

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: P912935

Luminaire Tested: DFN2DIP-TR4F0-090D110US850-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P912935  
REPORT IS A COMBINATION OF REPORTS P902025 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-090D110US850-FLLONL  
Description: 4 foot, Triangle Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

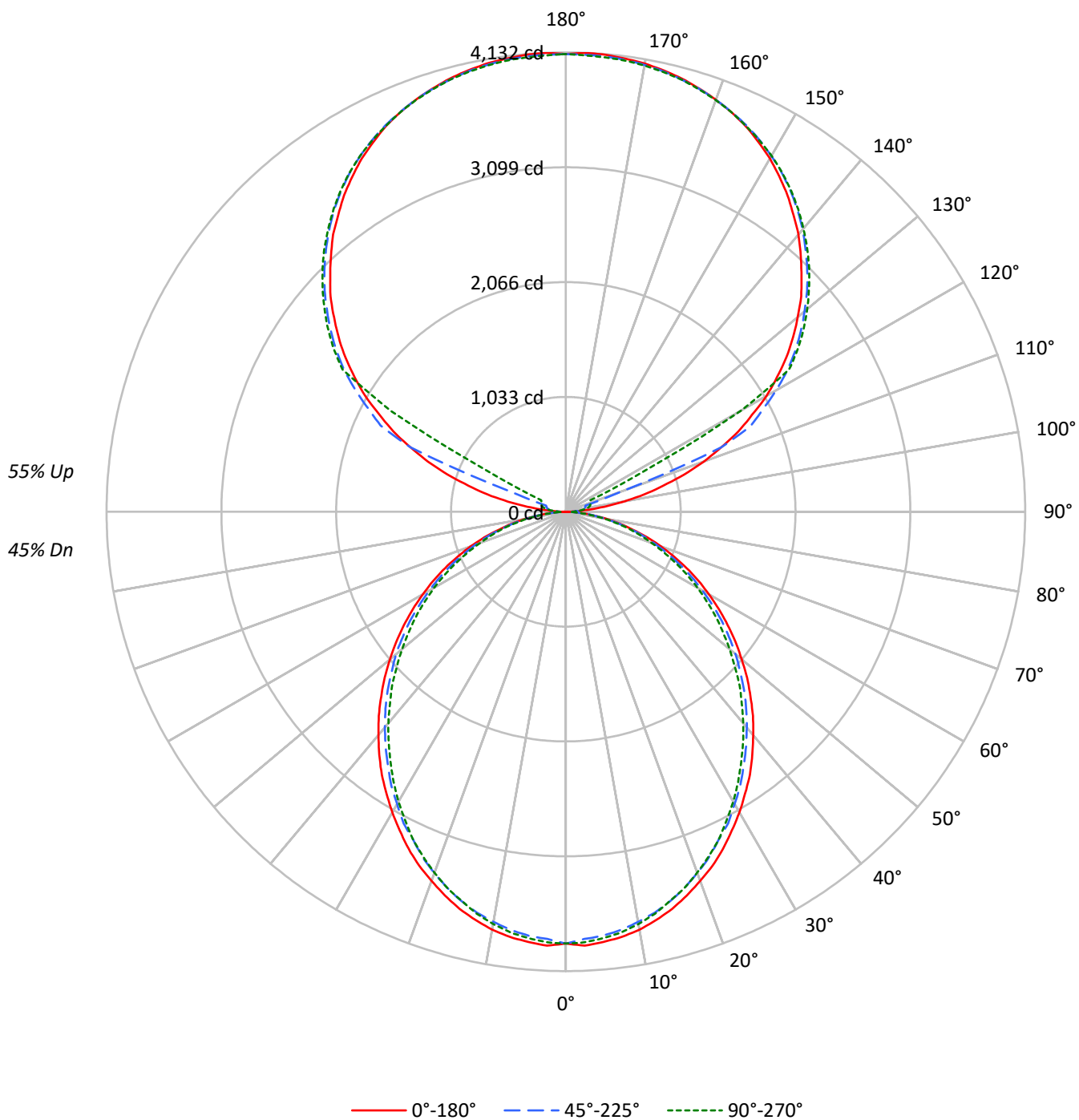
Lumens per Lamp: N/A  
Luminaire Lumens: 21958.2 lumens  
Efficiency: N/A  
Efficacy: 127.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 172.2  
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

TEST NUMBER: P912935

CATALOG NUMBER: DFN2DIP-TR4F0-090D110US850-FLLONL

### Luminous Intensity Polar Plot



TEST NUMBER: P912935

CATALOG NUMBER: DFN2DIP-TR4F0-090D110US850-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   | 106 | 106 | 106 | 106 | 97 | 97 | 97 | 97 | 81 | 81 | 81 | 65 | 65 | 65 | 52 | 52 | 52 |
| 1   | 97  | 92  | 89  | 85  | 88 | 85 | 82 | 79 | 71 | 68 | 66 | 58 | 56 | 54 | 46 | 45 | 44 |
| 2   | 88  | 81  | 75  | 69  | 80 | 74 | 69 | 64 | 62 | 58 | 55 | 51 | 48 | 45 | 40 | 38 | 37 |
| 3   | 80  | 71  | 64  | 58  | 73 | 65 | 59 | 54 | 55 | 50 | 46 | 45 | 41 | 38 | 36 | 33 | 31 |
| 4   | 73  | 63  | 55  | 49  | 67 | 58 | 51 | 46 | 48 | 43 | 39 | 40 | 36 | 33 | 32 | 29 | 27 |
| 5   | 67  | 56  | 48  | 42  | 61 | 52 | 44 | 39 | 43 | 38 | 34 | 36 | 32 | 29 | 29 | 26 | 23 |
| 6   | 62  | 50  | 42  | 36  | 57 | 46 | 39 | 34 | 39 | 34 | 29 | 32 | 28 | 25 | 26 | 23 | 21 |
| 7   | 57  | 45  | 37  | 32  | 52 | 42 | 35 | 30 | 35 | 30 | 26 | 29 | 25 | 22 | 24 | 21 | 18 |
| 8   | 53  | 41  | 33  | 28  | 49 | 38 | 31 | 26 | 32 | 27 | 23 | 27 | 23 | 20 | 22 | 19 | 16 |
| 9   | 50  | 37  | 30  | 25  | 45 | 35 | 28 | 23 | 30 | 24 | 21 | 25 | 21 | 18 | 20 | 17 | 15 |
| 10  | 46  | 34  | 27  | 22  | 42 | 32 | 25 | 21 | 27 | 22 | 18 | 23 | 19 | 16 | 19 | 16 | 13 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3085 | 3085 | 3085 |
| 5°  | 3090 | 3042 | 3063 |
| 10° | 3065 | 3001 | 3021 |
| 15° | 3020 | 2952 | 2956 |
| 20° | 2959 | 2883 | 2890 |
| 25° | 2899 | 2801 | 2813 |
| 30° | 2823 | 2725 | 2715 |
| 35° | 2751 | 2634 | 2612 |
| 40° | 2662 | 2543 | 2514 |
| 45° | 2574 | 2452 | 2413 |
| 50° | 2478 | 2356 | 2297 |
| 55° | 2377 | 2245 | 2190 |
| 60° | 2262 | 2114 | 2067 |
| 65° | 2138 | 1978 | 1923 |
| 70° | 1979 | 1812 | 1767 |
| 75° | 1759 | 1613 | 1623 |
| 80° | 1495 | 1360 | 1349 |
| 85° | 1081 | 923  | 894  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2574 cd/sqm

TEST NUMBER: P912935

CATALOG NUMBER: DFN2DIP-TR4F0-090D110US850-FLLONL

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 365.5   | 1.7       |
| 10°-20°   | 1028.5  | 4.7       |
| 20°-30°   | 1511.4  | 6.9       |
| 30°-40°   | 1755.4  | 8.0       |
| 40°-50°   | 1753.3  | 8.0       |
| 50°-60°   | 1528.8  | 7.0       |
| 60°-70°   | 1130.1  | 5.1       |
| 70°-80°   | 639.4   | 2.9       |
| 80°-90°   | 176.0   | 0.8       |
| 90°-100°  | 135.7   | 0.6       |
| 100°-110° | 506.1   | 2.3       |
| 110°-120° | 1342.2  | 6.1       |
| 120°-130° | 2226.1  | 10.1      |
| 130°-140° | 2364.7  | 10.8      |
| 140°-150° | 2197.7  | 10.0      |
| 150°-160° | 1766.9  | 8.0       |
| 160°-170° | 1138.5  | 5.2       |
| 170°-180° | 391.9   | 1.8       |
| 0°-30°    | 2905.4  | 13.2      |
| 0°-40°    | 4660.9  | 21.2      |
| 0°-60°    | 7942.9  | 36.2      |
| 0°-90°    | 9888.4  | 45.0      |
| 90°-120°  | 1984.0  | 9.0       |
| 90°-150°  | 8772.5  | 40.0      |
| 90°-180°  | 12070.0 | 55.0      |
| 0°-180°   | 21958.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3884 | 3884  | 3884 | 3884  | 3884 |      |
| 5°   | 3884 | 3869  | 3828 | 3858  | 3850 | 369  |
| 15°  | 3697 | 3675  | 3626 | 3641  | 3622 | 1041 |
| 25°  | 3346 | 3316  | 3253 | 3260  | 3253 | 1540 |
| 35°  | 2887 | 2850  | 2790 | 2767  | 2748 | 1803 |
| 45°  | 2349 | 2323  | 2267 | 2226  | 2211 | 1813 |
| 55°  | 1778 | 1755  | 1710 | 1666  | 1647 | 1589 |
| 65°  | 1199 | 1176  | 1139 | 1106  | 1087 | 1185 |
| 75°  | 627  | 620   | 601  | 579   | 586  | 670  |
| 85°  | 153  | 149   | 146  | 134   | 131  | 171  |
| 90°  | 3    | 36    | 59   | 75    | 80   | 20   |
| 95°  | 194  | 95    | 116  | 131   | 128  | 229  |
| 105° | 906  | 995   | 182  | 214   | 226  | 968  |
| 115° | 1713 | 1763  | 1838 | 459   | 244  | 1686 |
| 125° | 2422 | 2461  | 2517 | 2538  | 2547 | 2160 |
| 135° | 2997 | 3045  | 3071 | 3101  | 3095 | 2315 |
| 145° | 3477 | 3474  | 3524 | 3545  | 3530 | 2174 |
| 155° | 3828 | 3801  | 3837 | 3855  | 3831 | 1764 |
| 165° | 4034 | 4016  | 4025 | 4046  | 4025 | 1140 |
| 175° | 4126 | 4105  | 4111 | 4132  | 4102 | 393  |
| 180° | 4117 | 4117  | 4117 | 4117  | 4117 |      |

TEST NUMBER: P912935

CATALOG NUMBER: DFN2DIP-TR4F0-090D110US850-FLLONL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3883.6 | 3883.6 | 3883.6 | 3883.6 | 3883.6 |
| 2.5°   | 3906.2 | 3887.6 | 3846.5 | 3883.6 | 3876.5 |
| 5°     | 3883.6 | 3869.0 | 3827.8 | 3857.5 | 3850.3 |
| 7.5°   | 3857.5 | 3835.4 | 3794.1 | 3824.3 | 3816.7 |
| 10°    | 3816.7 | 3790.6 | 3745.8 | 3775.5 | 3764.4 |
| 12.5°  | 3760.4 | 3738.2 | 3693.5 | 3712.0 | 3704.6 |
| 15°    | 3697.1 | 3674.9 | 3626.1 | 3641.2 | 3622.5 |
| 17.5°  | 3618.6 | 3596.4 | 3547.7 | 3566.3 | 3547.7 |
| 20°    | 3532.6 | 3510.4 | 3458.1 | 3469.2 | 3454.5 |
| 22.5°  | 3447.0 | 3413.4 | 3364.6 | 3364.6 | 3357.1 |
| 25°    | 3346.0 | 3316.2 | 3252.9 | 3260.0 | 3252.9 |
| 27.5°  | 3233.8 | 3207.7 | 3159.4 | 3148.3 | 3129.7 |
| 30°    | 3122.2 | 3092.0 | 3036.1 | 3025.0 | 3010.0 |
| 32.5°  | 3002.5 | 2980.3 | 2920.4 | 2897.9 | 2882.8 |
| 35°    | 2886.8 | 2849.6 | 2789.7 | 2767.2 | 2748.5 |
| 37.5°  | 2756.1 | 2722.4 | 2662.5 | 2636.4 | 2617.8 |
| 40°    | 2621.7 | 2591.6 | 2531.7 | 2498.5 | 2483.5 |
| 42.5°  | 2490.9 | 2460.9 | 2401.4 | 2363.8 | 2341.7 |
| 45°    | 2349.1 | 2323.0 | 2266.7 | 2225.9 | 2210.9 |
| 47.5°  | 2210.9 | 2184.7 | 2124.8 | 2083.7 | 2061.5 |
| 50°    | 2065.1 | 2046.4 | 1994.1 | 1941.9 | 1923.2 |
| 52.5°  | 1923.2 | 1897.1 | 1848.7 | 1807.6 | 1781.4 |
| 55°    | 1777.8 | 1755.2 | 1710.4 | 1665.7 | 1647.1 |
| 57.5°  | 1632.0 | 1613.4 | 1564.7 | 1519.9 | 1504.8 |
| 60°    | 1486.2 | 1471.5 | 1419.2 | 1378.0 | 1367.0 |
| 62.5°  | 1344.3 | 1318.2 | 1280.9 | 1243.7 | 1228.7 |
| 65°    | 1198.9 | 1176.3 | 1139.1 | 1105.5 | 1086.8 |
| 67.5°  | 1049.6 | 1030.6 | 997.2  | 971.2  | 956.1  |
| 70°    | 911.3  | 896.2  | 862.6  | 836.4  | 821.8  |
| 72.5°  | 769.4  | 754.3  | 735.7  | 709.6  | 698.6  |
| 75°    | 627.3  | 620.0  | 601.1  | 578.9  | 586.4  |
| 77.5°  | 500.4  | 485.4  | 477.9  | 466.8  | 455.7  |
| 80°    | 373.6  | 369.6  | 362.1  | 351.0  | 343.6  |
| 82.5°  | 254.0  | 254.0  | 250.4  | 235.3  | 235.3  |
| 85°    | 152.9  | 149.4  | 145.8  | 134.3  | 130.8  |
| 87.5°  | 67.3   | 59.8   | 52.3   | 41.3   | 37.3   |
| 90°    | 2.9    | 35.7   | 59.4   | 74.6   | 80.3   |
| 92.5°  | 74.6   | 62.7   | 71.4   | 77.5   | 80.3   |
| 95°    | 193.5  | 95.2   | 116.0  | 131.2  | 128.1  |
| 97.5°  | 348.4  | 104.4  | 151.7  | 160.9  | 163.8  |
| 100°   | 527.4  | 119.2  | 169.8  | 193.5  | 199.5  |
| 102.5° | 723.7  | 718.1  | 175.8  | 208.4  | 217.6  |
| 105°   | 905.6  | 995.1  | 181.9  | 214.4  | 226.5  |
| 107.5° | 1117.2 | 1191.4 | 187.9  | 220.4  | 232.4  |
| 110°   | 1319.8 | 1382.1 | 521.5  | 223.6  | 235.2  |

TEST NUMBER: P912935

CATALOG NUMBER: DFN2DIP-TR4F0-090D110US850-FLLONL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1510.6 | 1563.9 | 1513.3 | 229.2  | 238.4  |
| 115°   | 1712.9 | 1763.4 | 1838.2 | 458.8  | 244.4  |
| 117.5° | 1888.7 | 1948.2 | 1999.1 | 1572.8 | 792.4  |
| 120°   | 2085.4 | 2129.9 | 2183.7 | 2219.4 | 1817.2 |
| 122.5° | 2252.0 | 2299.7 | 2359.5 | 2377.3 | 2380.5 |
| 125°   | 2421.8 | 2460.8 | 2517.3 | 2538.2 | 2547.0 |
| 127.5° | 2576.8 | 2618.5 | 2663.4 | 2693.1 | 2696.0 |
| 130°   | 2722.8 | 2770.6 | 2803.1 | 2836.0 | 2833.3 |
| 132.5° | 2871.8 | 2910.7 | 2943.3 | 2970.1 | 2967.4 |
| 135°   | 2997.1 | 3044.8 | 3071.3 | 3101.4 | 3095.3 |
| 137.5° | 3127.9 | 3163.6 | 3193.7 | 3223.4 | 3214.5 |
| 140°   | 3256.0 | 3280.0 | 3312.6 | 3339.4 | 3324.6 |
| 142.5° | 3363.5 | 3384.3 | 3422.9 | 3446.7 | 3431.8 |
| 145°   | 3476.7 | 3473.5 | 3524.1 | 3545.0 | 3530.2 |
| 147.5° | 3574.8 | 3565.9 | 3616.4 | 3631.3 | 3619.7 |
| 150°   | 3670.2 | 3649.4 | 3697.1 | 3714.8 | 3700.0 |
| 152.5° | 3750.5 | 3726.8 | 3771.4 | 3789.5 | 3768.6 |
| 155°   | 3828.0 | 3801.4 | 3837.1 | 3854.9 | 3831.2 |
| 157.5° | 3890.6 | 3866.9 | 3893.8 | 3914.7 | 3890.6 |
| 160°   | 3944.4 | 3926.3 | 3944.4 | 3962.0 | 3941.2 |
| 162.5° | 3991.7 | 3974.1 | 3989.0 | 4009.8 | 3983.0 |
| 165°   | 4033.5 | 4015.8 | 4024.7 | 4045.5 | 4024.7 |
| 167.5° | 4066.4 | 4048.4 | 4057.6 | 4078.5 | 4051.6 |
| 170°   | 4093.3 | 4075.2 | 4081.2 | 4102.2 | 4075.2 |
| 172.5° | 4111.0 | 4093.3 | 4099.3 | 4120.2 | 4093.3 |
| 175°   | 4125.8 | 4105.0 | 4111.0 | 4131.9 | 4102.2 |
| 177.5° | 4131.9 | 4111.0 | 4114.2 | 4135.0 | 4108.2 |
| 180°   | 4117.1 | 4117.1 | 4117.1 | 4117.1 | 4117.1 |

TEST NUMBER: P912935

CATALOG NUMBER: DFN2DIP-TR4F0-090D110US850-FLLONL

**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 | 10.70            | 11.52 | 11.70 | 12.53 | 13.87 | 10.27          | 11.09 | 11.27 | 12.10 | 13.44 |
|                 | 3H   | 12.36            | 13.09 | 13.37 | 14.11 | 15.47 | 11.89          | 12.62 | 12.90 | 13.64 | 15.00 |
|                 | 4H   | 12.95            | 13.64 | 13.97 | 14.66 | 16.03 | 12.47          | 13.17 | 13.50 | 14.19 | 15.56 |
|                 | 6H   | 13.34            | 13.98 | 14.38 | 15.01 | 16.39 | 12.87          | 13.51 | 13.90 | 14.53 | 15.92 |
|                 | 8H   | 13.45            | 14.06 | 14.48 | 15.10 | 16.48 | 12.97          | 13.58 | 14.01 | 14.62 | 16.00 |
|                 | 12H  | 13.49            | 14.07 | 14.54 | 15.11 | 16.51 | 13.01          | 13.59 | 14.06 | 14.63 | 16.03 |
| 4H              | 2H   | 11.16            | 11.86 | 12.19 | 12.88 | 14.25 | 10.82          | 11.51 | 11.84 | 12.53 | 13.90 |
|                 | 3H   | 13.02            | 13.60 | 14.06 | 14.65 | 16.03 | 12.63          | 13.21 | 13.67 | 14.26 | 15.64 |
|                 | 4H   | 13.73            | 14.27 | 14.78 | 15.31 | 16.71 | 13.33          | 13.86 | 14.37 | 14.90 | 16.31 |
|                 | 6H   | 14.25            | 14.70 | 15.30 | 15.77 | 17.17 | 13.84          | 14.30 | 14.89 | 15.36 | 16.76 |
|                 | 8H   | 14.40            | 14.82 | 15.45 | 15.88 | 17.30 | 13.98          | 14.41 | 15.04 | 15.47 | 16.88 |
|                 | 12H  | 14.47            | 14.85 | 15.54 | 15.92 | 17.35 | 14.05          | 14.43 | 15.12 | 15.50 | 16.92 |
| 8H              | 4H   | 13.93            | 14.35 | 14.98 | 15.41 | 16.83 | 13.57          | 13.99 | 14.62 | 15.05 | 16.47 |
|                 | 6H   | 14.56            | 14.91 | 15.64 | 16.01 | 17.42 | 14.19          | 14.55 | 15.27 | 15.65 | 17.06 |
|                 | 8H   | 14.78            | 15.09 | 15.86 | 16.17 | 17.60 | 14.41          | 14.72 | 15.49 | 15.80 | 17.23 |
|                 | 12H  | 14.91            | 15.18 | 16.00 | 16.26 | 17.73 | 14.52          | 14.80 | 15.61 | 15.87 | 17.35 |
| 12H             | 4H   | 13.91            | 14.30 | 14.98 | 15.37 | 16.79 | 13.56          | 13.95 | 14.63 | 15.02 | 16.44 |
|                 | 6H   | 14.59            | 14.90 | 15.67 | 15.98 | 17.41 | 14.24          | 14.55 | 15.32 | 15.63 | 17.06 |
|                 | 8H   | 14.83            | 15.10 | 15.92 | 16.18 | 17.65 | 14.47          | 14.74 | 15.56 | 15.82 | 17.29 |

END OF REPORT