

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: P908804

Luminaire Tested: DFN2DIP-PN4F0-090D100US840-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P908804  
REPORT IS A COMBINATION OF REPORTS P899727 AND P896497  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-PN4F0-090D100US840-FLLFLL  
Description: 4 foot, Pentagon Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

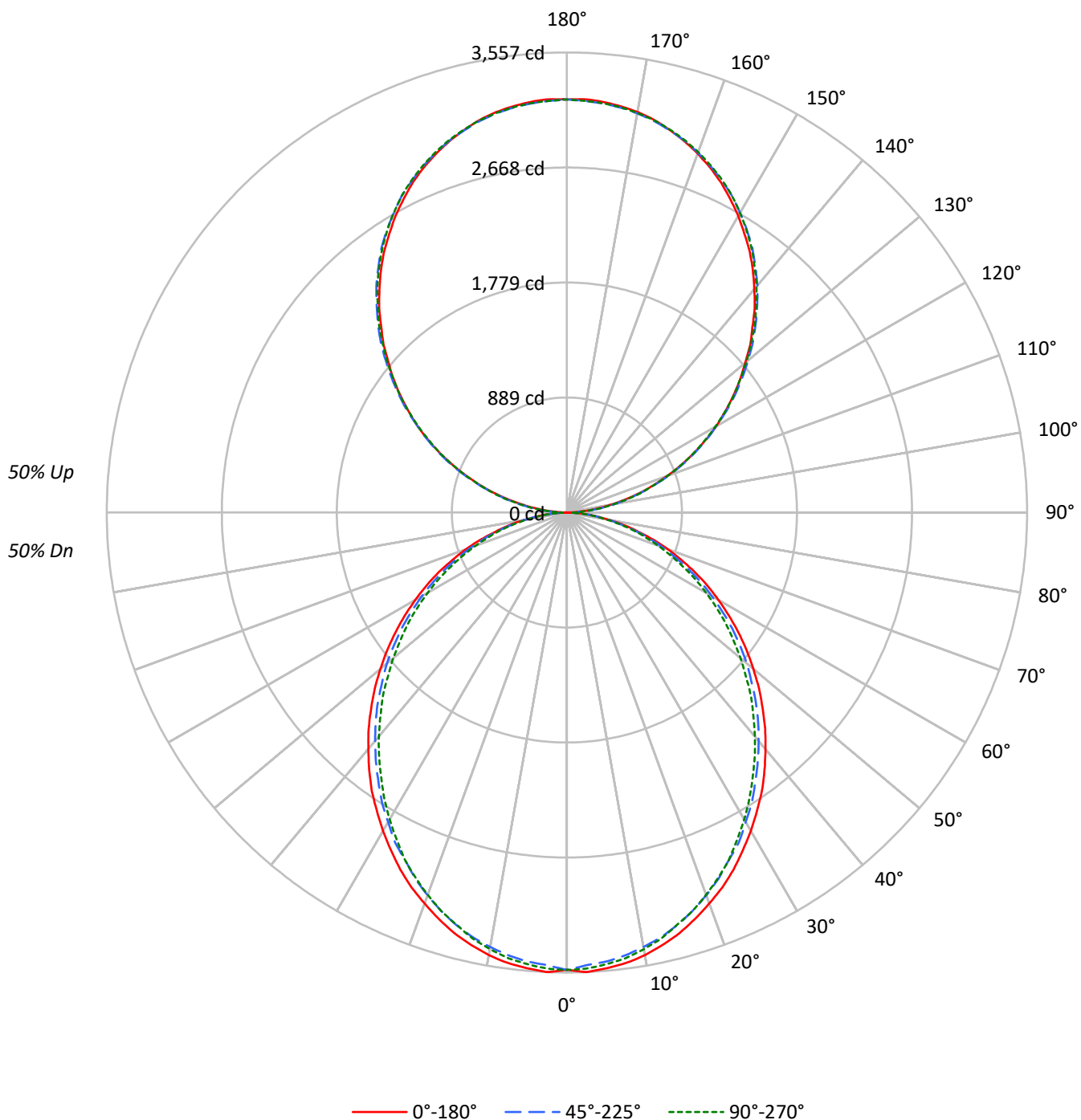
Lumens per Lamp: N/A  
Luminaire Lumens: 17935.2 lumens  
Efficiency: N/A  
Efficacy: 109.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.74' x L: 3.94' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 163.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9963  
Total Harmonic Distortion (THDi): 0.065  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P908804

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### Luminous Intensity Polar Plot



TEST NUMBER: P908804

CATALOG NUMBER: DFN2DIP-PN4F0-090D100US840-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   | 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 | 69 | 61 | 59 | 58 | 50 | 49 | 48 |
| 2   | 89  | 82  | 76  | 70  | 82 | 76 | 70 | 66 | 64 | 60 | 57 | 54 | 51 | 48 | 44 | 42 | 40 |
| 3   | 81  | 72  | 64  | 59  | 75 | 67 | 60 | 55 | 57 | 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 | 41 | 35 | 31 | 34 | 30 | 27 | 28 | 25 | 23 |
| 7   | 58  | 46  | 38  | 32  | 54 | 43 | 36 | 31 | 37 | 31 | 27 | 31 | 27 | 23 | 26 | 23 | 20 |
| 8   | 54  | 42  | 34  | 29  | 50 | 39 | 32 | 27 | 34 | 28 | 24 | 29 | 24 | 21 | 24 | 20 | 18 |
| 9   | 50  | 38  | 31  | 25  | 46 | 36 | 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°  | 2581 | 2581 | 2581 |
| 5°  | 2586 | 2546 | 2563 |
| 10° | 2565 | 2512 | 2529 |
| 15° | 2527 | 2471 | 2475 |
| 20° | 2476 | 2414 | 2420 |
| 25° | 2425 | 2345 | 2356 |
| 30° | 2362 | 2282 | 2275 |
| 35° | 2302 | 2207 | 2189 |
| 40° | 2227 | 2131 | 2108 |
| 45° | 2154 | 2055 | 2024 |
| 50° | 2073 | 1975 | 1927 |
| 55° | 1988 | 1883 | 1839 |
| 60° | 1892 | 1773 | 1737 |
| 65° | 1788 | 1660 | 1617 |
| 70° | 1655 | 1522 | 1488 |
| 75° | 1472 | 1357 | 1370 |
| 80° | 1250 | 1146 | 1142 |
| 85° | 904  | 783  | 764  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2501 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 332.9   | 1.9       |
| 10°-20°   | 936.5   | 5.2       |
| 20°-30°   | 1376.3  | 7.7       |
| 30°-40°   | 1598.5  | 8.9       |
| 40°-50°   | 1596.5  | 8.9       |
| 50°-60°   | 1392.1  | 7.8       |
| 60°-70°   | 1029.1  | 5.7       |
| 70°-80°   | 582.2   | 3.2       |
| 80°-90°   | 162.7   | 0.9       |
| 90°-100°  | 197.6   | 1.1       |
| 100°-110° | 627.9   | 3.5       |
| 110°-120° | 1074.6  | 6.0       |
| 120°-130° | 1413.3  | 7.9       |
| 130°-140° | 1586.4  | 8.8       |
| 140°-150° | 1555.6  | 8.7       |
| 150°-160° | 1304.9  | 7.3       |
| 160°-170° | 865.4   | 4.8       |
| 170°-180° | 302.5   | 1.7       |
| 0°-30°    | 2645.7  | 14.8      |
| 0°-40°    | 4244.2  | 23.7      |
| 0°-60°    | 7232.9  | 40.3      |
| 0°-90°    | 9007.0  | 50.2      |
| 90°-120°  | 1900.2  | 10.6      |
| 90°-150°  | 6455.4  | 36.0      |
| 90°-180°  | 8928.0  | 49.8      |
| 0°-180°   | 17935.2 | 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°  | 3    | 35    | 94   | 89    | 92   | 17   |
| 95°  | 141  | 168   | 172  | 172   | 168  | 156  |
| 105° | 580  | 587   | 593  | 598   | 598  | 612  |
| 115° | 1078 | 1094  | 1089 | 1086  | 1078 | 1067 |
| 125° | 1568 | 1593  | 1585 | 1576  | 1573 | 1402 |
| 135° | 2029 | 2059  | 2064 | 2062  | 2054 | 1568 |
| 145° | 2463 | 2482  | 2498 | 2500  | 2490 | 1539 |
| 155° | 2816 | 2824  | 2833 | 2846  | 2838 | 1296 |
| 165° | 3064 | 3061  | 3061 | 3080  | 3067 | 864  |
| 175° | 3188 | 3180  | 3175 | 3194  | 3177 | 303  |
| 180° | 3194 | 3194  | 3194 | 3194  | 3194 |      |

TEST NUMBER: P908804

CATALOG NUMBER: DFN2DIP-PN4F0-090D100US840-FLLFLL

**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°    | 2.9    | 34.6   | 94.3   | 88.6   | 91.5   |
| 92.5°  | 59.7   | 80.9   | 83.8   | 86.6   | 86.6   |
| 95°    | 140.6  | 167.5  | 172.4  | 172.4  | 167.5  |
| 97.5°  | 234.0  | 259.0  | 269.6  | 269.6  | 269.6  |
| 100°   | 341.8  | 364.0  | 371.6  | 371.6  | 368.8  |
| 102.5° | 455.4  | 471.8  | 482.4  | 485.2  | 482.4  |
| 105°   | 579.7  | 587.3  | 593.1  | 597.9  | 597.9  |
| 107.5° | 702.9  | 714.5  | 714.5  | 716.4  | 702.9  |
| 110°   | 822.3  | 837.7  | 837.7  | 837.7  | 830.0  |



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CATALOG NUMBER: DFN2DIP-PN4F0-090D100US840-FLLFLL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 951.3  | 967.7  | 964.8  | 957.0  | 951.3  |
| 115°   | 1078.4 | 1093.8 | 1089.0 | 1086.1 | 1078.4 |
| 117.5° | 1204.6 | 1225.8 | 1212.2 | 1204.6 | 1196.8 |
| 120°   | 1331.6 | 1352.8 | 1331.6 | 1331.6 | 1323.0 |
| 122.5° | 1447.1 | 1474.1 | 1460.7 | 1453.0 | 1447.1 |
| 125°   | 1568.5 | 1592.6 | 1584.9 | 1576.2 | 1573.4 |
| 127.5° | 1687.0 | 1716.8 | 1706.2 | 1694.7 | 1687.0 |
| 130°   | 1797.7 | 1832.3 | 1827.6 | 1821.7 | 1811.2 |
| 132.5° | 1921.9 | 1948.8 | 1950.8 | 1937.3 | 1929.6 |
| 135°   | 2028.7 | 2058.6 | 2064.4 | 2061.5 | 2053.8 |
| 137.5° | 2148.2 | 2172.2 | 2177.1 | 2175.1 | 2163.5 |
| 140°   | 2253.1 | 2277.1 | 2290.7 | 2290.7 | 2280.1 |
| 142.5° | 2361.0 | 2385.0 | 2392.7 | 2395.6 | 2385.0 |
| 145°   | 2463.0 | 2482.2 | 2497.7 | 2500.5 | 2489.9 |
| 147.5° | 2554.5 | 2578.6 | 2590.1 | 2595.0 | 2584.3 |
| 150°   | 2648.9 | 2665.2 | 2675.8 | 2684.4 | 2675.8 |
| 152.5° | 2732.6 | 2749.0 | 2762.5 | 2773.1 | 2762.5 |
| 155°   | 2816.4 | 2824.1 | 2832.8 | 2846.2 | 2837.5 |
| 157.5° | 2888.6 | 2894.4 | 2899.2 | 2918.4 | 2905.0 |
| 160°   | 2953.1 | 2958.9 | 2961.7 | 2978.1 | 2966.6 |
| 162.5° | 3012.8 | 3012.8 | 3015.7 | 3033.9 | 3020.5 |
| 165°   | 3063.8 | 3060.9 | 3060.9 | 3080.2 | 3066.8 |
| 167.5° | 3110.1 | 3101.4 | 3101.4 | 3120.7 | 3107.2 |
| 170°   | 3144.7 | 3137.0 | 3134.1 | 3153.4 | 3137.0 |
| 172.5° | 3168.8 | 3161.1 | 3158.2 | 3177.4 | 3161.1 |
| 175°   | 3188.0 | 3180.4 | 3174.6 | 3193.8 | 3177.4 |
| 177.5° | 3198.6 | 3191.0 | 3185.1 | 3201.5 | 3185.1 |
| 180°   | 3193.8 | 3193.8 | 3193.8 | 3193.8 | 3193.8 |

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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 | 10.59            | 11.46 | 11.55 | 12.43 | 13.70 | 10.15          | 11.02 | 11.11 | 11.99 | 13.25 |
|                 | 3H   | 12.26            | 13.03 | 13.22 | 14.01 | 15.30 | 11.77          | 12.55 | 12.74 | 13.53 | 14.82 |
|                 | 4H   | 12.85            | 13.58 | 13.83 | 14.56 | 15.86 | 12.36          | 13.09 | 13.34 | 14.08 | 15.37 |
|                 | 6H   | 13.25            | 13.92 | 14.24 | 14.91 | 16.22 | 12.76          | 13.43 | 13.75 | 14.42 | 15.73 |
|                 | 8H   | 13.35            | 14.00 | 14.35 | 15.00 | 16.31 | 12.86          | 13.50 | 13.86 | 14.51 | 15.82 |
|                 | 12H  | 13.40            | 14.02 | 14.41 | 15.02 | 16.35 | 12.90          | 13.52 | 13.91 | 14.52 | 15.85 |
| 4H              | 2H   | 11.05            | 11.79 | 12.04 | 12.77 | 14.07 | 10.70          | 11.44 | 11.69 | 12.42 | 13.72 |
|                 | 3H   | 12.92            | 13.54 | 13.92 | 14.55 | 15.86 | 12.52          | 13.13 | 13.52 | 14.15 | 15.46 |
|                 | 4H   | 13.64            | 14.20 | 14.64 | 15.21 | 16.54 | 13.22          | 13.78 | 14.23 | 14.79 | 16.12 |
|                 | 6H   | 14.16            | 14.64 | 15.17 | 15.67 | 17.00 | 13.73          | 14.22 | 14.75 | 15.25 | 16.58 |
|                 | 8H   | 14.31            | 14.76 | 15.33 | 15.78 | 17.13 | 13.88          | 14.33 | 14.90 | 15.35 | 16.70 |
|                 | 12H  | 14.38            | 14.79 | 15.42 | 15.83 | 17.18 | 13.94          | 14.35 | 14.98 | 15.39 | 16.74 |
| 8H              | 4H   | 13.84            | 14.29 | 14.85 | 15.31 | 16.66 | 13.47          | 13.92 | 14.48 | 14.94 | 16.29 |
|                 | 6H   | 14.47            | 14.84 | 15.51 | 15.91 | 17.25 | 14.10          | 14.47 | 15.14 | 15.53 | 16.88 |
|                 | 8H   | 14.69            | 15.02 | 15.74 | 16.07 | 17.44 | 14.31          | 14.64 | 15.36 | 15.69 | 17.05 |
|                 | 12H  | 14.83            | 15.12 | 15.88 | 16.16 | 17.57 | 14.43          | 14.72 | 15.48 | 15.76 | 17.17 |
| 12H             | 4H   | 13.82            | 14.23 | 14.86 | 15.27 | 16.62 | 13.46          | 13.87 | 14.50 | 14.91 | 16.26 |
|                 | 6H   | 14.50            | 14.83 | 15.55 | 15.88 | 17.25 | 14.14          | 14.47 | 15.19 | 15.52 | 16.88 |
|                 | 8H   | 14.75            | 15.04 | 15.80 | 16.08 | 17.49 | 14.37          | 14.66 | 15.43 | 15.71 | 17.12 |

END OF REPORT