

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: P915097

Luminaire Tested: DFN2DIP-SQ4F0-120D160US927-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P915097  
REPORT IS A COMBINATION OF REPORTS P901735 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-120D160US927-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

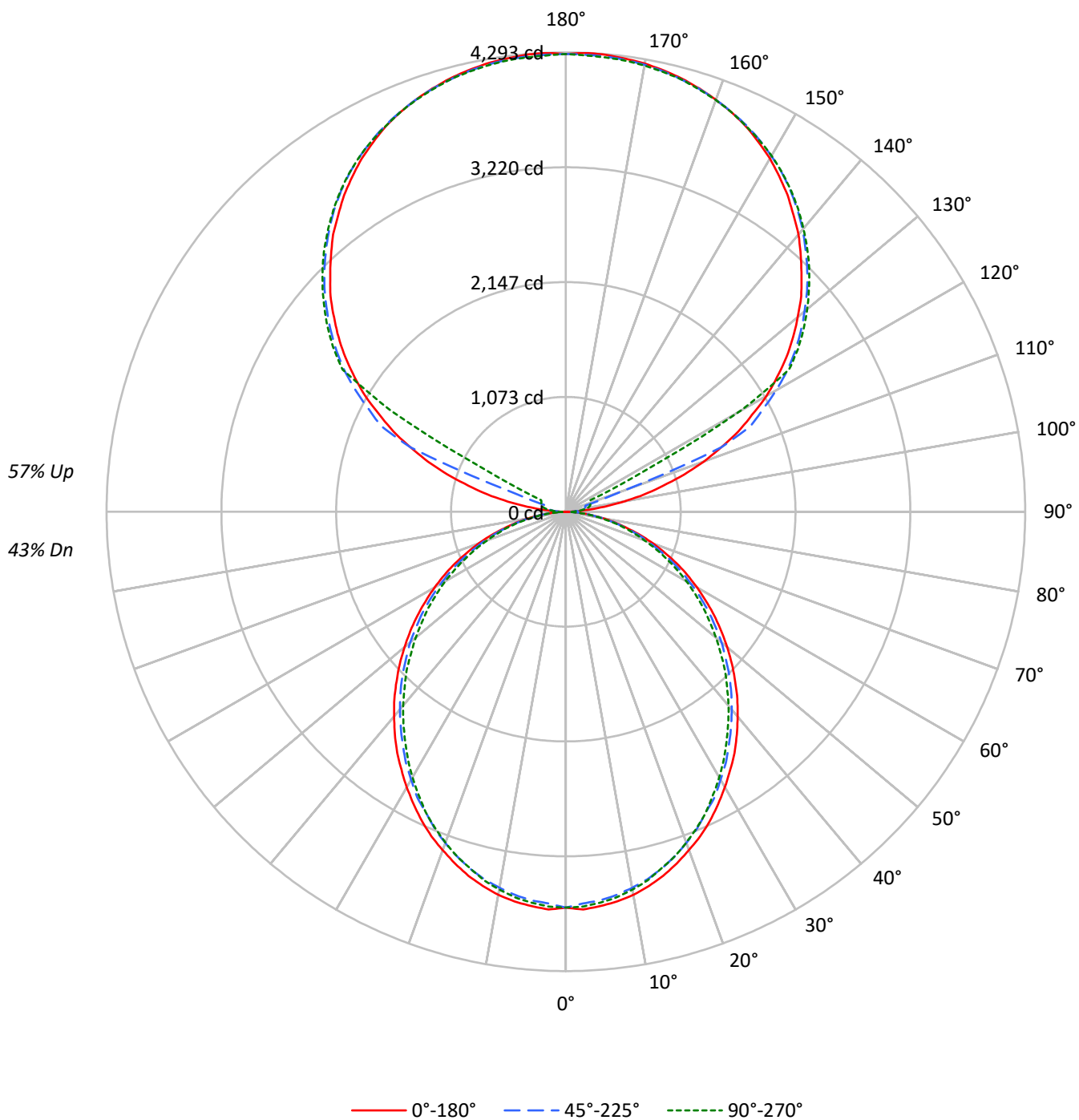
Lumens per Lamp: N/A  
Luminaire Lumens: 21959.3 lumens  
Efficiency: N/A  
Efficacy: 91.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 239.7  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9933  
Total Harmonic Distortion (THDi): 0.066  
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 | 79 | 79 | 79 | 64 | 64 | 64 | 50 | 50 | 50 |
| 1   | 96  | 92  | 88  | 85  | 88 | 84 | 81 | 78 | 70 | 67 | 65 | 56 | 55 | 53 | 44 | 43 | 42 |
| 2   | 88  | 80  | 74  | 69  | 80 | 74 | 68 | 64 | 61 | 57 | 54 | 49 | 47 | 44 | 39 | 37 | 35 |
| 3   | 80  | 71  | 63  | 58  | 73 | 65 | 58 | 53 | 54 | 49 | 45 | 44 | 40 | 38 | 34 | 32 | 30 |
| 4   | 73  | 62  | 55  | 49  | 66 | 57 | 50 | 45 | 48 | 43 | 39 | 39 | 35 | 32 | 31 | 28 | 26 |
| 5   | 67  | 56  | 48  | 42  | 61 | 51 | 44 | 39 | 43 | 37 | 33 | 35 | 31 | 28 | 28 | 25 | 23 |
| 6   | 62  | 50  | 42  | 36  | 56 | 46 | 39 | 34 | 38 | 33 | 29 | 31 | 27 | 24 | 25 | 22 | 20 |
| 7   | 57  | 45  | 37  | 32  | 52 | 41 | 34 | 29 | 35 | 29 | 25 | 29 | 25 | 22 | 23 | 20 | 18 |
| 8   | 53  | 41  | 33  | 28  | 48 | 38 | 31 | 26 | 32 | 26 | 23 | 26 | 22 | 19 | 21 | 18 | 16 |
| 9   | 49  | 37  | 30  | 25  | 45 | 34 | 28 | 23 | 29 | 24 | 20 | 24 | 20 | 17 | 19 | 16 | 14 |
| 10  | 46  | 34  | 27  | 22  | 42 | 31 | 25 | 21 | 27 | 22 | 18 | 22 | 18 | 16 | 18 | 15 | 13 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2595 | 2595 | 2595 |
| 5°  | 2600 | 2560 | 2577 |
| 10° | 2578 | 2526 | 2543 |
| 15° | 2541 | 2485 | 2489 |
| 20° | 2489 | 2428 | 2434 |
| 25° | 2438 | 2359 | 2370 |
| 30° | 2374 | 2295 | 2289 |
| 35° | 2314 | 2220 | 2203 |
| 40° | 2239 | 2144 | 2121 |
| 45° | 2165 | 2068 | 2038 |
| 50° | 2084 | 1988 | 1940 |
| 55° | 1998 | 1895 | 1852 |
| 60° | 1902 | 1785 | 1750 |
| 65° | 1797 | 1672 | 1629 |
| 70° | 1664 | 1533 | 1501 |
| 75° | 1479 | 1368 | 1382 |
| 80° | 1256 | 1157 | 1155 |
| 85° | 908  | 792  | 776  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 2292 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 348.1   | 1.6       |
| 10°-20°   | 979.5   | 4.5       |
| 20°-30°   | 1439.5  | 6.6       |
| 30°-40°   | 1671.9  | 7.6       |
| 40°-50°   | 1669.9  | 7.6       |
| 50°-60°   | 1456.0  | 6.6       |
| 60°-70°   | 1076.3  | 4.9       |
| 70°-80°   | 609.0   | 2.8       |
| 80°-90°   | 168.3   | 0.8       |
| 90°-100°  | 141.0   | 0.6       |
| 100°-110° | 525.8   | 2.4       |
| 110°-120° | 1394.6  | 6.4       |
| 120°-130° | 2313.0  | 10.5      |
| 130°-140° | 2456.9  | 11.2      |
| 140°-150° | 2283.4  | 10.4      |
| 150°-160° | 1835.8  | 8.4       |
| 160°-170° | 1182.9  | 5.4       |
| 170°-180° | 407.2   | 1.9       |
| 0°-30°    | 2767.2  | 12.6      |
| 0°-40°    | 4439.1  | 20.2      |
| 0°-60°    | 7565.0  | 34.5      |
| 0°-90°    | 9418.6  | 42.9      |
| 90°-120°  | 2061.4  | 9.4       |
| 90°-150°  | 9114.7  | 41.5      |
| 90°-180°  | 12541.0 | 57.1      |
| 0°-180°   | 21959.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3699 | 3699  | 3699 | 3699  | 3699 |      |
| 5°   | 3699 | 3685  | 3646 | 3674  | 3667 | 351  |
| 15°  | 3521 | 3500  | 3454 | 3468  | 3450 | 992  |
| 25°  | 3187 | 3158  | 3098 | 3105  | 3098 | 1466 |
| 35°  | 2749 | 2714  | 2657 | 2636  | 2618 | 1717 |
| 45°  | 2237 | 2212  | 2159 | 2120  | 2106 | 1727 |
| 55°  | 1693 | 1672  | 1629 | 1586  | 1569 | 1514 |
| 65°  | 1142 | 1120  | 1085 | 1053  | 1035 | 1129 |
| 75°  | 597  | 591   | 572  | 551   | 558  | 638  |
| 85°  | 146  | 142   | 139  | 128   | 124  | 162  |
| 90°  | 3    | 37    | 62   | 78    | 83   | 20   |
| 95°  | 201  | 99    | 121  | 136   | 133  | 238  |
| 105° | 941  | 1034  | 189  | 223   | 235  | 1005 |
| 115° | 1780 | 1832  | 1910 | 477   | 254  | 1752 |
| 125° | 2516 | 2557  | 2616 | 2637  | 2646 | 2244 |
| 135° | 3114 | 3164  | 3191 | 3222  | 3216 | 2405 |
| 145° | 3612 | 3609  | 3662 | 3683  | 3668 | 2259 |
| 155° | 3977 | 3950  | 3987 | 4005  | 3981 | 1833 |
| 165° | 4191 | 4172  | 4182 | 4203  | 4182 | 1184 |
| 175° | 4287 | 4265  | 4271 | 4293  | 4262 | 408  |
| 180° | 4278 | 4278  | 4278 | 4278  | 4278 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3698.9 | 3698.9 | 3698.9 | 3698.9 | 3698.9 |
| 2.5°   | 3720.4 | 3702.7 | 3663.4 | 3698.9 | 3692.1 |
| 5°     | 3698.9 | 3684.9 | 3645.7 | 3674.0 | 3667.2 |
| 7.5°   | 3674.0 | 3652.8 | 3613.6 | 3642.3 | 3635.2 |
| 10°    | 3635.2 | 3610.2 | 3567.6 | 3595.9 | 3585.3 |
| 12.5°  | 3581.5 | 3560.4 | 3517.8 | 3535.5 | 3528.3 |
| 15°    | 3521.2 | 3500.0 | 3453.6 | 3467.9 | 3450.2 |
| 17.5°  | 3446.5 | 3425.3 | 3378.9 | 3396.6 | 3378.9 |
| 20°    | 3364.6 | 3343.4 | 3293.7 | 3304.2 | 3290.2 |
| 22.5°  | 3283.0 | 3251.0 | 3204.5 | 3204.5 | 3197.4 |
| 25°    | 3186.8 | 3158.5 | 3098.1 | 3105.0 | 3098.1 |
| 27.5°  | 3080.0 | 3055.1 | 3009.1 | 2998.5 | 2980.8 |
| 30°    | 2973.6 | 2944.9 | 2891.7 | 2881.2 | 2866.8 |
| 32.5°  | 2859.6 | 2838.5 | 2781.5 | 2760.0 | 2745.7 |
| 35°    | 2749.4 | 2714.0 | 2657.0 | 2635.5 | 2617.8 |
| 37.5°  | 2624.9 | 2592.9 | 2535.9 | 2511.0 | 2493.2 |
| 40°    | 2497.0 | 2468.4 | 2411.3 | 2379.6 | 2365.3 |
| 42.5°  | 2372.5 | 2343.8 | 2287.2 | 2251.4 | 2230.2 |
| 45°    | 2237.4 | 2212.5 | 2158.9 | 2120.0 | 2105.7 |
| 47.5°  | 2105.7 | 2080.7 | 2023.8 | 1984.6 | 1963.4 |
| 50°    | 1966.8 | 1949.1 | 1899.3 | 1849.4 | 1831.7 |
| 52.5°  | 1831.7 | 1806.8 | 1760.8 | 1721.5 | 1696.6 |
| 55°    | 1693.2 | 1671.7 | 1629.0 | 1586.4 | 1568.7 |
| 57.5°  | 1554.3 | 1536.6 | 1490.2 | 1447.6 | 1433.2 |
| 60°    | 1415.5 | 1401.5 | 1351.7 | 1312.5 | 1301.9 |
| 62.5°  | 1280.4 | 1255.4 | 1220.0 | 1184.5 | 1170.2 |
| 65°    | 1141.9 | 1120.4 | 1084.9 | 1052.8 | 1035.1 |
| 67.5°  | 999.7  | 981.5  | 949.8  | 925.0  | 910.6  |
| 70°    | 867.9  | 853.6  | 821.5  | 796.6  | 782.7  |
| 72.5°  | 732.8  | 718.5  | 700.8  | 675.9  | 665.3  |
| 75°    | 597.4  | 590.6  | 572.4  | 551.4  | 558.5  |
| 77.5°  | 476.6  | 462.2  | 455.1  | 444.5  | 434.0  |
| 80°    | 355.8  | 352.0  | 344.9  | 334.4  | 327.2  |
| 82.5°  | 241.9  | 241.9  | 238.5  | 224.2  | 224.2  |
| 85°    | 145.7  | 142.3  | 138.9  | 127.9  | 124.5  |
| 87.5°  | 64.2   | 57.0   | 49.8   | 39.2   | 35.5   |
| 90°    | 2.9    | 37.2   | 61.7   | 77.6   | 83.4   |
| 92.5°  | 77.6   | 65.0   | 74.2   | 80.5   | 83.4   |
| 95°    | 201.1  | 98.9   | 120.6  | 136.3  | 133.1  |
| 97.5°  | 362.0  | 108.4  | 157.6  | 167.2  | 170.2  |
| 100°   | 548.0  | 123.9  | 176.4  | 201.1  | 207.3  |
| 102.5° | 752.0  | 746.2  | 182.7  | 216.5  | 226.0  |
| 105°   | 941.0  | 1034.0 | 188.9  | 222.8  | 235.2  |
| 107.5° | 1160.7 | 1237.9 | 195.2  | 229.0  | 241.5  |
| 110°   | 1371.3 | 1436.1 | 541.8  | 232.3  | 244.4  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1569.5 | 1625.0 | 1572.4 | 238.2  | 247.7  |
| 115°   | 1779.7 | 1832.2 | 1909.8 | 476.7  | 254.0  |
| 117.5° | 1962.4 | 2024.1 | 2077.1 | 1634.2 | 823.3  |
| 120°   | 2166.8 | 2213.0 | 2268.9 | 2306.0 | 1888.2 |
| 122.5° | 2339.9 | 2389.5 | 2451.6 | 2469.9 | 2473.3 |
| 125°   | 2516.3 | 2556.7 | 2615.5 | 2637.3 | 2646.4 |
| 127.5° | 2677.3 | 2720.7 | 2767.3 | 2798.2 | 2801.2 |
| 130°   | 2829.1 | 2878.7 | 2912.5 | 2946.7 | 2943.7 |
| 132.5° | 2983.8 | 3024.2 | 3058.1 | 3086.0 | 3083.1 |
| 135°   | 3113.9 | 3163.6 | 3191.1 | 3222.4 | 3216.1 |
| 137.5° | 3249.9 | 3287.1 | 3318.3 | 3349.2 | 3340.0 |
| 140°   | 3383.0 | 3408.0 | 3441.8 | 3469.8 | 3454.3 |
| 142.5° | 3494.7 | 3516.4 | 3556.5 | 3581.1 | 3565.7 |
| 145°   | 3612.3 | 3609.0 | 3661.6 | 3683.2 | 3667.9 |
| 147.5° | 3714.1 | 3705.0 | 3757.6 | 3773.0 | 3760.8 |
| 150°   | 3813.4 | 3791.7 | 3841.4 | 3859.7 | 3844.3 |
| 152.5° | 3896.8 | 3872.2 | 3918.5 | 3937.3 | 3915.6 |
| 155°   | 3977.3 | 3949.7 | 3986.9 | 4005.3 | 3980.6 |
| 157.5° | 4042.4 | 4017.8 | 4045.7 | 4067.4 | 4042.4 |
| 160°   | 4098.3 | 4079.5 | 4098.3 | 4116.6 | 4094.9 |
| 162.5° | 4147.5 | 4129.2 | 4144.5 | 4166.2 | 4138.4 |
| 165°   | 4190.9 | 4172.5 | 4181.7 | 4203.4 | 4181.7 |
| 167.5° | 4225.1 | 4206.3 | 4215.9 | 4237.5 | 4209.7 |
| 170°   | 4253.0 | 4234.3 | 4240.5 | 4262.2 | 4234.3 |
| 172.5° | 4271.4 | 4253.0 | 4259.2 | 4280.9 | 4253.0 |
| 175°   | 4286.8 | 4265.1 | 4271.4 | 4293.1 | 4262.2 |
| 177.5° | 4293.1 | 4271.4 | 4274.7 | 4296.4 | 4268.4 |
| 180°   | 4277.6 | 4277.6 | 4277.6 | 4277.6 | 4277.6 |

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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 | 9.90             | 10.70 | 10.92 | 11.73 | 13.10 | 9.46           | 10.26 | 10.47 | 11.28 | 12.65 |
|                 | 3H   | 11.56            | 12.28 | 12.59 | 13.32 | 14.70 | 11.07          | 11.79 | 12.10 | 12.83 | 14.21 |
|                 | 4H   | 12.15            | 12.83 | 13.19 | 13.87 | 15.26 | 11.66          | 12.34 | 12.70 | 13.37 | 14.77 |
|                 | 6H   | 12.55            | 13.18 | 13.60 | 14.22 | 15.63 | 12.05          | 12.68 | 13.10 | 13.72 | 15.13 |
|                 | 8H   | 12.66            | 13.25 | 13.71 | 14.31 | 15.71 | 12.15          | 12.75 | 13.21 | 13.81 | 15.21 |
|                 | 12H  | 12.70            | 13.27 | 13.76 | 14.32 | 15.75 | 12.19          | 12.76 | 13.25 | 13.81 | 15.24 |
| 4H              | 2H   | 10.36            | 11.04 | 11.40 | 12.07 | 13.47 | 10.00          | 10.68 | 11.05 | 11.72 | 13.12 |
|                 | 3H   | 12.22            | 12.79 | 13.28 | 13.85 | 15.26 | 11.82          | 12.38 | 12.87 | 13.45 | 14.86 |
|                 | 4H   | 12.94            | 13.46 | 14.00 | 14.51 | 15.95 | 12.51          | 13.03 | 13.57 | 14.09 | 15.52 |
|                 | 6H   | 13.45            | 13.90 | 14.52 | 14.98 | 16.41 | 13.02          | 13.47 | 14.09 | 14.55 | 15.97 |
|                 | 8H   | 13.60            | 14.02 | 14.67 | 15.09 | 16.54 | 13.17          | 13.58 | 14.24 | 14.66 | 16.10 |
|                 | 12H  | 13.68            | 14.05 | 14.76 | 15.14 | 16.59 | 13.23          | 13.61 | 14.31 | 14.69 | 16.14 |
| 8H              | 4H   | 13.13            | 13.55 | 14.20 | 14.62 | 16.06 | 12.75          | 13.17 | 13.82 | 14.24 | 15.68 |
|                 | 6H   | 13.76            | 14.11 | 14.86 | 15.22 | 16.66 | 13.38          | 13.73 | 14.47 | 14.84 | 16.28 |
|                 | 8H   | 13.99            | 14.29 | 15.09 | 15.39 | 16.84 | 13.59          | 13.90 | 14.69 | 14.99 | 16.45 |
|                 | 12H  | 14.12            | 14.38 | 15.22 | 15.48 | 16.97 | 13.71          | 13.97 | 14.81 | 15.07 | 16.56 |
| 12H             | 4H   | 13.11            | 13.49 | 14.20 | 14.58 | 16.02 | 12.75          | 13.12 | 13.83 | 14.21 | 15.66 |
|                 | 6H   | 13.79            | 14.10 | 14.89 | 15.19 | 16.65 | 13.42          | 13.73 | 14.52 | 14.82 | 16.28 |
|                 | 8H   | 14.04            | 14.30 | 15.14 | 15.39 | 16.89 | 13.66          | 13.92 | 14.76 | 15.01 | 16.51 |

END OF REPORT