

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: P910199

Luminaire Tested: DFN2DIP-TR4F0-090D090US840-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P910199  
REPORT IS A COMBINATION OF REPORTS P901989 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-090D090US840-FLLONL  
Description: 4 foot, Triangle Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

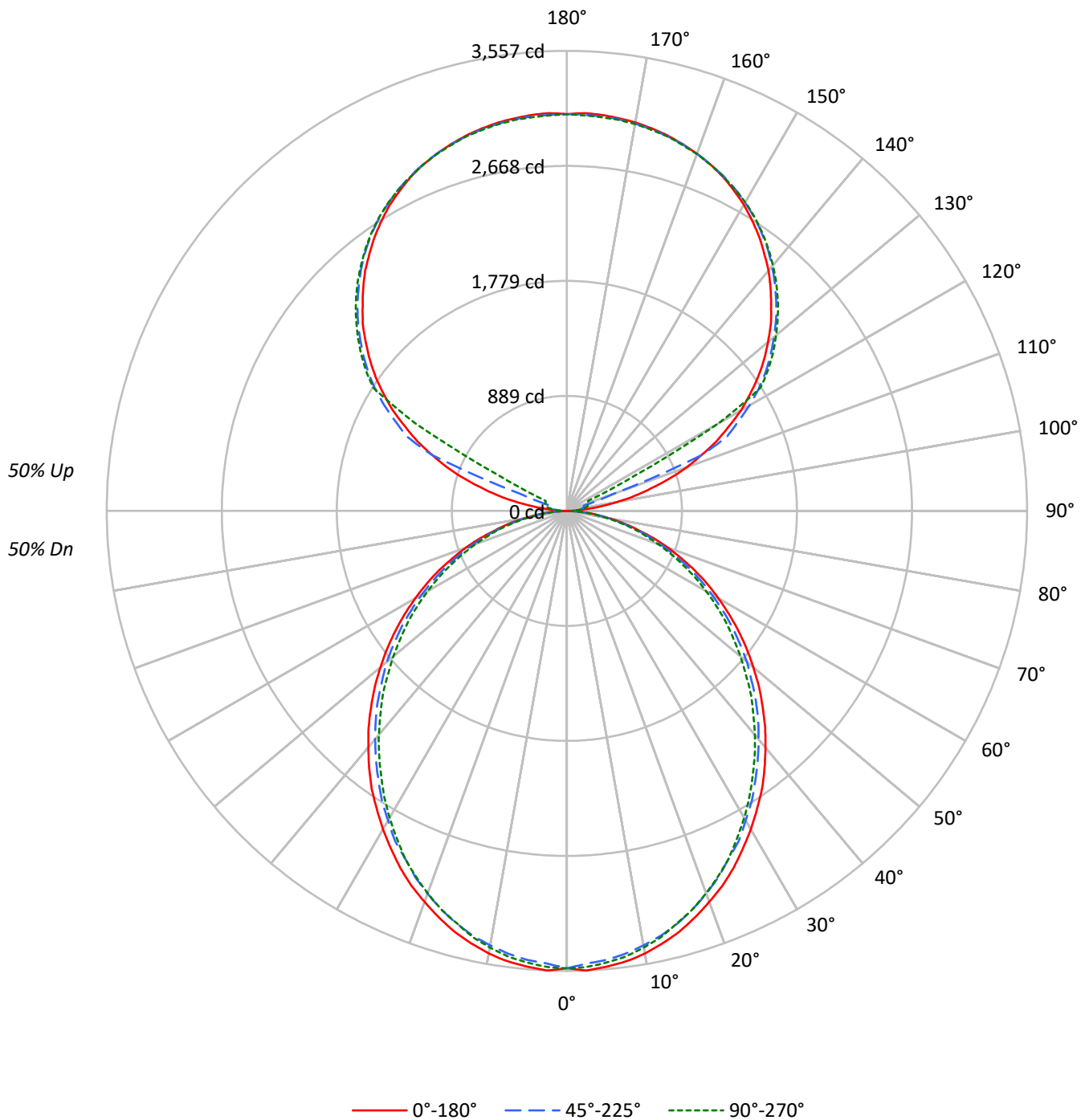
Lumens per Lamp: N/A  
Luminaire Lumens: 17995.8 lumens  
Efficiency: N/A  
Efficacy: 116.0 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 155.1  
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: P910199

CATALOG NUMBER: DFN2DIP-TR4F0-090D090US840-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 |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 107 | 107 | 107 | 107 | 99 | 99 | 99 | 99 | 83 | 83 | 83 | 69 | 69 | 69 | 56 | 56 | 56 |
| 1   | 98  | 93  | 90  | 86  | 90 | 86 | 83 | 80 | 73 | 71 | 68 | 61 | 59 | 58 | 50 | 48 | 47 |
| 2   | 89  | 82  | 75  | 70  | 82 | 76 | 70 | 66 | 64 | 60 | 57 | 53 | 51 | 48 | 44 | 42 | 40 |
| 3   | 81  | 72  | 64  | 59  | 75 | 66 | 60 | 55 | 56 | 52 | 48 | 47 | 44 | 41 | 39 | 36 | 34 |
| 4   | 74  | 64  | 56  | 50  | 68 | 59 | 52 | 47 | 50 | 45 | 41 | 42 | 38 | 35 | 35 | 32 | 29 |
| 5   | 68  | 57  | 48  | 42  | 63 | 53 | 45 | 40 | 45 | 39 | 35 | 38 | 34 | 30 | 31 | 28 | 26 |
| 6   | 63  | 51  | 43  | 37  | 58 | 47 | 40 | 35 | 40 | 35 | 31 | 34 | 30 | 27 | 28 | 25 | 23 |
| 7   | 58  | 46  | 38  | 32  | 53 | 43 | 36 | 30 | 37 | 31 | 27 | 31 | 27 | 23 | 26 | 23 | 20 |
| 8   | 54  | 42  | 34  | 29  | 50 | 39 | 32 | 27 | 33 | 28 | 24 | 28 | 24 | 21 | 24 | 20 | 18 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 29 | 24 | 31 | 25 | 21 | 26 | 22 | 19 | 22 | 19 | 16 |
| 10  | 47  | 35  | 28  | 23  | 43 | 33 | 26 | 22 | 28 | 23 | 19 | 24 | 20 | 17 | 20 | 17 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2809 | 2809 | 2809 |
| 5°  | 2814 | 2770 | 2789 |
| 10° | 2791 | 2733 | 2751 |
| 15° | 2750 | 2688 | 2692 |
| 20° | 2695 | 2625 | 2631 |
| 25° | 2640 | 2551 | 2562 |
| 30° | 2571 | 2481 | 2473 |
| 35° | 2505 | 2399 | 2379 |
| 40° | 2424 | 2316 | 2289 |
| 45° | 2344 | 2233 | 2198 |
| 50° | 2256 | 2146 | 2092 |
| 55° | 2164 | 2045 | 1994 |
| 60° | 2060 | 1925 | 1883 |
| 65° | 1947 | 1801 | 1751 |
| 70° | 1802 | 1650 | 1609 |
| 75° | 1602 | 1469 | 1478 |
| 80° | 1361 | 1238 | 1228 |
| 85° | 985  | 840  | 814  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2344 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 332.9   | 1.8       |
| 10°-20°   | 936.5   | 5.2       |
| 20°-30°   | 1376.3  | 7.6       |
| 30°-40°   | 1598.5  | 8.9       |
| 40°-50°   | 1596.5  | 8.9       |
| 50°-60°   | 1392.1  | 7.7       |
| 60°-70°   | 1029.1  | 5.7       |
| 70°-80°   | 582.2   | 3.2       |
| 80°-90°   | 159.1   | 0.9       |
| 90°-100°  | 101.2   | 0.6       |
| 100°-110° | 377.0   | 2.1       |
| 110°-120° | 1000.0  | 5.6       |
| 120°-130° | 1658.6  | 9.2       |
| 130°-140° | 1761.8  | 9.8       |
| 140°-150° | 1637.4  | 9.1       |
| 150°-160° | 1316.4  | 7.3       |
| 160°-170° | 848.2   | 4.7       |
| 170°-180° | 292.0   | 1.6       |
| 0°-30°    | 2645.7  | 14.7      |
| 0°-40°    | 4244.2  | 23.6      |
| 0°-60°    | 7232.9  | 40.2      |
| 0°-90°    | 9003.3  | 50.0      |
| 90°-120°  | 1478.2  | 8.2       |
| 90°-150°  | 6535.9  | 36.3      |
| 90°-180°  | 8992.0  | 50.0      |
| 0°-180°   | 17995.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3536 | 3536  | 3536 | 3536  | 3536 |      |
| 5°   | 3536 | 3523  | 3486 | 3513  | 3506 | 336  |
| 15°  | 3367 | 3346  | 3302 | 3316  | 3299 | 948  |
| 25°  | 3047 | 3020  | 2962 | 2969  | 2962 | 1402 |
| 35°  | 2629 | 2595  | 2540 | 2520  | 2503 | 1642 |
| 45°  | 2139 | 2115  | 2064 | 2027  | 2013 | 1651 |
| 55°  | 1619 | 1598  | 1558 | 1517  | 1500 | 1447 |
| 65°  | 1092 | 1071  | 1037 | 1007  | 990  | 1079 |
| 75°  | 571  | 565   | 547  | 527   | 534  | 610  |
| 85°  | 139  | 136   | 133  | 122   | 119  | 155  |
| 90°  | 2    | 27    | 44   | 56    | 60   | 17   |
| 95°  | 144  | 71    | 86   | 98    | 95   | 171  |
| 105° | 675  | 741   | 135  | 160   | 169  | 721  |
| 115° | 1276 | 1314  | 1370 | 342   | 182  | 1256 |
| 125° | 1804 | 1833  | 1876 | 1891  | 1898 | 1609 |
| 135° | 2233 | 2268  | 2288 | 2311  | 2306 | 1725 |
| 145° | 2590 | 2588  | 2626 | 2641  | 2630 | 1620 |
| 155° | 2852 | 2832  | 2859 | 2872  | 2854 | 1314 |
| 165° | 3005 | 2992  | 2999 | 3014  | 2999 | 849  |
| 175° | 3074 | 3058  | 3063 | 3078  | 3056 | 293  |
| 180° | 3067 | 3067  | 3067 | 3067  | 3067 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3536.4 | 3536.4 | 3536.4 | 3536.4 | 3536.4 |
| 2.5°   | 3557.0 | 3540.1 | 3502.6 | 3536.4 | 3530.0 |
| 5°     | 3536.4 | 3523.1 | 3485.7 | 3512.7 | 3506.2 |
| 7.5°   | 3512.7 | 3492.5 | 3455.0 | 3482.4 | 3475.6 |
| 10°    | 3475.6 | 3451.7 | 3410.9 | 3438.0 | 3427.9 |
| 12.5°  | 3424.3 | 3404.1 | 3363.4 | 3380.2 | 3373.5 |
| 15°    | 3366.6 | 3346.4 | 3302.0 | 3315.7 | 3298.7 |
| 17.5°  | 3295.1 | 3274.9 | 3230.6 | 3247.5 | 3230.6 |
| 20°    | 3216.8 | 3196.6 | 3149.0 | 3159.1 | 3145.7 |
| 22.5°  | 3138.9 | 3108.3 | 3063.8 | 3063.8 | 3057.0 |
| 25°    | 3046.9 | 3019.8 | 2962.1 | 2968.6 | 2962.1 |
| 27.5°  | 2944.8 | 2920.9 | 2877.0 | 2866.9 | 2849.9 |
| 30°    | 2843.1 | 2815.6 | 2764.7 | 2754.6 | 2741.0 |
| 32.5°  | 2734.1 | 2713.9 | 2659.4 | 2638.9 | 2625.1 |
| 35°    | 2628.8 | 2594.8 | 2540.3 | 2519.8 | 2502.9 |
| 37.5°  | 2509.7 | 2479.0 | 2424.5 | 2400.8 | 2383.8 |
| 40°    | 2387.3 | 2360.0 | 2305.4 | 2275.1 | 2261.5 |
| 42.5°  | 2268.3 | 2240.9 | 2186.8 | 2152.5 | 2132.3 |
| 45°    | 2139.1 | 2115.4 | 2064.1 | 2026.9 | 2013.3 |
| 47.5°  | 2013.3 | 1989.4 | 1934.9 | 1897.4 | 1877.2 |
| 50°    | 1880.5 | 1863.5 | 1815.8 | 1768.3 | 1751.3 |
| 52.5°  | 1751.3 | 1727.5 | 1683.4 | 1646.0 | 1622.1 |
| 55°    | 1618.9 | 1598.3 | 1557.5 | 1516.8 | 1499.9 |
| 57.5°  | 1486.1 | 1469.2 | 1424.8 | 1384.0 | 1370.3 |
| 60°    | 1353.3 | 1340.0 | 1292.3 | 1254.9 | 1244.8 |
| 62.5°  | 1224.2 | 1200.3 | 1166.4 | 1132.6 | 1118.8 |
| 65°    | 1091.8 | 1071.2 | 1037.2 | 1006.6 | 989.7  |
| 67.5°  | 955.7  | 938.5  | 908.1  | 884.3  | 870.6  |
| 70°    | 829.8  | 816.1  | 785.5  | 761.6  | 748.3  |
| 72.5°  | 700.6  | 686.9  | 669.9  | 646.2  | 636.1  |
| 75°    | 571.2  | 564.6  | 547.3  | 527.1  | 534.0  |
| 77.5°  | 455.7  | 442.0  | 435.2  | 425.1  | 415.0  |
| 80°    | 340.2  | 336.6  | 329.7  | 319.6  | 312.9  |
| 82.5°  | 231.3  | 231.3  | 228.0  | 214.3  | 214.3  |
| 85°    | 139.3  | 136.0  | 132.8  | 122.3  | 119.1  |
| 87.5°  | 61.3   | 54.4   | 47.7   | 37.6   | 33.9   |
| 90°    | 2.1    | 26.7   | 44.2   | 55.6   | 59.8   |
| 92.5°  | 55.6   | 46.7   | 53.2   | 57.8   | 59.8   |
| 95°    | 144.2  | 70.9   | 86.4   | 97.8   | 95.4   |
| 97.5°  | 259.6  | 77.8   | 113.1  | 119.9  | 122.0  |
| 100°   | 392.9  | 88.9   | 126.5  | 144.2  | 148.7  |
| 102.5° | 539.3  | 535.0  | 131.0  | 155.2  | 162.1  |
| 105°   | 674.7  | 741.4  | 135.4  | 159.8  | 168.6  |
| 107.5° | 832.3  | 887.7  | 140.0  | 164.2  | 173.2  |
| 110°   | 983.3  | 1029.8 | 388.5  | 166.5  | 175.3  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1125.4 | 1165.2 | 1127.5 | 170.8  | 177.6  |
| 115°   | 1276.2 | 1313.8 | 1369.5 | 341.8  | 182.1  |
| 117.5° | 1407.1 | 1451.5 | 1489.3 | 1171.8 | 590.4  |
| 120°   | 1553.7 | 1586.9 | 1627.0 | 1653.6 | 1353.9 |
| 122.5° | 1677.9 | 1713.4 | 1758.0 | 1771.1 | 1773.5 |
| 125°   | 1804.3 | 1833.3 | 1875.5 | 1891.1 | 1897.6 |
| 127.5° | 1919.8 | 1950.9 | 1984.4 | 2006.5 | 2008.6 |
| 130°   | 2028.6 | 2064.3 | 2088.5 | 2112.9 | 2110.9 |
| 132.5° | 2139.6 | 2168.6 | 2192.8 | 2212.9 | 2210.8 |
| 135°   | 2232.9 | 2268.5 | 2288.3 | 2310.7 | 2306.2 |
| 137.5° | 2330.5 | 2357.0 | 2379.4 | 2401.6 | 2395.0 |
| 140°   | 2425.8 | 2443.8 | 2468.0 | 2488.0 | 2477.0 |
| 142.5° | 2506.0 | 2521.5 | 2550.2 | 2567.9 | 2556.9 |
| 145°   | 2590.3 | 2587.9 | 2625.7 | 2641.2 | 2630.1 |
| 147.5° | 2663.3 | 2656.8 | 2694.4 | 2705.5 | 2696.7 |
| 150°   | 2734.5 | 2719.0 | 2754.5 | 2767.6 | 2756.6 |
| 152.5° | 2794.3 | 2776.6 | 2809.8 | 2823.3 | 2807.7 |
| 155°   | 2852.1 | 2832.3 | 2858.8 | 2872.1 | 2854.4 |
| 157.5° | 2898.7 | 2881.0 | 2901.0 | 2916.6 | 2898.7 |
| 160°   | 2938.7 | 2925.3 | 2938.7 | 2951.9 | 2936.4 |
| 162.5° | 2974.1 | 2960.8 | 2971.9 | 2987.5 | 2967.5 |
| 165°   | 3005.2 | 2991.9 | 2998.6 | 3014.1 | 2998.6 |
| 167.5° | 3029.7 | 3016.3 | 3023.0 | 3038.6 | 3018.6 |
| 170°   | 3049.7 | 3036.3 | 3040.7 | 3056.3 | 3036.3 |
| 172.5° | 3062.9 | 3049.7 | 3054.1 | 3069.7 | 3049.7 |
| 175°   | 3073.9 | 3058.4 | 3062.9 | 3078.4 | 3056.3 |
| 177.5° | 3078.4 | 3062.9 | 3065.2 | 3080.8 | 3060.8 |
| 180°   | 3067.4 | 3067.4 | 3067.4 | 3067.4 | 3067.4 |

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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 | 10.86            | 11.72 | 11.82 | 12.69 | 13.96 | 10.43          | 11.29 | 11.38 | 12.26 | 13.53 |
|                 | 3H   | 12.52            | 13.29 | 13.49 | 14.27 | 15.57 | 12.05          | 12.82 | 13.01 | 13.80 | 15.09 |
|                 | 4H   | 13.11            | 13.84 | 14.09 | 14.82 | 16.12 | 12.63          | 13.36 | 13.62 | 14.35 | 15.65 |
|                 | 6H   | 13.51            | 14.18 | 14.50 | 15.17 | 16.48 | 13.03          | 13.71 | 14.02 | 14.70 | 16.01 |
|                 | 8H   | 13.61            | 14.25 | 14.61 | 15.26 | 16.57 | 13.14          | 13.78 | 14.14 | 14.79 | 16.10 |
|                 | 12H  | 13.66            | 14.27 | 14.66 | 15.27 | 16.61 | 13.18          | 13.79 | 14.18 | 14.79 | 16.13 |
| 4H              | 2H   | 11.32            | 12.05 | 12.31 | 13.04 | 14.34 | 10.98          | 11.71 | 11.96 | 12.69 | 13.99 |
|                 | 3H   | 13.19            | 13.80 | 14.18 | 14.81 | 16.13 | 12.79          | 13.40 | 13.79 | 14.42 | 15.73 |
|                 | 4H   | 13.90            | 14.46 | 14.91 | 15.47 | 16.81 | 13.50          | 14.05 | 14.50 | 15.06 | 16.40 |
|                 | 6H   | 14.42            | 14.90 | 15.43 | 15.93 | 17.26 | 14.01          | 14.49 | 15.02 | 15.52 | 16.85 |
|                 | 8H   | 14.57            | 15.01 | 15.58 | 16.04 | 17.39 | 14.15          | 14.60 | 15.17 | 15.63 | 16.98 |
|                 | 12H  | 14.64            | 15.04 | 15.67 | 16.08 | 17.44 | 14.22          | 14.62 | 15.25 | 15.66 | 17.02 |
| 8H              | 4H   | 14.10            | 14.55 | 15.12 | 15.57 | 16.92 | 13.74          | 14.19 | 14.76 | 15.21 | 16.56 |
|                 | 6H   | 14.73            | 15.10 | 15.77 | 16.17 | 17.51 | 14.37          | 14.74 | 15.41 | 15.80 | 17.15 |
|                 | 8H   | 14.95            | 15.28 | 16.00 | 16.33 | 17.69 | 14.58          | 14.91 | 15.63 | 15.96 | 17.33 |
|                 | 12H  | 15.08            | 15.37 | 16.13 | 16.41 | 17.82 | 14.70          | 14.98 | 15.75 | 16.03 | 17.44 |
| 12H             | 4H   | 14.08            | 14.49 | 15.12 | 15.53 | 16.88 | 13.73          | 14.14 | 14.77 | 15.18 | 16.53 |
|                 | 6H   | 14.76            | 15.09 | 15.81 | 16.14 | 17.50 | 14.41          | 14.73 | 15.46 | 15.79 | 17.15 |
|                 | 8H   | 15.00            | 15.29 | 16.05 | 16.33 | 17.74 | 14.64          | 14.93 | 15.70 | 15.98 | 17.39 |

END OF REPORT