

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: P904143

Luminaire Tested: DFN2DIP-SQ4F0-110D120US830-RLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P904143  
REPORT IS A COMBINATION OF REPORTS P901698 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-110D120US830-RLLONL  
Description: 4 foot, Square Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

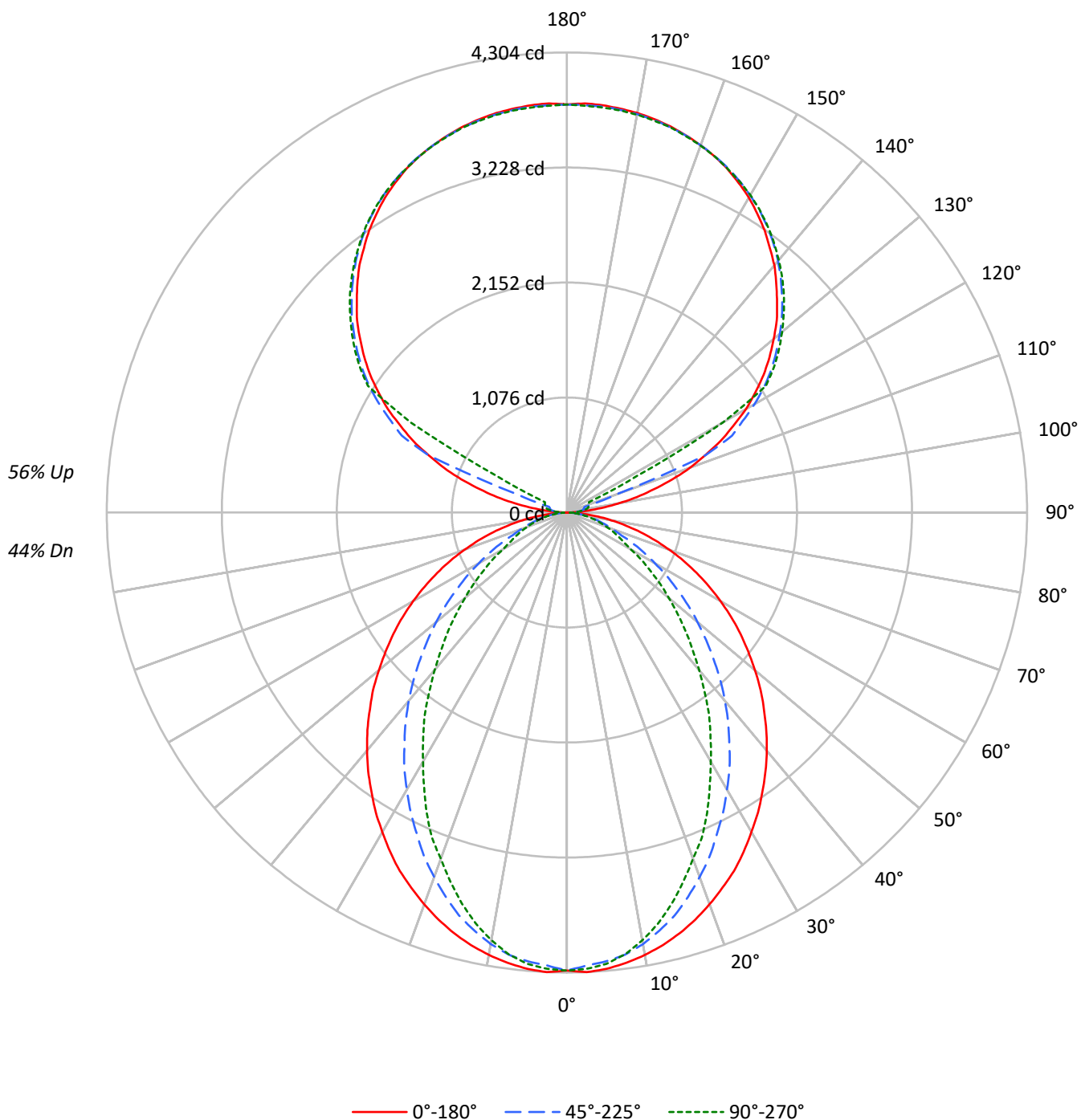
Lumens per Lamp: N/A  
Luminaire Lumens: 20010.2 lumens  
Efficiency: N/A  
Efficacy: 102.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 195.2  
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



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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   | 106 | 106 | 106 | 106 | 97 | 97 | 97 | 97 | 80 | 80 | 80 | 65 | 65 | 65 | 51 | 51 | 51 |
| 1   | 97  | 93  | 89  | 86  | 89 | 85 | 82 | 79 | 71 | 69 | 67 | 58 | 56 | 55 | 45 | 44 | 44 |
| 2   | 89  | 81  | 76  | 71  | 81 | 75 | 70 | 66 | 62 | 59 | 56 | 51 | 49 | 46 | 40 | 39 | 37 |
| 3   | 81  | 72  | 65  | 59  | 74 | 66 | 60 | 55 | 55 | 51 | 47 | 46 | 42 | 40 | 36 | 34 | 32 |
| 4   | 74  | 64  | 56  | 51  | 68 | 59 | 52 | 47 | 50 | 45 | 41 | 41 | 37 | 34 | 33 | 30 | 28 |
| 5   | 68  | 57  | 49  | 44  | 62 | 53 | 46 | 41 | 45 | 39 | 35 | 37 | 33 | 30 | 30 | 27 | 25 |
| 6   | 63  | 51  | 44  | 38  | 58 | 48 | 41 | 36 | 40 | 35 | 31 | 33 | 29 | 26 | 27 | 24 | 22 |
| 7   | 58  | 46  | 39  | 33  | 53 | 43 | 36 | 31 | 37 | 31 | 27 | 31 | 27 | 24 | 25 | 22 | 20 |
| 8   | 54  | 42  | 35  | 30  | 50 | 39 | 33 | 28 | 33 | 28 | 24 | 28 | 24 | 21 | 23 | 20 | 18 |
| 9   | 51  | 39  | 31  | 26  | 46 | 36 | 29 | 25 | 31 | 26 | 22 | 26 | 22 | 19 | 21 | 18 | 16 |
| 10  | 47  | 35  | 28  | 24  | 43 | 33 | 27 | 22 | 28 | 23 | 20 | 24 | 20 | 17 | 20 | 17 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3007 | 3007 | 3007 |
| 5°  | 3012 | 2960 | 2979 |
| 10° | 2982 | 2902 | 2883 |
| 15° | 2941 | 2807 | 2734 |
| 20° | 2886 | 2675 | 2550 |
| 25° | 2831 | 2527 | 2374 |
| 30° | 2756 | 2376 | 2149 |
| 35° | 2683 | 2213 | 1951 |
| 40° | 2608 | 2044 | 1725 |
| 45° | 2522 | 1857 | 1520 |
| 50° | 2432 | 1668 | 1319 |
| 55° | 2339 | 1466 | 1126 |
| 60° | 2231 | 1255 | 928  |
| 65° | 2106 | 1040 | 836  |
| 70° | 1955 | 839  | 758  |
| 75° | 1766 | 741  | 692  |
| 80° | 1491 | 624  | 603  |
| 85° | 1038 | 419  | 459  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 2522 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 401.6   | 2.0       |
| 10°-20°   | 1102.5  | 5.5       |
| 20°-30°   | 1547.8  | 7.7       |
| 30°-40°   | 1687.2  | 8.4       |
| 40°-50°   | 1550.8  | 7.7       |
| 50°-60°   | 1217.9  | 6.1       |
| 60°-70°   | 792.7   | 4.0       |
| 70°-80°   | 408.1   | 2.0       |
| 80°-90°   | 110.9   | 0.6       |
| 90°-100°  | 125.9   | 0.6       |
| 100°-110° | 469.2   | 2.3       |
| 110°-120° | 1244.4  | 6.2       |
| 120°-130° | 2064.0  | 10.3      |
| 130°-140° | 2192.4  | 11.0      |
| 140°-150° | 2037.6  | 10.2      |
| 150°-160° | 1638.2  | 8.2       |
| 160°-170° | 1055.6  | 5.3       |
| 170°-180° | 363.3   | 1.8       |
| 0°-30°    | 3051.9  | 15.3      |
| 0°-40°    | 4739.1  | 23.7      |
| 0°-60°    | 7507.8  | 37.5      |
| 0°-90°    | 8819.5  | 44.1      |
| 90°-120°  | 1839.5  | 9.2       |
| 90°-150°  | 8133.6  | 40.6      |
| 90°-180°  | 11191.0 | 55.9      |
| 0°-180°   | 20010.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4285 | 4285  | 4285 | 4285  | 4285 |      |
| 5°   | 4285 | 4266  | 4215 | 4250  | 4239 | 406  |
| 15°  | 4076 | 4033  | 3901 | 3828  | 3789 | 1148 |
| 25°  | 3700 | 3575  | 3319 | 3161  | 3102 | 1701 |
| 35°  | 3188 | 2990  | 2649 | 2404  | 2319 | 1995 |
| 45°  | 2606 | 2346  | 1939 | 1663  | 1570 | 2013 |
| 55°  | 1981 | 1679  | 1260 | 1028  | 954  | 1771 |
| 65°  | 1338 | 1024  | 675  | 543   | 531  | 1326 |
| 75°  | 713  | 442   | 310  | 283   | 279  | 755  |
| 85°  | 167  | 85    | 74   | 74    | 74   | 191  |
| 90°  | 3    | 33    | 55   | 69    | 74   | 19   |
| 95°  | 179  | 88    | 108  | 122   | 119  | 212  |
| 105° | 840  | 923   | 169  | 199   | 210  | 897  |
| 115° | 1588 | 1635  | 1704 | 425   | 227  | 1563 |
| 125° | 2245 | 2282  | 2334 | 2353  | 2362 | 2003 |
| 135° | 2779 | 2823  | 2848 | 2876  | 2870 | 2146 |
| 145° | 3224 | 3221  | 3267 | 3287  | 3273 | 2016 |
| 155° | 3549 | 3524  | 3558 | 3574  | 3552 | 1635 |
| 165° | 3740 | 3723  | 3732 | 3751  | 3732 | 1057 |
| 175° | 3825 | 3806  | 3812 | 3831  | 3803 | 364  |
| 180° | 3817 | 3817  | 3817 | 3817  | 3817 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4285.1 | 4285.1 | 4285.1 | 4285.1 | 4285.1 |
| 2.5°   | 4304.4 | 4285.1 | 4242.3 | 4281.4 | 4273.6 |
| 5°     | 4285.1 | 4265.8 | 4215.1 | 4250.1 | 4238.6 |
| 7.5°   | 4250.1 | 4227.0 | 4172.7 | 4188.0 | 4168.6 |
| 10°    | 4203.6 | 4176.4 | 4099.1 | 4087.1 | 4064.1 |
| 12.5°  | 4145.6 | 4110.6 | 4005.7 | 3982.6 | 3939.8 |
| 15°    | 4075.6 | 4032.9 | 3901.2 | 3827.6 | 3788.8 |
| 17.5°  | 3994.2 | 3932.1 | 3769.1 | 3683.9 | 3621.8 |
| 20°    | 3901.2 | 3823.4 | 3629.6 | 3532.9 | 3447.3 |
| 22.5°  | 3800.4 | 3711.1 | 3486.1 | 3354.4 | 3296.4 |
| 25°    | 3699.6 | 3575.3 | 3319.4 | 3160.6 | 3102.2 |
| 27.5°  | 3579.5 | 3447.3 | 3164.3 | 2982.0 | 2892.8 |
| 30°    | 3451.5 | 3303.8 | 2993.6 | 2796.1 | 2691.1 |
| 32.5°  | 3327.3 | 3148.7 | 2831.0 | 2598.2 | 2501.1 |
| 35°    | 3187.8 | 2989.8 | 2648.8 | 2404.4 | 2318.8 |
| 37.5°  | 3052.0 | 2838.5 | 2478.0 | 2210.2 | 2113.6 |
| 40°    | 2908.4 | 2676.0 | 2299.5 | 2024.2 | 1923.4 |
| 42.5°  | 2761.1 | 2513.0 | 2121.4 | 1834.2 | 1737.5 |
| 45°    | 2606.0 | 2346.0 | 1939.1 | 1663.4 | 1570.5 |
| 47.5°  | 2458.7 | 2183.5 | 1764.6 | 1488.9 | 1403.8 |
| 50°    | 2295.8 | 2020.5 | 1593.9 | 1326.1 | 1245.0 |
| 52.5°  | 2136.6 | 1845.7 | 1431.0 | 1175.1 | 1101.4 |
| 55°    | 1981.4 | 1679.0 | 1260.2 | 1027.7 | 954.1  |
| 57.5°  | 1822.7 | 1512.4 | 1109.2 | 892.0  | 829.8  |
| 60°    | 1659.7 | 1349.5 | 950.0  | 752.5  | 690.4  |
| 62.5°  | 1500.9 | 1190.7 | 814.3  | 628.3  | 597.4  |
| 65°    | 1337.9 | 1023.6 | 674.8  | 543.1  | 531.1  |
| 67.5°  | 1182.9 | 868.6  | 543.1  | 476.8  | 465.3  |
| 70°    | 1019.9 | 717.6  | 449.7  | 411.0  | 395.4  |
| 72.5°  | 864.8  | 577.7  | 376.1  | 345.2  | 337.3  |
| 75°    | 713.4  | 441.9  | 310.2  | 283.0  | 279.4  |
| 77.5°  | 562.4  | 314.0  | 244.4  | 228.8  | 220.9  |
| 80°    | 422.5  | 225.1  | 186.0  | 170.8  | 170.8  |
| 82.5°  | 294.5  | 151.4  | 128.0  | 120.2  | 120.2  |
| 85°    | 166.6  | 85.2   | 73.6   | 73.6   | 73.6   |
| 87.5°  | 62.1   | 30.8   | 30.8   | 27.1   | 27.1   |
| 90°    | 2.6    | 33.1   | 55.1   | 69.2   | 74.5   |
| 92.5°  | 69.2   | 58.1   | 66.3   | 71.8   | 74.5   |
| 95°    | 179.4  | 88.2   | 107.5  | 121.7  | 118.8  |
| 97.5°  | 323.1  | 96.8   | 140.7  | 149.2  | 151.8  |
| 100°   | 489.0  | 110.6  | 157.4  | 179.4  | 185.0  |
| 102.5° | 671.1  | 665.8  | 163.0  | 193.2  | 201.7  |
| 105°   | 839.6  | 922.7  | 168.6  | 198.8  | 209.9  |
| 107.5° | 1035.8 | 1104.7 | 174.2  | 204.3  | 215.5  |
| 110°   | 1223.7 | 1281.5 | 483.4  | 207.3  | 218.1  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1400.5 | 1450.0 | 1403.2 | 212.5  | 221.0  |
| 115°   | 1588.1 | 1635.0 | 1704.2 | 425.4  | 226.7  |
| 117.5° | 1751.1 | 1806.3 | 1853.5 | 1458.2 | 734.7  |
| 120°   | 1933.5 | 1974.8 | 2024.7 | 2057.9 | 1684.9 |
| 122.5° | 2088.0 | 2132.3 | 2187.7 | 2204.1 | 2207.1 |
| 125°   | 2245.4 | 2281.5 | 2334.0 | 2353.3 | 2361.5 |
| 127.5° | 2389.1 | 2427.8 | 2469.5 | 2497.0 | 2499.6 |
| 130°   | 2524.5 | 2568.8 | 2599.0 | 2629.5 | 2626.9 |
| 132.5° | 2662.6 | 2698.7 | 2728.8 | 2753.8 | 2751.2 |
| 135°   | 2778.7 | 2823.0 | 2847.6 | 2875.5 | 2869.9 |
| 137.5° | 2900.1 | 2933.2 | 2961.1 | 2988.6 | 2980.4 |
| 140°   | 3018.9 | 3041.1 | 3071.3 | 3096.3 | 3082.5 |
| 142.5° | 3118.5 | 3137.9 | 3173.6 | 3195.6 | 3181.8 |
| 145°   | 3223.5 | 3220.6 | 3267.4 | 3286.8 | 3273.0 |
| 147.5° | 3314.4 | 3306.2 | 3353.1 | 3366.9 | 3356.0 |
| 150°   | 3402.9 | 3383.5 | 3427.8 | 3444.2 | 3430.5 |
| 152.5° | 3477.3 | 3455.4 | 3496.7 | 3513.4 | 3494.1 |
| 155°   | 3549.1 | 3524.5 | 3557.7 | 3574.1 | 3552.2 |
| 157.5° | 3607.2 | 3585.2 | 3610.2 | 3629.5 | 3607.2 |
| 160°   | 3657.1 | 3640.4 | 3657.1 | 3673.5 | 3654.1 |
| 162.5° | 3701.1 | 3684.7 | 3698.4 | 3717.8 | 3692.9 |
| 165°   | 3739.7 | 3723.3 | 3731.5 | 3750.9 | 3731.5 |
| 167.5° | 3770.3 | 3753.5 | 3762.1 | 3781.4 | 3756.5 |
| 170°   | 3795.1 | 3778.5 | 3784.0 | 3803.3 | 3778.5 |
| 172.5° | 3811.5 | 3795.1 | 3800.8 | 3820.1 | 3795.1 |
| 175°   | 3825.3 | 3806.0 | 3811.5 | 3831.0 | 3803.3 |
| 177.5° | 3831.0 | 3811.5 | 3814.6 | 3833.9 | 3809.0 |
| 180°   | 3817.2 | 3817.2 | 3817.2 | 3817.2 | 3817.2 |

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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 | 10.40            | 11.19 | 11.42 | 12.21 | 13.56 | 6.37           | 7.15  | 7.38  | 8.17  | 9.52  |
|                 | 3H   | 12.08            | 12.78 | 13.11 | 13.81 | 15.19 | 7.55           | 8.25  | 8.57  | 9.28  | 10.66 |
|                 | 4H   | 12.69            | 13.36 | 13.73 | 14.39 | 15.77 | 8.00           | 8.66  | 9.04  | 9.69  | 11.08 |
|                 | 6H   | 13.12            | 13.73 | 14.16 | 14.76 | 16.16 | 8.32           | 8.93  | 9.36  | 9.96  | 11.36 |
|                 | 8H   | 13.24            | 13.82 | 14.29 | 14.87 | 16.26 | 8.41           | 8.99  | 9.46  | 10.04 | 11.43 |
|                 | 12H  | 13.30            | 13.86 | 14.36 | 14.90 | 16.31 | 8.45           | 9.00  | 9.51  | 10.05 | 11.46 |
| 4H              | 2H   | 10.42            | 11.08 | 11.46 | 12.11 | 13.49 | 6.96           | 7.62  | 8.00  | 8.65  | 10.03 |
|                 | 3H   | 12.25            | 12.80 | 13.30 | 13.86 | 15.25 | 8.30           | 8.86  | 9.35  | 9.91  | 11.31 |
|                 | 4H   | 12.94            | 13.45 | 14.00 | 14.49 | 15.91 | 8.85           | 9.36  | 9.91  | 10.41 | 11.82 |
|                 | 6H   | 13.46            | 13.89 | 14.52 | 14.96 | 16.38 | 9.27           | 9.70  | 10.33 | 10.77 | 12.19 |
|                 | 8H   | 13.63            | 14.04 | 14.70 | 15.10 | 16.53 | 9.40           | 9.80  | 10.46 | 10.87 | 12.30 |
|                 | 12H  | 13.73            | 14.10 | 14.81 | 15.17 | 16.61 | 9.46           | 9.83  | 10.54 | 10.91 | 12.34 |
| 8H              | 4H   | 12.91            | 13.31 | 13.97 | 14.37 | 15.80 | 9.13           | 9.53  | 10.20 | 10.60 | 12.03 |
|                 | 6H   | 13.47            | 13.81 | 14.56 | 14.92 | 16.34 | 9.65           | 9.98  | 10.74 | 11.09 | 12.52 |
|                 | 8H   | 13.69            | 13.99 | 14.79 | 15.08 | 16.52 | 9.84           | 10.13 | 10.94 | 11.22 | 12.67 |
|                 | 12H  | 13.83            | 14.09 | 14.93 | 15.18 | 16.66 | 9.96           | 10.22 | 11.06 | 11.30 | 12.79 |
| 12H             | 4H   | 12.86            | 13.22 | 13.94 | 14.30 | 15.73 | 9.13           | 9.50  | 10.22 | 10.58 | 12.01 |
|                 | 6H   | 13.45            | 13.74 | 14.55 | 14.83 | 16.28 | 9.70           | 9.99  | 10.79 | 11.08 | 12.53 |
|                 | 8H   | 13.67            | 13.93 | 14.77 | 15.01 | 16.50 | 9.91           | 10.17 | 11.01 | 11.25 | 12.74 |

END OF REPORT