 285.7  | 285.7  |
| 100°   | 362.2  | 385.7  | 393.8  | 393.8  | 390.7  |
| 102.5° | 482.6  | 499.9  | 511.1  | 514.2  | 511.1  |
| 105°   | 614.2  | 622.3  | 628.5  | 633.6  | 633.6  |
| 107.5° | 744.8  | 757.1  | 757.1  | 759.0  | 744.8  |
| 110°   | 871.3  | 887.6  | 887.6  | 887.6  | 879.5  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1008.0 | 1025.4 | 1022.3 | 1014.1 | 1008.0 |
| 115°   | 1142.6 | 1159.0 | 1153.9 | 1150.8 | 1142.6 |
| 117.5° | 1276.3 | 1298.8 | 1284.5 | 1276.3 | 1268.2 |
| 120°   | 1411.0 | 1433.4 | 1411.0 | 1411.0 | 1401.9 |
| 122.5° | 1533.5 | 1562.0 | 1547.7 | 1539.5 | 1533.5 |
| 125°   | 1662.0 | 1687.5 | 1679.4 | 1670.2 | 1667.1 |
| 127.5° | 1787.5 | 1819.1 | 1807.9 | 1795.6 | 1787.5 |
| 130°   | 1904.8 | 1941.5 | 1936.4 | 1930.3 | 1919.0 |
| 132.5° | 2036.4 | 2065.0 | 2067.0 | 2052.7 | 2044.6 |
| 135°   | 2149.6 | 2181.3 | 2187.5 | 2184.3 | 2176.2 |
| 137.5° | 2276.2 | 2301.7 | 2306.8 | 2304.7 | 2292.5 |
| 140°   | 2387.4 | 2412.9 | 2427.1 | 2427.1 | 2415.9 |
| 142.5° | 2501.7 | 2527.2 | 2535.3 | 2538.3 | 2527.2 |
| 145°   | 2609.8 | 2630.2 | 2646.5 | 2649.6 | 2638.4 |
| 147.5° | 2706.7 | 2732.2 | 2744.5 | 2749.6 | 2738.4 |
| 150°   | 2806.7 | 2824.0 | 2835.3 | 2844.5 | 2835.3 |
| 152.5° | 2895.5 | 2912.8 | 2927.1 | 2938.4 | 2927.1 |
| 155°   | 2984.2 | 2992.4 | 3001.6 | 3015.9 | 3006.7 |
| 157.5° | 3060.8 | 3066.9 | 3071.9 | 3092.4 | 3078.1 |
| 160°   | 3129.1 | 3135.3 | 3138.3 | 3155.7 | 3143.4 |
| 162.5° | 3192.3 | 3192.3 | 3195.4 | 3214.8 | 3200.5 |
| 165°   | 3246.4 | 3243.4 | 3243.4 | 3263.7 | 3249.5 |
| 167.5° | 3295.4 | 3286.2 | 3286.2 | 3306.6 | 3292.4 |
| 170°   | 3332.1 | 3323.9 | 3320.9 | 3341.3 | 3323.9 |
| 172.5° | 3357.6 | 3349.4 | 3346.4 | 3366.8 | 3349.4 |
| 175°   | 3378.1 | 3369.9 | 3363.8 | 3384.1 | 3366.8 |
| 177.5° | 3389.3 | 3381.1 | 3374.9 | 3392.3 | 3374.9 |
| 180°   | 3384.1 | 3384.1 | 3384.1 | 3384.1 | 3384.1 |

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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 | 6.97             | 7.68  | 8.07  | 8.77  | 10.28 | 2.95           | 3.65 | 4.05 | 4.75 | 6.25 |
|                 | 3H   | 8.64             | 9.27  | 9.75  | 10.37 | 11.89 | 4.13           | 4.76 | 5.24 | 5.86 | 7.38 |
|                 | 4H   | 9.25             | 9.84  | 10.36 | 10.95 | 12.47 | 4.57           | 5.17 | 5.69 | 6.27 | 7.80 |
|                 | 6H   | 9.66             | 10.21 | 10.79 | 11.32 | 12.85 | 4.89           | 5.44 | 6.02 | 6.55 | 8.08 |
|                 | 8H   | 9.79             | 10.31 | 10.92 | 11.43 | 12.96 | 4.98           | 5.50 | 6.11 | 6.62 | 8.15 |
|                 | 12H  | 9.84             | 10.34 | 10.98 | 11.45 | 13.01 | 5.02           | 5.51 | 6.15 | 6.63 | 8.18 |
| 4H              | 2H   | 6.98             | 7.58  | 8.10  | 8.68  | 10.20 | 3.53           | 4.13 | 4.65 | 5.23 | 6.75 |
|                 | 3H   | 8.80             | 9.29  | 9.93  | 10.42 | 11.96 | 4.87           | 5.37 | 6.00 | 6.49 | 8.03 |
|                 | 4H   | 9.48             | 9.94  | 10.62 | 11.06 | 12.62 | 5.41           | 5.87 | 6.55 | 6.99 | 8.55 |
|                 | 6H   | 9.99             | 10.38 | 11.13 | 11.53 | 13.08 | 5.83           | 6.22 | 6.97 | 7.36 | 8.91 |
|                 | 8H   | 10.17            | 10.53 | 11.31 | 11.66 | 13.23 | 5.96           | 6.32 | 7.10 | 7.45 | 9.02 |
|                 | 12H  | 10.26            | 10.59 | 11.41 | 11.73 | 13.30 | 6.02           | 6.35 | 7.17 | 7.49 | 9.06 |
| 8H              | 4H   | 9.44             | 9.81  | 10.58 | 10.94 | 12.51 | 5.68           | 6.05 | 6.82 | 7.18 | 8.75 |
|                 | 6H   | 10.01            | 10.31 | 11.17 | 11.48 | 13.04 | 6.20           | 6.50 | 7.36 | 7.68 | 9.24 |
|                 | 8H   | 10.22            | 10.49 | 11.39 | 11.64 | 13.22 | 6.39           | 6.66 | 7.56 | 7.81 | 9.39 |
|                 | 12H  | 10.36            | 10.59 | 11.53 | 11.74 | 13.36 | 6.51           | 6.74 | 7.68 | 7.89 | 9.51 |
| 12H             | 4H   | 9.39             | 9.72  | 10.55 | 10.86 | 12.44 | 5.68           | 6.01 | 6.84 | 7.16 | 8.73 |
|                 | 6H   | 9.98             | 10.24 | 11.15 | 11.40 | 12.98 | 6.25           | 6.51 | 7.42 | 7.67 | 9.25 |
|                 | 8H   | 10.20            | 10.43 | 11.37 | 11.58 | 13.20 | 6.46           | 6.69 | 7.63 | 7.84 | 9.46 |

END OF REPORT