

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: P912310

Luminaire Tested: DFN2DIP-SQ4F0-110D080US850-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P912310  
REPORT IS A COMBINATION OF REPORTS P900106 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-110D080US850-RLLFLL  
Description: 4 foot, Square Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

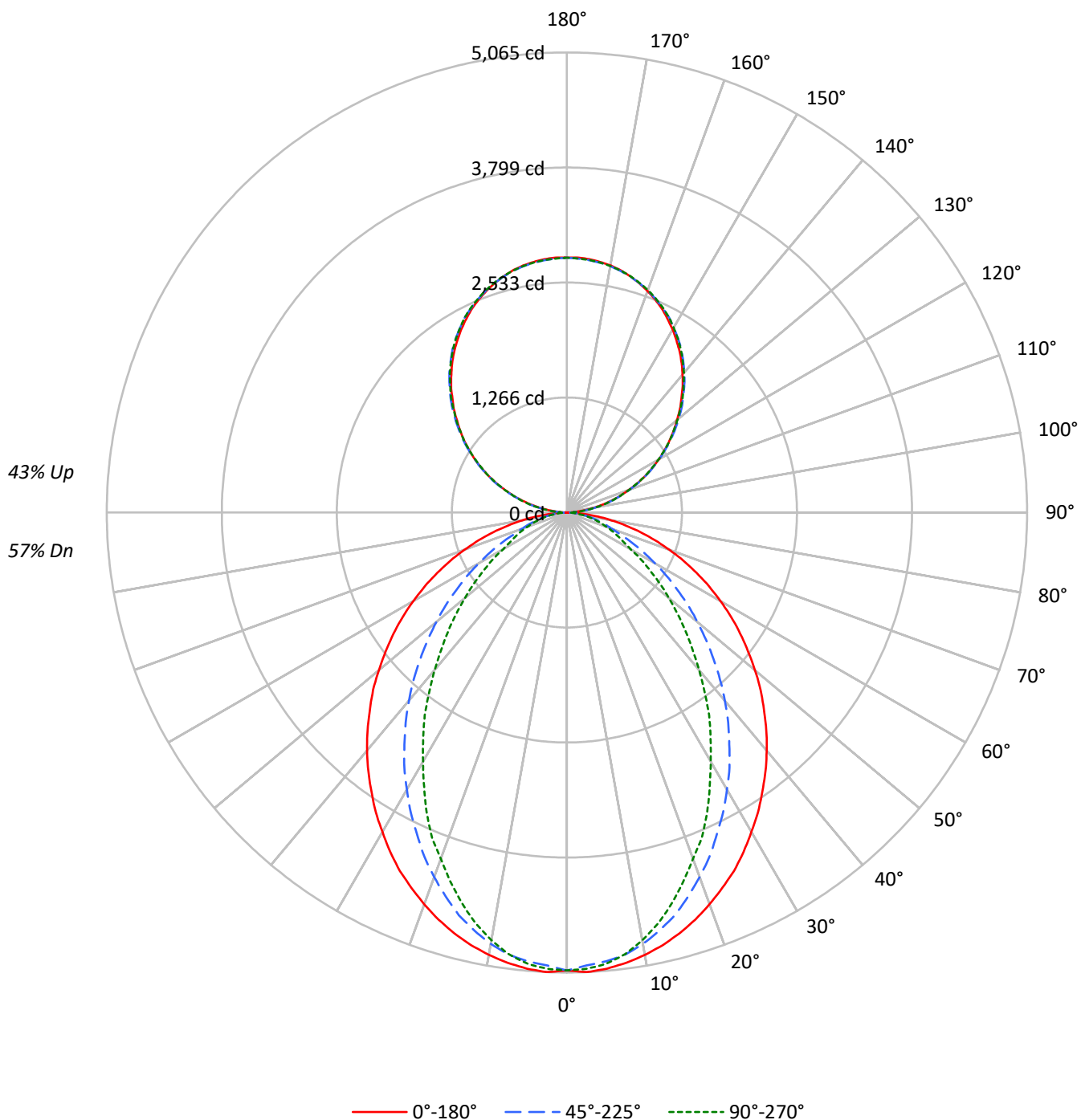
Lumens per Lamp: N/A  
Luminaire Lumens: 18220.9 lumens  
Efficiency: N/A  
Efficacy: 110.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 164.6  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9951  
Total Harmonic Distortion (THDi): 0.07  
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: P912310

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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 |
| RCR |     |     |     |     |  |     |     |     |     |  |    |    |    |  |    |    |    |  |    |    |    |
| 0   | 109 | 109 | 109 | 109 |  | 101 | 101 | 101 | 101 |  | 87 | 87 | 87 |  | 74 | 74 | 74 |  | 63 | 63 | 63 |
| 1   | 100 | 96  | 92  | 89  |  | 93  | 89  | 86  | 83  |  | 77 | 75 | 73 |  | 66 | 65 | 63 |  | 56 | 55 | 54 |
| 2   | 91  | 84  | 78  | 73  |  | 85  | 79  | 74  | 69  |  | 68 | 65 | 61 |  | 59 | 56 | 54 |  | 50 | 48 | 46 |
| 3   | 84  | 75  | 67  | 62  |  | 78  | 70  | 64  | 58  |  | 61 | 56 | 52 |  | 53 | 49 | 46 |  | 45 | 42 | 40 |
| 4   | 77  | 66  | 59  | 53  |  | 71  | 62  | 55  | 50  |  | 54 | 49 | 45 |  | 47 | 43 | 40 |  | 40 | 37 | 35 |
| 5   | 71  | 59  | 52  | 46  |  | 66  | 56  | 49  | 43  |  | 49 | 43 | 39 |  | 43 | 38 | 35 |  | 37 | 33 | 31 |
| 6   | 65  | 54  | 46  | 40  |  | 61  | 50  | 43  | 38  |  | 44 | 39 | 34 |  | 39 | 34 | 31 |  | 34 | 30 | 27 |
| 7   | 61  | 49  | 41  | 35  |  | 57  | 46  | 39  | 34  |  | 40 | 35 | 31 |  | 35 | 31 | 28 |  | 31 | 27 | 25 |
| 8   | 56  | 44  | 37  | 31  |  | 53  | 42  | 35  | 30  |  | 37 | 31 | 27 |  | 33 | 28 | 25 |  | 28 | 25 | 22 |
| 9   | 53  | 41  | 33  | 28  |  | 49  | 38  | 32  | 27  |  | 34 | 29 | 25 |  | 30 | 26 | 22 |  | 26 | 23 | 20 |
| 10  | 49  | 37  | 30  | 26  |  | 46  | 35  | 29  | 24  |  | 32 | 26 | 22 |  | 28 | 24 | 20 |  | 24 | 21 | 18 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3538 | 3538 | 3538 |
| 5°  | 3543 | 3482 | 3505 |
| 10° | 3508 | 3415 | 3392 |
| 15° | 3460 | 3303 | 3216 |
| 20° | 3396 | 3148 | 3001 |
| 25° | 3330 | 2974 | 2793 |
| 30° | 3243 | 2796 | 2528 |
| 35° | 3156 | 2604 | 2296 |
| 40° | 3069 | 2405 | 2029 |
| 45° | 2967 | 2185 | 1788 |
| 50° | 2862 | 1963 | 1552 |
| 55° | 2752 | 1725 | 1325 |
| 60° | 2624 | 1476 | 1092 |
| 65° | 2478 | 1223 | 984  |
| 70° | 2301 | 988  | 892  |
| 75° | 2078 | 872  | 814  |
| 80° | 1755 | 734  | 709  |
| 85° | 1222 | 494  | 540  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2967 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 472.5   | 2.6       |
| 10°-20°   | 1297.2  | 7.1       |
| 20°-30°   | 1821.2  | 10.0      |
| 30°-40°   | 1985.2  | 10.9      |
| 40°-50°   | 1824.6  | 10.0      |
| 50°-60°   | 1433.0  | 7.9       |
| 60°-70°   | 932.7   | 5.1       |
| 70°-80°   | 480.1   | 2.6       |
| 80°-90°   | 130.6   | 0.7       |
| 90°-100°  | 173.6   | 1.0       |
| 100°-110° | 551.7   | 3.0       |
| 110°-120° | 944.1   | 5.2       |
| 120°-130° | 1241.6  | 6.8       |
| 130°-140° | 1393.7  | 7.6       |
| 140°-150° | 1366.6  | 7.5       |
| 150°-160° | 1146.4  | 6.3       |
| 160°-170° | 760.3   | 4.2       |
| 170°-180° | 265.7   | 1.5       |
| 0°-30°    | 3590.9  | 19.7      |
| 0°-40°    | 5576.1  | 30.6      |
| 0°-60°    | 8833.7  | 48.5      |
| 0°-90°    | 10377.1 | 57.0      |
| 90°-120°  | 1669.4  | 9.2       |
| 90°-150°  | 5671.3  | 31.1      |
| 90°-180°  | 7844.0  | 43.0      |
| 0°-180°   | 18220.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5042 | 5042  | 5042 | 5042  | 5042 |      |
| 5°   | 5042 | 5019  | 4960 | 5001  | 4987 | 478  |
| 15°  | 4795 | 4745  | 4590 | 4504  | 4458 | 1351 |
| 25°  | 4353 | 4207  | 3906 | 3719  | 3650 | 2002 |
| 35°  | 3751 | 3518  | 3117 | 2829  | 2728 | 2348 |
| 45°  | 3066 | 2760  | 2282 | 1957  | 1848 | 2368 |
| 55°  | 2331 | 1976  | 1483 | 1209  | 1123 | 2083 |
| 65°  | 1574 | 1204  | 794  | 639   | 625  | 1561 |
| 75°  | 839  | 520   | 365  | 333   | 329  | 888  |
| 85°  | 196  | 100   | 87   | 87    | 87   | 225  |
| 90°  | 3    | 30    | 83   | 78    | 80   | 18   |
| 95°  | 124  | 147   | 151  | 151   | 147  | 137  |
| 105° | 509  | 516   | 521  | 525   | 525  | 537  |
| 115° | 947  | 961   | 957  | 954   | 947  | 937  |
| 125° | 1378 | 1399  | 1392 | 1385  | 1382 | 1231 |
| 135° | 1782 | 1809  | 1814 | 1811  | 1804 | 1378 |
| 145° | 2164 | 2181  | 2194 | 2197  | 2188 | 1352 |
| 155° | 2474 | 2481  | 2489 | 2500  | 2493 | 1139 |
| 165° | 2692 | 2689  | 2689 | 2706  | 2694 | 759  |
| 175° | 2801 | 2794  | 2789 | 2806  | 2792 | 266  |
| 180° | 2806 | 2806  | 2806 | 2806  | 2806 |      |

TEST NUMBER: P912310

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5041.8 | 5041.8 | 5041.8 | 5041.8 | 5041.8 |
| 2.5°   | 5064.6 | 5041.8 | 4991.5 | 5037.5 | 5028.3 |
| 5°     | 5041.8 | 5019.1 | 4959.6 | 5000.7 | 4987.2 |
| 7.5°   | 5000.7 | 4973.5 | 4909.7 | 4927.6 | 4904.8 |
| 10°    | 4946.0 | 4914.0 | 4823.0 | 4809.0 | 4781.9 |
| 12.5°  | 4877.7 | 4836.6 | 4713.1 | 4686.0 | 4635.6 |
| 15°    | 4795.4 | 4745.1 | 4590.2 | 4503.5 | 4458.0 |
| 17.5°  | 4699.6 | 4626.5 | 4434.8 | 4334.5 | 4261.4 |
| 20°    | 4590.2 | 4498.7 | 4270.6 | 4156.9 | 4056.2 |
| 22.5°  | 4471.6 | 4366.5 | 4101.7 | 3946.8 | 3878.5 |
| 25°    | 4352.9 | 4206.8 | 3905.7 | 3718.8 | 3650.1 |
| 27.5°  | 4211.6 | 4056.2 | 3723.1 | 3508.7 | 3403.6 |
| 30°    | 4061.0 | 3887.3 | 3522.3 | 3289.8 | 3166.4 |
| 32.5°  | 3914.9 | 3704.7 | 3331.0 | 3057.1 | 2942.8 |
| 35°    | 3750.7 | 3517.9 | 3116.6 | 2829.1 | 2728.4 |
| 37.5°  | 3591.1 | 3339.8 | 2915.7 | 2600.5 | 2486.8 |
| 40°    | 3422.0 | 3148.6 | 2705.6 | 2381.7 | 2263.1 |
| 42.5°  | 3248.7 | 2956.8 | 2496.0 | 2158.1 | 2044.3 |
| 45°    | 3066.3 | 2760.3 | 2281.5 | 1957.2 | 1847.8 |
| 47.5°  | 2892.9 | 2569.1 | 2076.3 | 1751.9 | 1651.7 |
| 50°    | 2701.2 | 2377.4 | 1875.4 | 1560.3 | 1464.9 |
| 52.5°  | 2513.9 | 2171.6 | 1683.7 | 1382.6 | 1295.9 |
| 55°    | 2331.3 | 1975.6 | 1482.7 | 1209.3 | 1122.6 |
| 57.5°  | 2144.6 | 1779.5 | 1305.1 | 1049.6 | 976.4  |
| 60°    | 1952.8 | 1587.9 | 1117.8 | 885.4  | 812.3  |
| 62.5°  | 1766.0 | 1401.0 | 958.1  | 739.3  | 702.9  |
| 65°    | 1574.2 | 1204.4 | 793.9  | 639.0  | 624.9  |
| 67.5°  | 1391.8 | 1021.9 | 639.0  | 561.0  | 547.5  |
| 70°    | 1200.0 | 844.3  | 529.1  | 483.6  | 465.2  |
| 72.5°  | 1017.5 | 679.7  | 442.5  | 406.1  | 396.9  |
| 75°    | 839.4  | 519.9  | 365.0  | 333.0  | 328.7  |
| 77.5°  | 661.7  | 369.4  | 287.6  | 269.2  | 259.9  |
| 80°    | 497.2  | 264.8  | 218.8  | 201.0  | 201.0  |
| 82.5°  | 346.6  | 178.1  | 150.6  | 141.4  | 141.4  |
| 85°    | 196.1  | 100.3  | 86.6   | 86.6   | 86.6   |
| 87.5°  | 73.1   | 36.3   | 36.3   | 31.9   | 31.9   |
| 90°    | 2.6    | 30.5   | 83.0   | 77.9   | 80.4   |
| 92.5°  | 52.5   | 71.1   | 73.6   | 76.1   | 76.1   |
| 95°    | 123.5  | 147.2  | 151.4  | 151.4  | 147.2  |
| 97.5°  | 205.6  | 227.6  | 236.9  | 236.9  | 236.9  |
| 100°   | 300.3  | 319.7  | 326.5  | 326.5  | 323.9  |
| 102.5° | 400.1  | 414.5  | 423.7  | 426.3  | 423.7  |
| 105°   | 509.3  | 516.0  | 521.1  | 525.3  | 525.3  |
| 107.5° | 617.5  | 627.7  | 627.7  | 629.4  | 617.5  |
| 110°   | 722.4  | 735.9  | 735.9  | 735.9  | 729.2  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 835.7  | 850.2  | 847.6  | 840.8  | 835.7  |
| 115°   | 947.4  | 960.9  | 956.7  | 954.2  | 947.4  |
| 117.5° | 1058.2 | 1076.8 | 1065.0 | 1058.2 | 1051.4 |
| 120°   | 1169.9 | 1188.5 | 1169.9 | 1169.9 | 1162.2 |
| 122.5° | 1271.4 | 1295.1 | 1283.2 | 1276.5 | 1271.4 |
| 125°   | 1377.9 | 1399.1 | 1392.3 | 1384.7 | 1382.3 |
| 127.5° | 1482.1 | 1508.2 | 1498.9 | 1488.8 | 1482.1 |
| 130°   | 1579.3 | 1609.7 | 1605.5 | 1600.5 | 1591.2 |
| 132.5° | 1688.5 | 1712.1 | 1713.8 | 1702.0 | 1695.2 |
| 135°   | 1782.3 | 1808.6 | 1813.7 | 1811.1 | 1804.3 |
| 137.5° | 1887.2 | 1908.4 | 1912.6 | 1910.9 | 1900.7 |
| 140°   | 1979.5 | 2000.5 | 2012.4 | 2012.4 | 2003.1 |
| 142.5° | 2074.2 | 2095.3 | 2102.1 | 2104.7 | 2095.3 |
| 145°   | 2163.9 | 2180.7 | 2194.3 | 2196.8 | 2187.5 |
| 147.5° | 2244.2 | 2265.4 | 2275.4 | 2279.8 | 2270.5 |
| 150°   | 2327.1 | 2341.4 | 2350.7 | 2358.4 | 2350.7 |
| 152.5° | 2400.7 | 2415.1 | 2426.9 | 2436.3 | 2426.9 |
| 155°   | 2474.3 | 2481.1 | 2488.7 | 2500.5 | 2492.9 |
| 157.5° | 2537.7 | 2542.8 | 2547.0 | 2563.9 | 2552.1 |
| 160°   | 2594.4 | 2599.5 | 2602.0 | 2616.4 | 2606.3 |
| 162.5° | 2646.9 | 2646.9 | 2649.4 | 2665.5 | 2653.6 |
| 165°   | 2691.7 | 2689.1 | 2689.1 | 2706.1 | 2694.2 |
| 167.5° | 2732.2 | 2724.7 | 2724.7 | 2741.6 | 2729.7 |
| 170°   | 2762.7 | 2756.0 | 2753.4 | 2770.4 | 2756.0 |
| 172.5° | 2783.9 | 2777.2 | 2774.6 | 2791.5 | 2777.2 |
| 175°   | 2800.8 | 2794.0 | 2788.9 | 2805.9 | 2791.5 |
| 177.5° | 2810.1 | 2803.3 | 2798.2 | 2812.6 | 2798.2 |
| 180°   | 2805.9 | 2805.9 | 2805.9 | 2805.9 | 2805.9 |

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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 | 12.17            | 13.06 | 13.08 | 13.98 | 15.15 | 8.13           | 9.03  | 9.04  | 9.94  | 11.11 |
|                 | 3H   | 13.86            | 14.66 | 14.77 | 15.58 | 16.78 | 9.33           | 10.12 | 10.24 | 11.05 | 12.25 |
|                 | 4H   | 14.47            | 15.23 | 15.40 | 16.16 | 17.36 | 9.78           | 10.53 | 10.71 | 11.47 | 12.67 |
|                 | 6H   | 14.90            | 15.60 | 15.84 | 16.53 | 17.75 | 10.11          | 10.80 | 11.05 | 11.74 | 12.95 |
|                 | 8H   | 15.03            | 15.69 | 15.98 | 16.65 | 17.86 | 10.20          | 10.86 | 11.15 | 11.81 | 13.03 |
|                 | 12H  | 15.10            | 15.73 | 16.05 | 16.67 | 17.91 | 10.25          | 10.87 | 11.20 | 11.82 | 13.06 |
| 4H              | 2H   | 12.20            | 12.95 | 13.13 | 13.88 | 15.09 | 8.74           | 9.49  | 9.67  | 10.42 | 11.63 |
|                 | 3H   | 14.04            | 14.66 | 14.98 | 15.63 | 16.85 | 10.10          | 10.72 | 11.04 | 11.68 | 12.90 |
|                 | 4H   | 14.74            | 15.31 | 15.69 | 16.26 | 17.51 | 10.65          | 11.22 | 11.60 | 12.17 | 13.42 |
|                 | 6H   | 15.26            | 15.75 | 16.23 | 16.73 | 17.97 | 11.07          | 11.56 | 12.04 | 12.54 | 13.79 |
|                 | 8H   | 15.44            | 15.90 | 16.41 | 16.87 | 18.13 | 11.20          | 11.66 | 12.17 | 12.63 | 13.89 |
|                 | 12H  | 15.54            | 15.95 | 16.53 | 16.94 | 18.20 | 11.27          | 11.68 | 12.26 | 12.67 | 13.94 |
| 8H              | 4H   | 14.71            | 15.17 | 15.68 | 16.14 | 17.40 | 10.93          | 11.39 | 11.90 | 12.37 | 13.62 |
|                 | 6H   | 15.28            | 15.66 | 16.28 | 16.68 | 17.93 | 11.46          | 11.83 | 12.45 | 12.85 | 14.11 |
|                 | 8H   | 15.50            | 15.84 | 16.51 | 16.84 | 18.11 | 11.65          | 11.98 | 12.65 | 12.99 | 14.26 |
|                 | 12H  | 15.65            | 15.94 | 16.65 | 16.94 | 18.26 | 11.77          | 12.06 | 12.78 | 13.06 | 14.38 |
| 12H             | 4H   | 14.66            | 15.08 | 15.65 | 16.07 | 17.33 | 10.94          | 11.36 | 11.93 | 12.35 | 13.61 |
|                 | 6H   | 15.26            | 15.59 | 16.26 | 16.60 | 17.87 | 11.51          | 11.84 | 12.51 | 12.84 | 14.12 |
|                 | 8H   | 15.48            | 15.78 | 16.49 | 16.77 | 18.10 | 11.72          | 12.02 | 12.73 | 13.01 | 14.33 |

END OF REPORT