

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: P907481

Luminaire Tested: DFN2DIP-TR4F0-090D110US835-RLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P907481  
REPORT IS A COMBINATION OF REPORTS P902026 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-090D110US835-RLLONL  
Description: 4 foot, Triangle Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

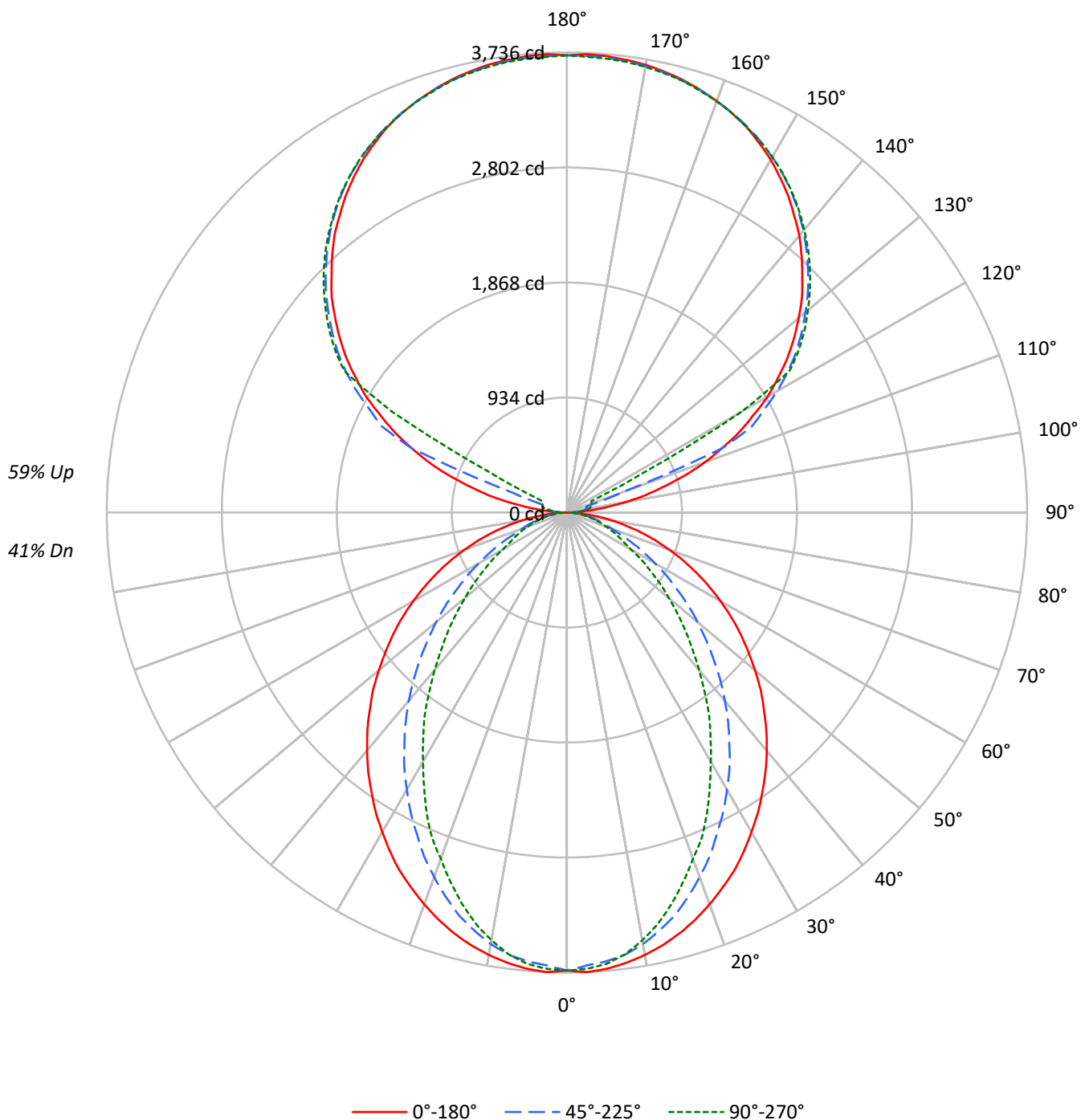
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 18540.0 lumens  
Efficiency: N/A  
Efficacy: 107.7 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: 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

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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 |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 105 | 105 | 105 | 105 | 96 | 96 | 96 | 96 | 78 | 78 | 78 | 63 | 63 | 63 | 48 | 48 | 48 |
| 1   | 96  | 92  | 88  | 85  | 88 | 84 | 81 | 78 | 69 | 67 | 65 | 56 | 54 | 53 | 43 | 42 | 41 |
| 2   | 88  | 81  | 75  | 70  | 80 | 74 | 69 | 65 | 61 | 58 | 55 | 49 | 47 | 45 | 38 | 37 | 35 |
| 3   | 80  | 71  | 64  | 59  | 73 | 65 | 59 | 55 | 54 | 50 | 46 | 44 | 41 | 38 | 34 | 32 | 31 |
| 4   | 74  | 63  | 56  | 50  | 67 | 58 | 52 | 47 | 48 | 44 | 40 | 39 | 36 | 33 | 31 | 29 | 27 |
| 5   | 68  | 57  | 49  | 43  | 62 | 52 | 45 | 40 | 44 | 38 | 35 | 36 | 32 | 29 | 28 | 26 | 24 |
| 6   | 63  | 51  | 43  | 38  | 57 | 47 | 40 | 35 | 39 | 34 | 30 | 32 | 28 | 26 | 26 | 23 | 21 |
| 7   | 58  | 46  | 38  | 33  | 53 | 42 | 36 | 31 | 36 | 31 | 27 | 29 | 26 | 23 | 24 | 21 | 19 |
| 8   | 54  | 42  | 34  | 29  | 49 | 39 | 32 | 27 | 33 | 28 | 24 | 27 | 23 | 20 | 22 | 19 | 17 |
| 9   | 50  | 38  | 31  | 26  | 46 | 35 | 29 | 25 | 30 | 25 | 21 | 25 | 21 | 18 | 20 | 17 | 15 |
| 10  | 47  | 35  | 28  | 23  | 43 | 33 | 26 | 22 | 28 | 23 | 19 | 23 | 19 | 17 | 19 | 16 | 14 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2955 | 2955 | 2955 |
| 5°  | 2960 | 2908 | 2927 |
| 10° | 2931 | 2851 | 2831 |
| 15° | 2890 | 2757 | 2684 |
| 20° | 2837 | 2627 | 2503 |
| 25° | 2782 | 2481 | 2329 |
| 30° | 2709 | 2332 | 2107 |
| 35° | 2637 | 2171 | 1913 |
| 40° | 2564 | 2005 | 1690 |
| 45° | 2479 | 1821 | 1488 |
| 50° | 2391 | 1635 | 1291 |
| 55° | 2299 | 1436 | 1101 |
| 60° | 2193 | 1228 | 906  |
| 65° | 2071 | 1017 | 816  |
| 70° | 1923 | 820  | 738  |
| 75° | 1737 | 723  | 671  |
| 80° | 1468 | 606  | 582  |
| 85° | 1023 | 404  | 437  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2479 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 348.6   | 1.9       |
| 10°-20°   | 957.0   | 5.2       |
| 20°-30°   | 1343.6  | 7.2       |
| 30°-40°   | 1464.6  | 7.9       |
| 40°-50°   | 1346.2  | 7.3       |
| 50°-60°   | 1057.2  | 5.7       |
| 60°-70°   | 688.1   | 3.7       |
| 70°-80°   | 354.2   | 1.9       |
| 80°-90°   | 97.0    | 0.5       |
| 90°-100°  | 122.4   | 0.7       |
| 100°-110° | 456.3   | 2.5       |
| 110°-120° | 1210.3  | 6.5       |
| 120°-130° | 2007.3  | 10.8      |
| 130°-140° | 2132.2  | 11.5      |
| 140°-150° | 1981.7  | 10.7      |
| 150°-160° | 1593.2  | 8.6       |
| 160°-170° | 1026.6  | 5.5       |
| 170°-180° | 353.3   | 1.9       |
| 0°-30°    | 2649.2  | 14.3      |
| 0°-40°    | 4113.9  | 22.2      |
| 0°-60°    | 6517.2  | 35.2      |
| 0°-90°    | 7656.5  | 41.3      |
| 90°-120°  | 1789.0  | 9.6       |
| 90°-150°  | 7910.3  | 42.7      |
| 90°-180°  | 10883.0 | 58.7      |
| 0°-180°   | 18540.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3720 | 3720  | 3720 | 3720  | 3720 |      |
| 5°   | 3720 | 3703  | 3659 | 3689  | 3679 | 353  |
| 15°  | 3538 | 3501  | 3386 | 3322  | 3289 | 997  |
| 25°  | 3212 | 3104  | 2882 | 2744  | 2693 | 1477 |
| 35°  | 2767 | 2595  | 2299 | 2087  | 2013 | 1732 |
| 45°  | 2262 | 2036  | 1683 | 1444  | 1363 | 1747 |
| 55°  | 1720 | 1458  | 1094 | 892   | 828  | 1537 |
| 65°  | 1161 | 889   | 586  | 471   | 461  | 1151 |
| 75°  | 619  | 384   | 269  | 246   | 242  | 655  |
| 85°  | 145  | 74    | 64   | 64    | 64   | 166  |
| 90°  | 3    | 32    | 54   | 67    | 72   | 17   |
| 95°  | 174  | 86    | 105  | 118   | 116  | 207  |
| 105° | 817  | 897   | 164  | 193   | 204  | 873  |
| 115° | 1544 | 1590  | 1658 | 414   | 220  | 1521 |
| 125° | 2184 | 2219  | 2270 | 2289  | 2297 | 1948 |
| 135° | 2702 | 2746  | 2769 | 2797  | 2791 | 2088 |
| 145° | 3135 | 3132  | 3178 | 3197  | 3183 | 1961 |
| 155° | 3452 | 3428  | 3460 | 3476  | 3455 | 1591 |
| 165° | 3637 | 3621  | 3629 | 3648  | 3629 | 1028 |
| 175° | 3720 | 3702  | 3707 | 3726  | 3699 | 354  |
| 180° | 3712 | 3712  | 3712 | 3712  | 3712 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3719.7 | 3719.7 | 3719.7 | 3719.7 | 3719.7 |
| 2.5°   | 3736.5 | 3719.7 | 3682.5 | 3716.5 | 3709.7 |
| 5°     | 3719.7 | 3702.9 | 3659.0 | 3689.3 | 3679.3 |
| 7.5°   | 3689.3 | 3669.3 | 3622.2 | 3635.4 | 3618.6 |
| 10°    | 3649.0 | 3625.4 | 3558.3 | 3547.9 | 3527.9 |
| 12.5°  | 3598.6 | 3568.3 | 3477.2 | 3457.2 | 3420.0 |
| 15°    | 3537.9 | 3500.8 | 3386.5 | 3322.5 | 3289.0 |
| 17.5°  | 3467.2 | 3413.3 | 3271.8 | 3197.9 | 3144.0 |
| 20°    | 3386.5 | 3319.0 | 3150.7 | 3066.8 | 2992.5 |
| 22.5°  | 3299.0 | 3221.5 | 3026.1 | 2911.8 | 2861.5 |
| 25°    | 3211.5 | 3103.6 | 2881.5 | 2743.6 | 2692.9 |
| 27.5°  | 3107.2 | 2992.5 | 2746.8 | 2588.6 | 2511.1 |
| 30°    | 2996.1 | 2867.9 | 2598.6 | 2427.2 | 2336.1 |
| 32.5°  | 2888.2 | 2733.2 | 2457.5 | 2255.4 | 2171.1 |
| 35°    | 2767.2 | 2595.4 | 2299.3 | 2087.2 | 2012.9 |
| 37.5°  | 2649.3 | 2464.0 | 2151.1 | 1918.6 | 1834.7 |
| 40°    | 2524.7 | 2322.9 | 1996.1 | 1757.2 | 1669.7 |
| 42.5°  | 2396.8 | 2181.5 | 1841.4 | 1592.2 | 1508.2 |
| 45°    | 2262.2 | 2036.5 | 1683.2 | 1443.9 | 1363.2 |
| 47.5°  | 2134.3 | 1895.4 | 1531.8 | 1292.5 | 1218.6 |
| 50°    | 1992.9 | 1753.9 | 1383.6 | 1151.1 | 1080.7 |
| 52.5°  | 1854.7 | 1602.2 | 1242.2 | 1020.0 | 956.1  |
| 55°    | 1720.0 | 1457.5 | 1093.9 | 892.2  | 828.2  |
| 57.5°  | 1582.2 | 1312.9 | 962.9  | 774.3  | 720.4  |
| 60°    | 1440.7 | 1171.4 | 824.7  | 653.2  | 599.3  |
| 62.5°  | 1302.9 | 1033.6 | 706.8  | 545.4  | 518.6  |
| 65°    | 1161.4 | 888.6  | 585.7  | 471.4  | 461.1  |
| 67.5°  | 1026.8 | 753.9  | 471.4  | 413.9  | 403.9  |
| 70°    | 885.4  | 622.9  | 390.4  | 356.8  | 343.2  |
| 72.5°  | 750.7  | 501.4  | 326.4  | 299.6  | 292.9  |
| 75°    | 619.3  | 383.6  | 269.3  | 245.7  | 242.5  |
| 77.5°  | 488.2  | 272.5  | 212.1  | 198.6  | 191.8  |
| 80°    | 366.8  | 195.4  | 161.4  | 148.2  | 148.2  |
| 82.5°  | 255.7  | 131.4  | 111.1  | 104.3  | 104.3  |
| 85°    | 144.6  | 73.9   | 63.9   | 63.9   | 63.9   |
| 87.5°  | 53.9   | 26.8   | 26.8   | 23.6   | 23.6   |
| 90°    | 2.6    | 32.2   | 53.6   | 67.3   | 72.4   |
| 92.5°  | 67.3   | 56.5   | 64.4   | 69.9   | 72.4   |
| 95°    | 174.5  | 85.8   | 104.6  | 118.3  | 115.5  |
| 97.5°  | 314.2  | 94.1   | 136.8  | 145.1  | 147.7  |
| 100°   | 475.6  | 107.5  | 153.1  | 174.5  | 179.9  |
| 102.5° | 652.6  | 647.5  | 158.5  | 187.9  | 196.2  |
| 105°   | 816.6  | 897.3  | 164.0  | 193.3  | 204.2  |
| 107.5° | 1007.4 | 1074.3 | 169.4  | 198.7  | 209.6  |
| 110°   | 1190.1 | 1246.3 | 470.2  | 201.6  | 212.1  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1362.1 | 1410.2 | 1364.6 | 206.7  | 215.0  |
| 115°   | 1544.5 | 1590.1 | 1657.5 | 413.7  | 220.4  |
| 117.5° | 1703.1 | 1756.7 | 1802.6 | 1418.2 | 714.5  |
| 120°   | 1880.4 | 1920.6 | 1969.1 | 2001.3 | 1638.6 |
| 122.5° | 2030.7 | 2073.7 | 2127.6 | 2143.6 | 2146.5 |
| 125°   | 2183.8 | 2218.9 | 2269.9 | 2288.7 | 2296.7 |
| 127.5° | 2323.5 | 2361.1 | 2401.6 | 2428.4 | 2431.0 |
| 130°   | 2455.2 | 2498.3 | 2527.6 | 2557.3 | 2554.8 |
| 132.5° | 2589.5 | 2624.6 | 2654.0 | 2678.2 | 2675.7 |
| 135°   | 2702.5 | 2745.5 | 2769.4 | 2796.6 | 2791.1 |
| 137.5° | 2820.5 | 2852.7 | 2879.8 | 2906.6 | 2898.6 |
| 140°   | 2936.0 | 2957.6 | 2987.0 | 3011.2 | 2997.8 |
| 142.5° | 3032.9 | 3051.7 | 3086.5 | 3107.9 | 3094.5 |
| 145°   | 3135.0 | 3132.1 | 3177.7 | 3196.6 | 3183.2 |
| 147.5° | 3223.4 | 3215.4 | 3261.0 | 3274.4 | 3263.9 |
| 150°   | 3309.5 | 3290.7 | 3333.7 | 3349.7 | 3336.3 |
| 152.5° | 3381.9 | 3360.5 | 3400.7 | 3417.0 | 3398.2 |
| 155°   | 3451.8 | 3427.8 | 3460.0 | 3476.0 | 3454.6 |
| 157.5° | 3508.2 | 3486.8 | 3511.1 | 3529.9 | 3508.2 |
| 160°   | 3556.7 | 3540.4 | 3556.7 | 3572.6 | 3553.8 |
| 162.5° | 3599.4 | 3583.5 | 3596.9 | 3615.7 | 3591.5 |
| 165°   | 3637.1 | 3621.1 | 3629.1 | 3647.9 | 3629.1 |
| 167.5° | 3666.7 | 3650.5 | 3658.8 | 3677.6 | 3653.4 |
| 170°   | 3691.0 | 3674.7 | 3680.1 | 3699.0 | 3674.7 |
| 172.5° | 3706.9 | 3691.0 | 3696.4 | 3715.2 | 3691.0 |
| 175°   | 3720.3 | 3701.5 | 3706.9 | 3725.8 | 3699.0 |
| 177.5° | 3725.8 | 3706.9 | 3709.8 | 3728.6 | 3704.4 |
| 180°   | 3712.4 | 3712.4 | 3712.4 | 3712.4 | 3712.4 |

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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 | 10.04            | 10.80 | 11.07 | 11.84 | 13.23 | 6.01           | 6.77 | 7.04  | 7.81  | 9.20  |
|                 | 3H   | 11.71            | 12.39 | 12.75 | 13.44 | 14.85 | 7.19           | 7.88 | 8.24  | 8.92  | 10.34 |
|                 | 4H   | 12.31            | 12.96 | 13.37 | 14.01 | 15.43 | 7.64           | 8.29 | 8.70  | 9.34  | 10.76 |
|                 | 6H   | 12.73            | 13.33 | 13.80 | 14.38 | 15.81 | 7.96           | 8.56 | 9.03  | 9.61  | 11.04 |
|                 | 8H   | 12.86            | 13.42 | 13.93 | 14.49 | 15.92 | 8.05           | 8.62 | 9.12  | 9.68  | 11.11 |
|                 | 12H  | 12.92            | 13.45 | 13.99 | 14.51 | 15.96 | 8.09           | 8.63 | 9.17  | 9.69  | 11.14 |
| 4H              | 2H   | 10.05            | 10.69 | 11.11 | 11.74 | 13.16 | 6.60           | 7.24 | 7.66  | 8.29  | 9.71  |
|                 | 3H   | 11.87            | 12.41 | 12.94 | 13.48 | 14.92 | 7.94           | 8.48 | 9.01  | 9.56  | 10.99 |
|                 | 4H   | 12.56            | 13.05 | 13.63 | 14.12 | 15.57 | 8.49           | 8.98 | 9.56  | 10.05 | 11.50 |
|                 | 6H   | 13.07            | 13.49 | 14.16 | 14.58 | 16.03 | 8.90           | 9.33 | 9.99  | 10.42 | 11.87 |
|                 | 8H   | 13.24            | 13.64 | 14.33 | 14.72 | 16.18 | 9.03           | 9.43 | 10.12 | 10.51 | 11.97 |
|                 | 12H  | 13.34            | 13.69 | 14.44 | 14.79 | 16.26 | 9.10           | 9.45 | 10.20 | 10.55 | 12.02 |
| 8H              | 4H   | 12.52            | 12.92 | 13.61 | 14.00 | 15.46 | 8.76           | 9.16 | 9.85  | 10.24 | 11.70 |
|                 | 6H   | 13.09            | 13.41 | 14.19 | 14.54 | 16.00 | 9.28           | 9.61 | 10.39 | 10.73 | 12.19 |
|                 | 8H   | 13.30            | 13.59 | 14.42 | 14.69 | 16.17 | 9.47           | 9.76 | 10.59 | 10.86 | 12.34 |
|                 | 12H  | 13.44            | 13.69 | 14.55 | 14.79 | 16.31 | 9.59           | 9.84 | 10.71 | 10.94 | 12.46 |
| 12H             | 4H   | 12.47            | 12.83 | 13.57 | 13.92 | 15.39 | 8.76           | 9.12 | 9.87  | 10.22 | 11.69 |
|                 | 6H   | 13.06            | 13.35 | 14.17 | 14.45 | 15.93 | 9.33           | 9.61 | 10.44 | 10.72 | 12.20 |
|                 | 8H   | 13.28            | 13.53 | 14.40 | 14.63 | 16.15 | 9.54           | 9.79 | 10.65 | 10.89 | 12.41 |

END OF REPORT