

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: P927696

Luminaire Tested: DFN2DIP-HX4F0-080D120US840-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P927696  
REPORT IS A COMBINATION OF REPORTS P900971 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-080D120US840-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

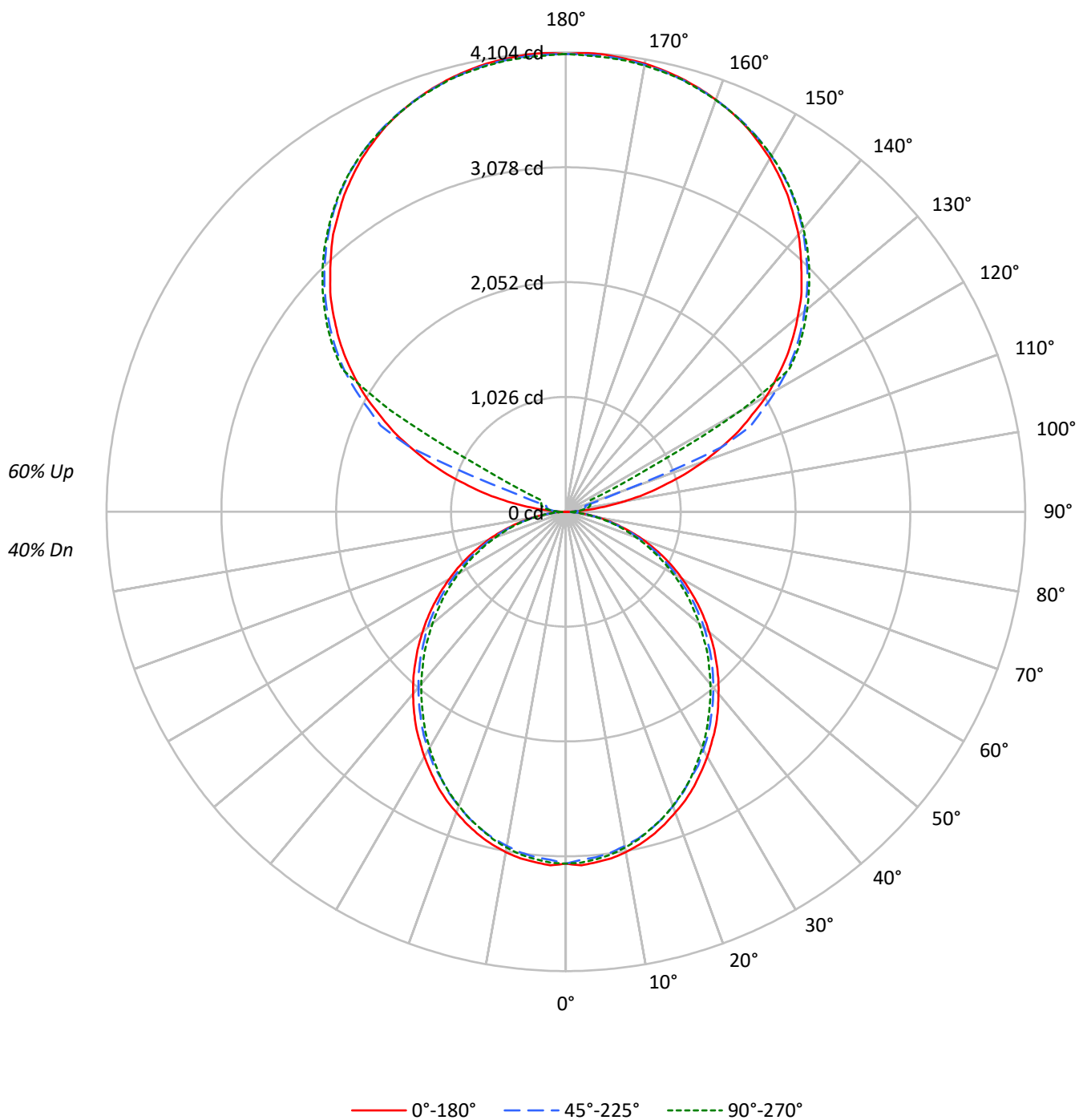
Lumens per Lamp: N/A  
Luminaire Lumens: 19994.1 lumens  
Efficiency: N/A  
Efficacy: 115.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 172.6  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9613  
Total Harmonic Distortion (THDi): 0.083  
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: P927696

CATALOG NUMBER: DFN2DIP-HX4F0-080D120US840-FLONL

**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 | 50 | 30 | 10 |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 105 | 105 | 105 | 105 | 95 | 95 | 95 | 95 | 78 | 78 | 78 | 62 | 62 | 62 | 47 | 47 | 47 |    |    | 40 |
| 1   | 96  | 91  | 87  | 84  | 87 | 83 | 80 | 77 | 68 | 66 | 64 | 54 | 53 | 51 | 41 | 41 | 40 |    |    | 34 |
| 2   | 87  | 80  | 74  | 69  | 79 | 73 | 68 | 63 | 60 | 56 | 53 | 48 | 45 | 43 | 37 | 35 | 33 |    |    | 28 |
| 3   | 79  | 70  | 63  | 57  | 72 | 64 | 58 | 53 | 53 | 48 | 44 | 42 | 39 | 36 | 32 | 30 | 28 |    |    | 24 |
| 4   | 73  | 62  | 54  | 48  | 66 | 57 | 50 | 45 | 47 | 42 | 38 | 37 | 34 | 31 | 29 | 26 | 24 |    |    | 21 |
| 5   | 67  | 55  | 47  | 41  | 60 | 50 | 44 | 38 | 42 | 37 | 33 | 34 | 30 | 27 | 26 | 23 | 21 |    |    | 18 |
| 6   | 61  | 49  | 41  | 36  | 56 | 45 | 38 | 33 | 38 | 32 | 28 | 30 | 26 | 23 | 24 | 21 | 19 |    |    | 16 |
| 7   | 57  | 45  | 37  | 31  | 51 | 41 | 34 | 29 | 34 | 29 | 25 | 28 | 24 | 21 | 22 | 19 | 17 |    |    | 14 |
| 8   | 52  | 40  | 33  | 27  | 48 | 37 | 30 | 26 | 31 | 26 | 22 | 25 | 21 | 18 | 20 | 17 | 15 |    |    | 12 |
| 9   | 49  | 37  | 29  | 24  | 44 | 34 | 27 | 23 | 28 | 23 | 20 | 23 | 19 | 17 | 18 | 15 | 13 |    |    | 11 |
| 10  | 46  | 34  | 27  | 22  | 41 | 31 | 25 | 20 | 26 | 21 | 18 | 21 | 18 | 15 | 17 | 14 | 12 |    |    | 10 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2337 | 2337 | 2337 |
| 5°  | 2341 | 2305 | 2320 |
| 10° | 2322 | 2274 | 2289 |
| 15° | 2288 | 2237 | 2240 |
| 20° | 2242 | 2185 | 2190 |
| 25° | 2197 | 2123 | 2132 |
| 30° | 2139 | 2065 | 2058 |
| 35° | 2085 | 1997 | 1980 |
| 40° | 2018 | 1929 | 1906 |
| 45° | 1952 | 1860 | 1830 |
| 50° | 1879 | 1788 | 1742 |
| 55° | 1802 | 1704 | 1661 |
| 60° | 1716 | 1605 | 1568 |
| 65° | 1622 | 1502 | 1459 |
| 70° | 1503 | 1377 | 1342 |
| 75° | 1336 | 1227 | 1233 |
| 80° | 1137 | 1036 | 1026 |
| 85° | 825  | 706  | 682  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2101 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 295.9   | 1.5       |
| 10°-20°   | 832.4   | 4.2       |
| 20°-30°   | 1223.3  | 6.1       |
| 30°-40°   | 1420.8  | 7.1       |
| 40°-50°   | 1419.1  | 7.1       |
| 50°-60°   | 1237.4  | 6.2       |
| 60°-70°   | 914.7   | 4.6       |
| 70°-80°   | 517.5   | 2.6       |
| 80°-90°   | 143.8   | 0.7       |
| 90°-100°  | 134.8   | 0.7       |
| 100°-110° | 502.7   | 2.5       |
| 110°-120° | 1333.2  | 6.7       |
| 120°-130° | 2211.3  | 11.1      |
| 130°-140° | 2348.9  | 11.7      |
| 140°-150° | 2183.0  | 10.9      |
| 150°-160° | 1755.1  | 8.8       |
| 160°-170° | 1130.9  | 5.7       |
| 170°-180° | 389.2   | 1.9       |
| 0°-30°    | 2351.6  | 11.8      |
| 0°-40°    | 3772.4  | 18.9      |
| 0°-60°    | 6428.8  | 32.2      |
| 0°-90°    | 8004.8  | 40.0      |
| 90°-120°  | 1970.8  | 9.9       |
| 90°-150°  | 8714.0  | 43.6      |
| 90°-180°  | 11989.0 | 60.0      |
| 0°-180°   | 19994.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3143 | 3143  | 3143 | 3143  | 3143 |      |
| 5°   | 3143 | 3132  | 3098 | 3122  | 3116 | 298  |
| 15°  | 2992 | 2974  | 2935 | 2947  | 2932 | 843  |
| 25°  | 2708 | 2684  | 2633 | 2639  | 2633 | 1246 |
| 35°  | 2336 | 2306  | 2258 | 2240  | 2225 | 1459 |
| 45°  | 1901 | 1880  | 1835 | 1802  | 1790 | 1467 |
| 55°  | 1439 | 1421  | 1384 | 1348  | 1333 | 1286 |
| 65°  | 970  | 952   | 922  | 895   | 880  | 959  |
| 75°  | 508  | 502   | 486  | 468   | 475  | 542  |
| 85°  | 124  | 121   | 118  | 109   | 106  | 138  |
| 90°  | 3    | 35    | 59   | 74    | 80   | 18   |
| 95°  | 192  | 94    | 115  | 130   | 127  | 228  |
| 105° | 900  | 988   | 181  | 213   | 225  | 961  |
| 115° | 1701 | 1752  | 1826 | 456   | 243  | 1675 |
| 125° | 2406 | 2444  | 2501 | 2521  | 2530 | 2146 |
| 135° | 2977 | 3024  | 3051 | 3081  | 3075 | 2300 |
| 145° | 3454 | 3450  | 3501 | 3521  | 3506 | 2160 |
| 155° | 3802 | 3776  | 3812 | 3829  | 3806 | 1752 |
| 165° | 4007 | 3989  | 3998 | 4019  | 3998 | 1132 |
| 175° | 4098 | 4078  | 4084 | 4104  | 4075 | 390  |
| 180° | 4090 | 4090  | 4090 | 4090  | 4090 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3143.3 | 3143.3 | 3143.3 | 3143.3 | 3143.3 |
| 2.5°   | 3161.6 | 3146.5 | 3113.2 | 3143.3 | 3137.5 |
| 5°     | 3143.3 | 3131.5 | 3098.2 | 3122.2 | 3116.4 |
| 7.5°   | 3122.2 | 3104.2 | 3070.9 | 3095.2 | 3089.2 |
| 10°    | 3089.2 | 3068.0 | 3031.7 | 3055.8 | 3046.9 |
| 12.5°  | 3043.6 | 3025.7 | 2989.4 | 3004.5 | 2998.4 |
| 15°    | 2992.3 | 2974.4 | 2934.9 | 2947.1 | 2932.1 |
| 17.5°  | 2928.8 | 2910.8 | 2871.4 | 2886.5 | 2871.4 |
| 20°    | 2859.2 | 2841.3 | 2799.0 | 2808.0 | 2796.0 |
| 22.5°  | 2790.0 | 2762.7 | 2723.2 | 2723.2 | 2717.2 |
| 25°    | 2708.2 | 2684.1 | 2632.9 | 2638.6 | 2632.9 |
| 27.5°  | 2617.4 | 2596.3 | 2557.1 | 2548.1 | 2533.1 |
| 30°    | 2527.0 | 2502.6 | 2457.4 | 2448.5 | 2436.2 |
| 32.5°  | 2430.2 | 2412.2 | 2363.7 | 2345.5 | 2333.3 |
| 35°    | 2336.5 | 2306.4 | 2257.9 | 2239.6 | 2224.6 |
| 37.5°  | 2230.6 | 2203.4 | 2155.0 | 2133.8 | 2118.8 |
| 40°    | 2122.0 | 2097.6 | 2049.2 | 2022.2 | 2010.0 |
| 42.5°  | 2016.2 | 1991.7 | 1943.7 | 1913.2 | 1895.3 |
| 45°    | 1901.4 | 1880.1 | 1834.6 | 1801.6 | 1789.5 |
| 47.5°  | 1789.5 | 1768.3 | 1719.8 | 1686.5 | 1668.5 |
| 50°    | 1671.4 | 1656.4 | 1614.0 | 1571.7 | 1556.6 |
| 52.5°  | 1556.6 | 1535.4 | 1496.3 | 1463.0 | 1441.8 |
| 55°    | 1438.9 | 1420.6 | 1384.4 | 1348.2 | 1333.0 |
| 57.5°  | 1320.9 | 1305.9 | 1266.4 | 1230.1 | 1217.9 |
| 60°    | 1202.9 | 1191.1 | 1148.6 | 1115.3 | 1106.3 |
| 62.5°  | 1088.1 | 1067.0 | 1036.8 | 1006.7 | 994.5  |
| 65°    | 970.4  | 952.1  | 921.9  | 894.7  | 879.6  |
| 67.5°  | 849.4  | 834.1  | 807.1  | 786.0  | 773.8  |
| 70°    | 737.6  | 725.3  | 698.2  | 677.0  | 665.1  |
| 72.5°  | 622.7  | 610.6  | 595.5  | 574.4  | 565.4  |
| 75°    | 507.6  | 501.9  | 486.5  | 468.5  | 474.6  |
| 77.5°  | 405.0  | 392.8  | 386.8  | 377.8  | 368.8  |
| 80°    | 302.4  | 299.2  | 293.1  | 284.2  | 278.0  |
| 82.5°  | 205.6  | 205.6  | 202.7  | 190.4  | 190.4  |
| 85°    | 123.8  | 120.9  | 118.0  | 108.8  | 105.8  |
| 87.5°  | 54.5   | 48.5   | 42.3   | 33.3   | 30.2   |
| 90°    | 2.8    | 35.4   | 59.1   | 74.1   | 79.8   |
| 92.5°  | 74.1   | 62.2   | 71.0   | 76.9   | 79.8   |
| 95°    | 192.2  | 94.5   | 115.2  | 130.4  | 127.2  |
| 97.5°  | 346.2  | 103.7  | 150.8  | 159.9  | 162.7  |
| 100°   | 523.9  | 118.4  | 168.6  | 192.2  | 198.2  |
| 102.5° | 719.0  | 713.3  | 174.6  | 207.0  | 216.1  |
| 105°   | 899.5  | 988.5  | 180.7  | 213.0  | 224.9  |
| 107.5° | 1109.7 | 1183.5 | 186.6  | 218.9  | 230.8  |
| 110°   | 1311.0 | 1372.9 | 517.9  | 222.1  | 233.7  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1500.5 | 1553.5 | 1503.3 | 227.7  | 236.8  |
| 115°   | 1701.4 | 1751.7 | 1825.8 | 455.7  | 242.9  |
| 117.5° | 1876.1 | 1935.2 | 1985.8 | 1562.3 | 787.1  |
| 120°   | 2071.5 | 2115.7 | 2169.2 | 2204.7 | 1805.1 |
| 122.5° | 2237.0 | 2284.5 | 2343.8 | 2361.4 | 2364.5 |
| 125°   | 2405.6 | 2444.3 | 2500.6 | 2521.3 | 2530.1 |
| 127.5° | 2559.5 | 2601.0 | 2645.7 | 2675.2 | 2678.0 |
| 130°   | 2704.6 | 2752.1 | 2784.4 | 2817.1 | 2814.3 |
| 132.5° | 2852.6 | 2891.3 | 2923.6 | 2950.3 | 2947.5 |
| 135°   | 2977.0 | 3024.5 | 3050.8 | 3080.7 | 3074.7 |
| 137.5° | 3107.1 | 3142.5 | 3172.4 | 3201.9 | 3193.1 |
| 140°   | 3234.3 | 3258.1 | 3290.4 | 3317.2 | 3302.4 |
| 142.5° | 3341.0 | 3361.8 | 3400.1 | 3423.6 | 3408.9 |
| 145°   | 3453.5 | 3450.4 | 3500.6 | 3521.4 | 3506.5 |
| 147.5° | 3550.9 | 3542.1 | 3592.4 | 3607.1 | 3595.5 |
| 150°   | 3645.7 | 3625.0 | 3672.4 | 3690.0 | 3675.3 |
| 152.5° | 3725.5 | 3701.9 | 3746.3 | 3764.1 | 3743.4 |
| 155°   | 3802.4 | 3776.0 | 3811.6 | 3829.2 | 3805.6 |
| 157.5° | 3864.6 | 3841.1 | 3867.8 | 3888.5 | 3864.6 |
| 160°   | 3918.0 | 3900.2 | 3918.0 | 3935.6 | 3914.9 |
| 162.5° | 3965.2 | 3947.6 | 3962.4 | 3983.1 | 3956.4 |
| 165°   | 4006.6 | 3989.0 | 3997.8 | 4018.6 | 3997.8 |
| 167.5° | 4039.3 | 4021.3 | 4030.5 | 4051.2 | 4024.6 |
| 170°   | 4066.0 | 4048.1 | 4054.0 | 4074.7 | 4048.1 |
| 172.5° | 4083.5 | 4066.0 | 4072.0 | 4092.7 | 4066.0 |
| 175°   | 4098.3 | 4077.6 | 4083.5 | 4104.3 | 4074.7 |
| 177.5° | 4104.3 | 4083.5 | 4086.8 | 4107.5 | 4080.8 |
| 180°   | 4089.6 | 4089.6 | 4089.6 | 4089.6 | 4089.6 |

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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 | 9.23             | 10.00 | 10.26 | 11.05 | 12.46 | 8.79           | 9.57  | 9.83  | 10.62 | 12.02 |
|                 | 3H   | 10.88            | 11.58 | 11.93 | 12.63 | 14.06 | 10.41          | 11.10 | 11.46 | 12.16 | 13.58 |
|                 | 4H   | 11.46            | 12.13 | 12.52 | 13.18 | 14.61 | 10.99          | 11.65 | 12.05 | 12.71 | 14.14 |
|                 | 6H   | 11.86            | 12.47 | 12.93 | 13.53 | 14.97 | 11.38          | 11.99 | 12.45 | 13.05 | 14.50 |
|                 | 8H   | 11.96            | 12.54 | 13.04 | 13.62 | 15.06 | 11.49          | 12.07 | 12.56 | 13.14 | 14.58 |
|                 | 12H  | 12.01            | 12.56 | 13.09 | 13.63 | 15.09 | 11.53          | 12.08 | 12.61 | 13.15 | 14.61 |
| 4H              | 2H   | 9.68             | 10.34 | 10.74 | 11.39 | 12.83 | 9.33           | 9.99  | 10.40 | 11.05 | 12.48 |
|                 | 3H   | 11.54            | 12.09 | 12.61 | 13.17 | 14.62 | 11.14          | 11.70 | 12.22 | 12.78 | 14.22 |
|                 | 4H   | 12.25            | 12.75 | 13.33 | 13.83 | 15.30 | 11.84          | 12.35 | 12.92 | 13.42 | 14.89 |
|                 | 6H   | 12.76            | 13.19 | 13.85 | 14.29 | 15.75 | 12.35          | 12.78 | 13.44 | 13.88 | 15.34 |
|                 | 8H   | 12.91            | 13.31 | 14.00 | 14.40 | 15.88 | 12.50          | 12.90 | 13.58 | 13.99 | 15.47 |
|                 | 12H  | 12.98            | 13.35 | 14.08 | 14.45 | 15.93 | 12.56          | 12.92 | 13.66 | 14.02 | 15.51 |
| 8H              | 4H   | 12.44            | 12.85 | 13.53 | 13.93 | 15.41 | 12.08          | 12.48 | 13.17 | 13.57 | 15.05 |
|                 | 6H   | 13.07            | 13.40 | 14.18 | 14.53 | 16.01 | 12.71          | 13.04 | 13.82 | 14.17 | 15.65 |
|                 | 8H   | 13.29            | 13.58 | 14.41 | 14.70 | 16.19 | 12.92          | 13.21 | 14.04 | 14.33 | 15.82 |
|                 | 12H  | 13.42            | 13.68 | 14.54 | 14.78 | 16.32 | 13.03          | 13.29 | 14.15 | 14.40 | 15.93 |
| 12H             | 4H   | 12.42            | 12.79 | 13.53 | 13.89 | 15.37 | 12.07          | 12.44 | 13.17 | 13.54 | 15.02 |
|                 | 6H   | 13.10            | 13.39 | 14.22 | 14.50 | 16.00 | 12.75          | 13.04 | 13.86 | 14.15 | 15.65 |
|                 | 8H   | 13.34            | 13.60 | 14.46 | 14.70 | 16.24 | 12.98          | 13.24 | 14.10 | 14.35 | 15.88 |

END OF REPORT