

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: P910173

Luminaire Tested: DFN2DIP-TR4F0-080D110US840-RLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P910173  
REPORT IS A COMBINATION OF REPORTS P902024 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-080D110US840-RLLONL  
Description: 4 foot, Triangle Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

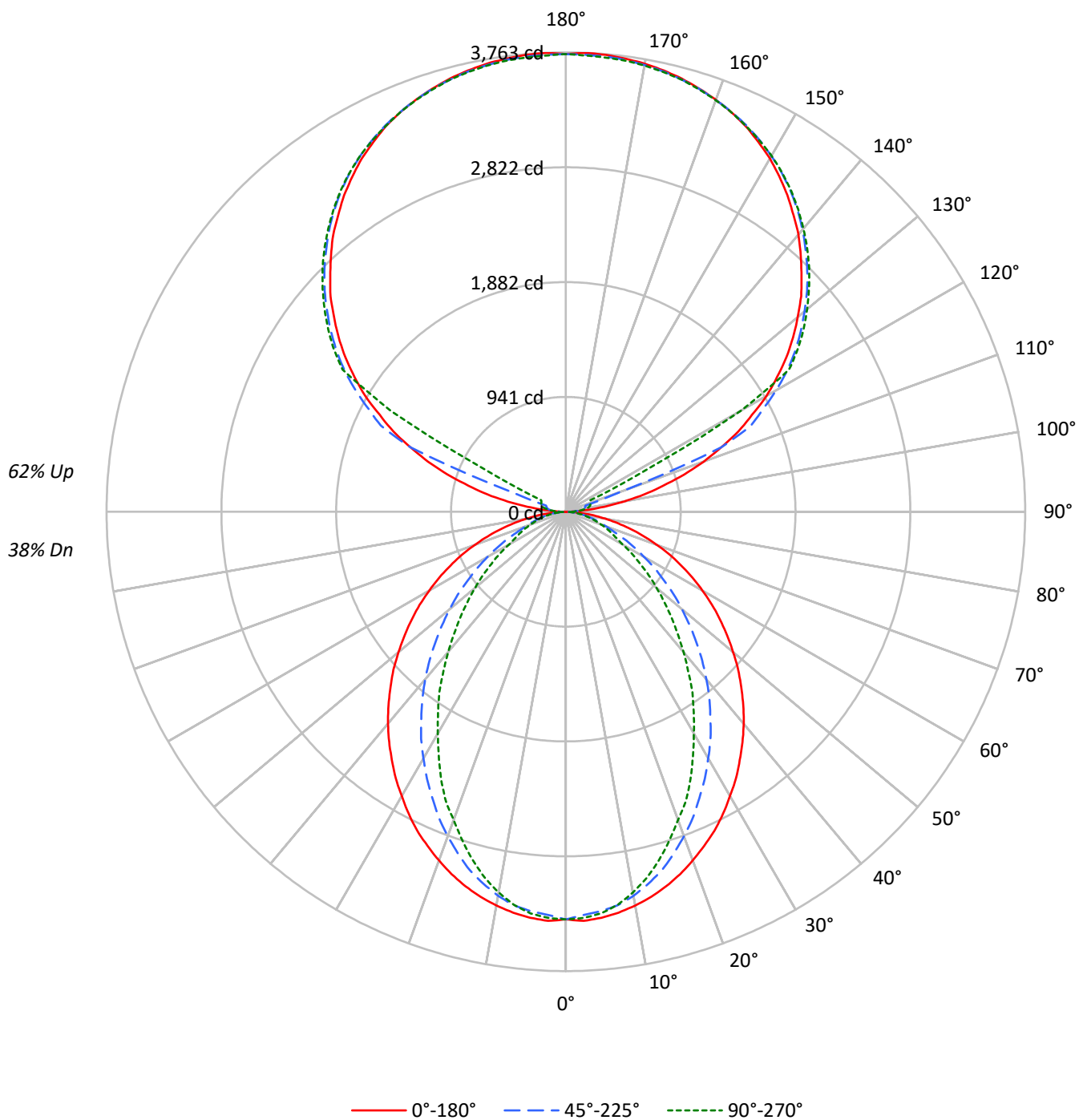
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 17864.5 lumens  
Efficiency: N/A  
Efficacy: 111.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: Semi-Indirect  
  
Input Watts (W): 159.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9957  
Total Harmonic Distortion (THDi): 0.049  
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



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**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   | 104 | 104 | 104 | 104 | 95 | 95 | 95 | 95 | 77 | 77 | 77 | 61 | 61 | 61 | 46 | 46 | 46 | 38 |    |    |
| 1   | 96  | 91  | 88  | 84  | 87 | 83 | 80 | 77 | 68 | 66 | 64 | 54 | 52 | 51 | 41 | 40 | 39 | 33 |    |    |
| 2   | 87  | 80  | 74  | 70  | 79 | 73 | 68 | 64 | 60 | 56 | 53 | 48 | 45 | 43 | 36 | 35 | 34 | 28 |    |    |
| 3   | 80  | 71  | 64  | 58  | 72 | 65 | 59 | 54 | 53 | 49 | 45 | 42 | 39 | 37 | 33 | 31 | 29 | 24 |    |    |
| 4   | 73  | 63  | 55  | 50  | 66 | 58 | 51 | 46 | 47 | 43 | 39 | 38 | 35 | 32 | 29 | 27 | 25 | 21 |    |    |
| 5   | 67  | 56  | 48  | 43  | 61 | 51 | 45 | 40 | 43 | 38 | 34 | 34 | 31 | 28 | 27 | 24 | 22 | 19 |    |    |
| 6   | 62  | 50  | 43  | 37  | 56 | 46 | 39 | 35 | 38 | 33 | 30 | 31 | 27 | 25 | 24 | 22 | 20 | 17 |    |    |
| 7   | 57  | 46  | 38  | 33  | 52 | 42 | 35 | 30 | 35 | 30 | 26 | 28 | 25 | 22 | 22 | 20 | 18 | 15 |    |    |
| 8   | 53  | 41  | 34  | 29  | 48 | 38 | 32 | 27 | 32 | 27 | 23 | 26 | 22 | 20 | 20 | 18 | 16 | 13 |    |    |
| 9   | 50  | 38  | 31  | 26  | 45 | 35 | 28 | 24 | 29 | 24 | 21 | 24 | 20 | 18 | 19 | 16 | 14 | 12 |    |    |
| 10  | 46  | 35  | 28  | 23  | 42 | 32 | 26 | 22 | 27 | 22 | 19 | 22 | 19 | 16 | 18 | 15 | 13 | 11 |    |    |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2653 | 2653 | 2653 |
| 5°  | 2657 | 2610 | 2627 |
| 10° | 2631 | 2559 | 2542 |
| 15° | 2594 | 2475 | 2409 |
| 20° | 2547 | 2358 | 2247 |
| 25° | 2498 | 2227 | 2090 |
| 30° | 2432 | 2093 | 1892 |
| 35° | 2367 | 1949 | 1717 |
| 40° | 2301 | 1800 | 1517 |
| 45° | 2225 | 1635 | 1336 |
| 50° | 2146 | 1468 | 1159 |
| 55° | 2064 | 1289 | 989  |
| 60° | 1969 | 1103 | 814  |
| 65° | 1859 | 913  | 732  |
| 70° | 1726 | 736  | 663  |
| 75° | 1559 | 649  | 603  |
| 80° | 1317 | 544  | 522  |
| 85° | 919  | 363  | 392  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2225 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 312.9   | 1.8       |
| 10°-20°   | 859.1   | 4.8       |
| 20°-30°   | 1206.1  | 6.8       |
| 30°-40°   | 1314.7  | 7.4       |
| 40°-50°   | 1208.4  | 6.8       |
| 50°-60°   | 949.0   | 5.3       |
| 60°-70°   | 617.7   | 3.5       |
| 70°-80°   | 318.0   | 1.8       |
| 80°-90°   | 87.8    | 0.5       |
| 90°-100°  | 123.6   | 0.7       |
| 100°-110° | 460.8   | 2.6       |
| 110°-120° | 1222.2  | 6.8       |
| 120°-130° | 2027.1  | 11.3      |
| 130°-140° | 2153.3  | 12.1      |
| 140°-150° | 2001.2  | 11.2      |
| 150°-160° | 1608.9  | 9.0       |
| 160°-170° | 1036.7  | 5.8       |
| 170°-180° | 356.8   | 2.0       |
| 0°-30°    | 2378.1  | 13.3      |
| 0°-40°    | 3692.9  | 20.7      |
| 0°-60°    | 5850.2  | 32.7      |
| 0°-90°    | 6873.7  | 38.5      |
| 90°-120°  | 1806.7  | 10.1      |
| 90°-150°  | 7988.3  | 44.7      |
| 90°-180°  | 10991.0 | 61.5      |
| 0°-180°   | 17864.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3339 | 3339  | 3339 | 3339  | 3339 |      |
| 5°   | 3339 | 3324  | 3284 | 3312  | 3303 | 317  |
| 15°  | 3176 | 3142  | 3040 | 2982  | 2952 | 895  |
| 25°  | 2883 | 2786  | 2587 | 2463  | 2417 | 1326 |
| 35°  | 2484 | 2330  | 2064 | 1874  | 1807 | 1555 |
| 45°  | 2031 | 1828  | 1511 | 1296  | 1224 | 1568 |
| 55°  | 1544 | 1308  | 982  | 801   | 744  | 1380 |
| 65°  | 1043 | 798   | 526  | 423   | 414  | 1034 |
| 75°  | 556  | 344   | 242  | 221   | 218  | 588  |
| 85°  | 130  | 66    | 57   | 57    | 57   | 149  |
| 90°  | 3    | 32    | 54   | 68    | 73   | 17   |
| 95°  | 176  | 87    | 106  | 120   | 117  | 209  |
| 105° | 825  | 906   | 166  | 195   | 206  | 881  |
| 115° | 1560 | 1606  | 1674 | 418   | 223  | 1536 |
| 125° | 2205 | 2241  | 2292 | 2311  | 2319 | 1967 |
| 135° | 2729 | 2773  | 2797 | 2824  | 2819 | 2108 |
| 145° | 3166 | 3163  | 3209 | 3228  | 3215 | 1980 |
| 155° | 3486 | 3462  | 3494 | 3510  | 3489 | 1606 |
| 165° | 3673 | 3657  | 3665 | 3684  | 3665 | 1038 |
| 175° | 3757 | 3738  | 3744 | 3763  | 3736 | 358  |
| 180° | 3749 | 3749  | 3749 | 3749  | 3749 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3339.0 | 3339.0 | 3339.0 | 3339.0 | 3339.0 |
| 2.5°   | 3354.1 | 3339.0 | 3305.7 | 3336.1 | 3330.0 |
| 5°     | 3339.0 | 3324.0 | 3284.5 | 3311.8 | 3302.8 |
| 7.5°   | 3311.8 | 3293.8 | 3251.5 | 3263.4 | 3248.2 |
| 10°    | 3275.5 | 3254.4 | 3194.1 | 3184.8 | 3166.8 |
| 12.5°  | 3230.4 | 3203.1 | 3121.3 | 3103.3 | 3070.0 |
| 15°    | 3175.8 | 3142.5 | 3039.9 | 2982.5 | 2952.3 |
| 17.5°  | 3112.3 | 3063.9 | 2937.0 | 2870.6 | 2822.2 |
| 20°    | 3039.9 | 2979.3 | 2828.3 | 2753.0 | 2686.2 |
| 22.5°  | 2961.3 | 2891.7 | 2716.4 | 2613.8 | 2568.6 |
| 25°    | 2882.8 | 2786.0 | 2586.6 | 2462.9 | 2417.3 |
| 27.5°  | 2789.1 | 2686.2 | 2465.7 | 2323.7 | 2254.1 |
| 30°    | 2689.5 | 2574.3 | 2332.7 | 2178.8 | 2097.0 |
| 32.5°  | 2592.6 | 2453.6 | 2206.1 | 2024.6 | 1948.9 |
| 35°    | 2484.0 | 2329.8 | 2064.0 | 1873.6 | 1806.9 |
| 37.5°  | 2378.1 | 2211.8 | 1931.0 | 1722.2 | 1646.9 |
| 40°    | 2266.3 | 2085.2 | 1791.8 | 1577.3 | 1498.7 |
| 42.5°  | 2151.5 | 1958.2 | 1652.9 | 1429.3 | 1353.8 |
| 45°    | 2030.6 | 1828.1 | 1511.0 | 1296.2 | 1223.8 |
| 47.5°  | 1915.9 | 1701.4 | 1375.0 | 1160.2 | 1093.9 |
| 50°    | 1788.9 | 1574.5 | 1242.0 | 1033.3 | 970.1  |
| 52.5°  | 1664.9 | 1438.1 | 1115.0 | 915.6  | 858.3  |
| 55°    | 1544.0 | 1308.4 | 982.0  | 800.8  | 743.5  |
| 57.5°  | 1420.3 | 1178.5 | 864.3  | 695.1  | 646.6  |
| 60°    | 1293.2 | 1051.6 | 740.2  | 586.3  | 538.0  |
| 62.5°  | 1169.5 | 927.8  | 634.5  | 489.6  | 465.5  |
| 65°    | 1042.6 | 797.6  | 525.7  | 423.2  | 413.8  |
| 67.5°  | 921.7  | 676.8  | 423.2  | 371.5  | 362.6  |
| 70°    | 794.8  | 559.2  | 350.4  | 320.2  | 308.1  |
| 72.5°  | 673.9  | 450.1  | 293.1  | 269.0  | 262.9  |
| 75°    | 555.9  | 344.4  | 241.8  | 220.6  | 217.7  |
| 77.5°  | 438.3  | 244.6  | 190.5  | 178.2  | 172.2  |
| 80°    | 329.2  | 175.4  | 144.9  | 133.0  | 133.0  |
| 82.5°  | 229.5  | 118.0  | 99.7   | 93.6   | 93.6   |
| 85°    | 129.9  | 66.3   | 57.4   | 57.4   | 57.4   |
| 87.5°  | 48.4   | 24.0   | 24.0   | 21.2   | 21.2   |
| 90°    | 2.6    | 32.5   | 54.1   | 68.0   | 73.1   |
| 92.5°  | 68.0   | 57.1   | 65.0   | 70.6   | 73.1   |
| 95°    | 176.2  | 86.6   | 105.6  | 119.5  | 116.6  |
| 97.5°  | 317.3  | 95.0   | 138.1  | 146.5  | 149.2  |
| 100°   | 480.3  | 108.6  | 154.6  | 176.2  | 181.7  |
| 102.5° | 659.0  | 653.9  | 160.1  | 189.8  | 198.1  |
| 105°   | 824.7  | 906.2  | 165.6  | 195.2  | 206.2  |
| 107.5° | 1017.3 | 1084.9 | 171.1  | 200.7  | 211.7  |
| 110°   | 1201.8 | 1258.6 | 474.8  | 203.6  | 214.2  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1375.5 | 1424.1 | 1378.1 | 208.7  | 217.1  |
| 115°   | 1559.7 | 1605.8 | 1673.9 | 417.8  | 222.6  |
| 117.5° | 1719.9 | 1774.0 | 1820.4 | 1432.2 | 721.5  |
| 120°   | 1899.0 | 1939.5 | 1988.5 | 2021.0 | 1654.8 |
| 122.5° | 2050.7 | 2094.2 | 2148.6 | 2164.7 | 2167.7 |
| 125°   | 2205.3 | 2240.8 | 2292.3 | 2311.3 | 2319.4 |
| 127.5° | 2346.4 | 2384.4 | 2425.3 | 2452.4 | 2455.0 |
| 130°   | 2479.4 | 2522.9 | 2552.5 | 2582.5 | 2580.0 |
| 132.5° | 2615.0 | 2650.5 | 2680.2 | 2704.6 | 2702.1 |
| 135°   | 2729.2 | 2772.6 | 2796.7 | 2824.2 | 2818.6 |
| 137.5° | 2848.3 | 2880.8 | 2908.2 | 2935.3 | 2927.2 |
| 140°   | 2965.0 | 2986.8 | 3016.5 | 3040.9 | 3027.4 |
| 142.5° | 3062.8 | 3081.8 | 3116.9 | 3138.6 | 3125.0 |
| 145°   | 3165.9 | 3163.0 | 3209.0 | 3228.1 | 3214.6 |
| 147.5° | 3255.2 | 3247.1 | 3293.2 | 3306.7 | 3296.1 |
| 150°   | 3342.2 | 3323.2 | 3366.6 | 3382.7 | 3369.2 |
| 152.5° | 3415.3 | 3393.7 | 3434.2 | 3450.7 | 3431.7 |
| 155°   | 3485.9 | 3461.6 | 3494.1 | 3510.3 | 3488.7 |
| 157.5° | 3542.8 | 3521.2 | 3545.7 | 3564.7 | 3542.8 |
| 160°   | 3591.8 | 3575.3 | 3591.8 | 3607.8 | 3588.9 |
| 162.5° | 3634.9 | 3618.9 | 3632.4 | 3651.4 | 3626.9 |
| 165°   | 3673.0 | 3656.8 | 3664.9 | 3683.9 | 3664.9 |
| 167.5° | 3702.9 | 3686.5 | 3694.9 | 3713.9 | 3689.4 |
| 170°   | 3727.4 | 3711.0 | 3716.4 | 3735.5 | 3711.0 |
| 172.5° | 3743.5 | 3727.4 | 3732.9 | 3751.9 | 3727.4 |
| 175°   | 3757.0 | 3738.0 | 3743.5 | 3762.6 | 3735.5 |
| 177.5° | 3762.6 | 3743.5 | 3746.4 | 3765.4 | 3740.9 |
| 180°   | 3749.0 | 3749.0 | 3749.0 | 3749.0 | 3749.0 |

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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 | 9.35             | 10.10 | 10.41 | 11.15 | 12.58 | 5.32           | 6.07 | 6.38  | 7.12  | 8.55  |
|                 | 3H   | 11.02            | 11.69 | 12.09 | 12.75 | 14.20 | 6.51           | 7.17 | 7.57  | 8.24  | 9.69  |
|                 | 4H   | 11.63            | 12.26 | 12.70 | 13.32 | 14.78 | 6.95           | 7.58 | 8.03  | 8.65  | 10.11 |
|                 | 6H   | 12.04            | 12.62 | 13.13 | 13.69 | 15.16 | 7.27           | 7.85 | 8.36  | 8.92  | 10.39 |
|                 | 8H   | 12.17            | 12.72 | 13.26 | 13.80 | 15.26 | 7.36           | 7.91 | 8.45  | 9.00  | 10.46 |
|                 | 12H  | 12.23            | 12.75 | 13.32 | 13.83 | 15.31 | 7.40           | 7.93 | 8.50  | 9.00  | 10.49 |
| 4H              | 2H   | 9.36             | 9.99  | 10.44 | 11.06 | 12.51 | 5.91           | 6.54 | 6.99  | 7.61  | 9.06  |
|                 | 3H   | 11.18            | 11.70 | 12.27 | 12.80 | 14.27 | 7.25           | 7.78 | 8.34  | 8.87  | 10.34 |
|                 | 4H   | 11.87            | 12.35 | 12.96 | 13.43 | 14.92 | 7.80           | 8.28 | 8.89  | 9.36  | 10.85 |
|                 | 6H   | 12.38            | 12.79 | 13.48 | 13.90 | 15.38 | 8.21           | 8.62 | 9.32  | 9.73  | 11.21 |
|                 | 8H   | 12.55            | 12.94 | 13.66 | 14.04 | 15.53 | 8.34           | 8.73 | 9.44  | 9.82  | 11.32 |
|                 | 12H  | 12.64            | 12.99 | 13.76 | 14.10 | 15.61 | 8.40           | 8.75 | 9.52  | 9.86  | 11.36 |
| 8H              | 4H   | 11.83            | 12.21 | 12.93 | 13.31 | 14.81 | 8.07           | 8.46 | 9.17  | 9.56  | 11.05 |
|                 | 6H   | 12.39            | 12.71 | 13.52 | 13.85 | 15.35 | 8.59           | 8.90 | 9.71  | 10.05 | 11.54 |
|                 | 8H   | 12.61            | 12.89 | 13.74 | 14.01 | 15.52 | 8.78           | 9.06 | 9.91  | 10.18 | 11.69 |
|                 | 12H  | 12.74            | 12.99 | 13.88 | 14.11 | 15.66 | 8.90           | 9.14 | 10.03 | 10.26 | 11.81 |
| 12H             | 4H   | 11.78            | 12.13 | 12.90 | 13.24 | 14.74 | 8.07           | 8.42 | 9.19  | 9.53  | 11.03 |
|                 | 6H   | 12.37            | 12.65 | 13.50 | 13.77 | 15.28 | 8.64           | 8.91 | 9.77  | 10.04 | 11.55 |
|                 | 8H   | 12.59            | 12.83 | 13.72 | 13.95 | 15.50 | 8.84           | 9.09 | 9.98  | 10.21 | 11.76 |

END OF REPORT