

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: P927768

Luminaire Tested: DFN2DIP-HX4F0-100D120US840-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P927768  
REPORT IS A COMBINATION OF REPORTS P900975 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-100D120US840-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

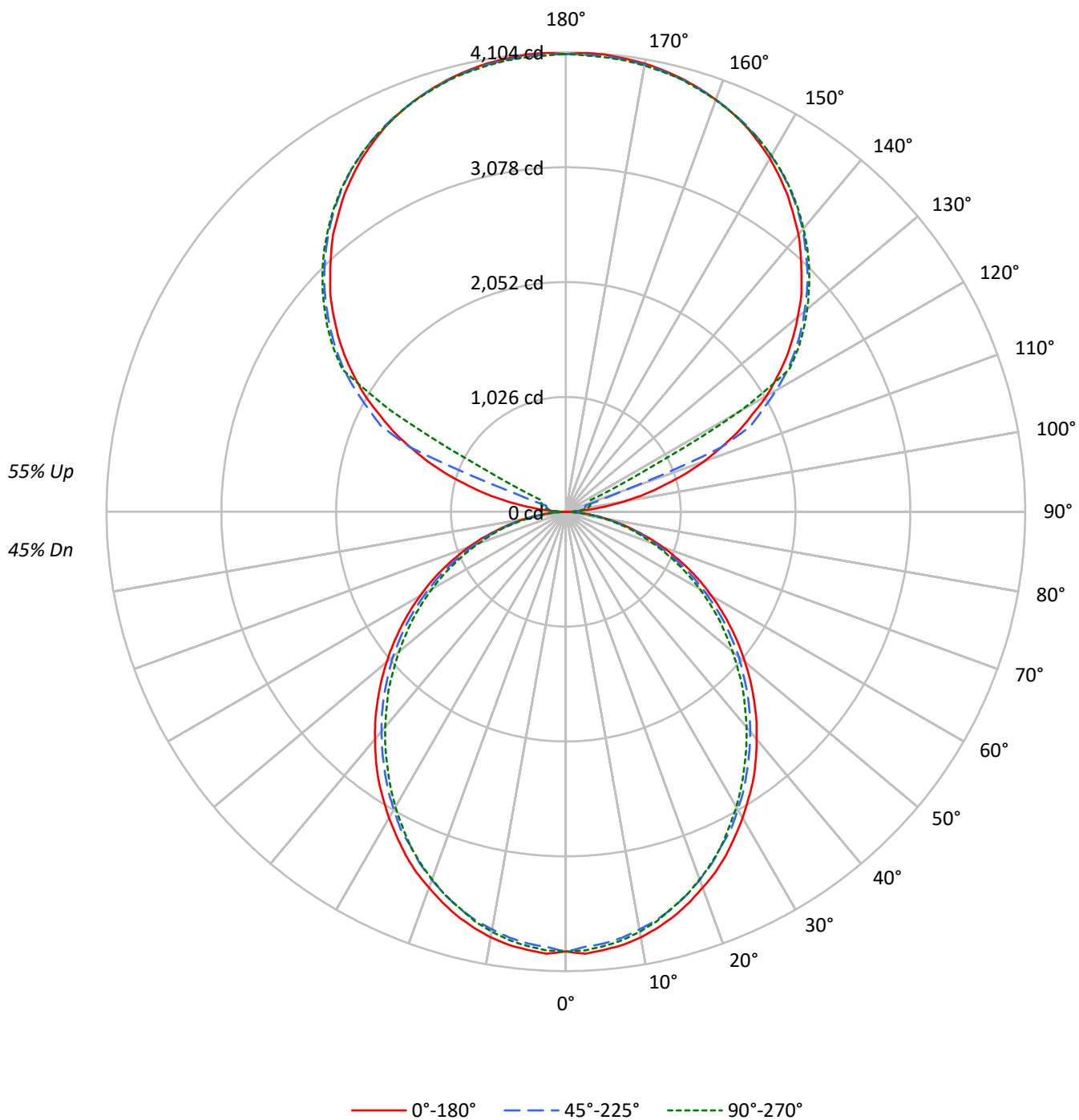
Lumens per Lamp: N/A  
Luminaire Lumens: 21993.5 lumens  
Efficiency: N/A  
Efficacy: 112.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 195.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.946  
Total Harmonic Distortion (THDi): 0.132  
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 | 81 | 81 | 81 | 66 | 66 | 66 | 52 | 52 | 52 |
| 1   | 97  | 92  | 89  | 85  | 89 | 85 | 82 | 79 | 71 | 68 | 66 | 58 | 56 | 55 | 46 | 45 | 44 |
| 2   | 88  | 81  | 75  | 70  | 81 | 74 | 69 | 65 | 62 | 58 | 55 | 51 | 48 | 46 | 40 | 39 | 37 |
| 3   | 80  | 71  | 64  | 58  | 73 | 65 | 59 | 54 | 55 | 50 | 46 | 45 | 42 | 39 | 36 | 33 | 31 |
| 4   | 74  | 63  | 55  | 49  | 67 | 58 | 51 | 46 | 49 | 43 | 39 | 40 | 36 | 33 | 32 | 29 | 27 |
| 5   | 67  | 56  | 48  | 42  | 62 | 52 | 45 | 39 | 43 | 38 | 34 | 36 | 32 | 29 | 29 | 26 | 24 |
| 6   | 62  | 50  | 42  | 36  | 57 | 46 | 39 | 34 | 39 | 34 | 30 | 32 | 28 | 25 | 26 | 23 | 21 |
| 7   | 57  | 45  | 37  | 32  | 53 | 42 | 35 | 30 | 35 | 30 | 26 | 30 | 25 | 22 | 24 | 21 | 18 |
| 8   | 53  | 41  | 33  | 28  | 49 | 38 | 31 | 26 | 32 | 27 | 23 | 27 | 23 | 20 | 22 | 19 | 17 |
| 9   | 50  | 37  | 30  | 25  | 45 | 35 | 28 | 24 | 30 | 24 | 21 | 25 | 21 | 18 | 20 | 17 | 15 |
| 10  | 46  | 34  | 27  | 22  | 42 | 32 | 25 | 21 | 27 | 22 | 19 | 23 | 19 | 16 | 19 | 16 | 14 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2922 | 2922 | 2922 |
| 5°  | 2927 | 2881 | 2900 |
| 10° | 2903 | 2843 | 2861 |
| 15° | 2861 | 2796 | 2800 |
| 20° | 2803 | 2731 | 2737 |
| 25° | 2746 | 2654 | 2665 |
| 30° | 2674 | 2582 | 2573 |
| 35° | 2606 | 2497 | 2475 |
| 40° | 2523 | 2411 | 2382 |
| 45° | 2440 | 2325 | 2288 |
| 50° | 2348 | 2235 | 2178 |
| 55° | 2253 | 2130 | 2077 |
| 60° | 2145 | 2006 | 1961 |
| 65° | 2028 | 1878 | 1824 |
| 70° | 1878 | 1721 | 1677 |
| 75° | 1671 | 1534 | 1542 |
| 80° | 1421 | 1295 | 1283 |
| 85° | 1031 | 882  | 853  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2440 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 369.8   | 1.7       |
| 10°-20°   | 1040.5  | 4.7       |
| 20°-30°   | 1529.1  | 7.0       |
| 30°-40°   | 1776.0  | 8.1       |
| 40°-50°   | 1773.8  | 8.1       |
| 50°-60°   | 1546.7  | 7.0       |
| 60°-70°   | 1143.4  | 5.2       |
| 70°-80°   | 646.9   | 2.9       |
| 80°-90°   | 177.9   | 0.8       |
| 90°-100°  | 134.8   | 0.6       |
| 100°-110° | 502.7   | 2.3       |
| 110°-120° | 1333.2  | 6.1       |
| 120°-130° | 2211.3  | 10.1      |
| 130°-140° | 2348.9  | 10.7      |
| 140°-150° | 2183.0  | 9.9       |
| 150°-160° | 1755.1  | 8.0       |
| 160°-170° | 1130.9  | 5.1       |
| 170°-180° | 389.2   | 1.8       |
| 0°-30°    | 2939.5  | 13.4      |
| 0°-40°    | 4715.5  | 21.4      |
| 0°-60°    | 8036.0  | 36.5      |
| 0°-90°    | 10004.3 | 45.5      |
| 90°-120°  | 1970.8  | 9.0       |
| 90°-150°  | 8714.0  | 39.6      |
| 90°-180°  | 11989.0 | 54.5      |
| 0°-180°   | 21993.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3929 | 3929  | 3929 | 3929  | 3929 |      |
| 5°   | 3929 | 3914  | 3873 | 3903  | 3896 | 373  |
| 15°  | 3740 | 3718  | 3669 | 3684  | 3665 | 1053 |
| 25°  | 3385 | 3355  | 3291 | 3298  | 3291 | 1558 |
| 35°  | 2921 | 2883  | 2822 | 2800  | 2781 | 1824 |
| 45°  | 2377 | 2350  | 2293 | 2252  | 2237 | 1834 |
| 55°  | 1799 | 1776  | 1730 | 1685  | 1666 | 1608 |
| 65°  | 1213 | 1190  | 1152 | 1118  | 1100 | 1199 |
| 75°  | 635  | 627   | 608  | 586   | 593  | 677  |
| 85°  | 155  | 151   | 148  | 136   | 132  | 173  |
| 90°  | 3    | 35    | 59   | 74    | 80   | 20   |
| 95°  | 192  | 94    | 115  | 130   | 127  | 228  |
| 105° | 900  | 988   | 181  | 213   | 225  | 961  |
| 115° | 1701 | 1752  | 1826 | 456   | 243  | 1675 |
| 125° | 2406 | 2444  | 2501 | 2521  | 2530 | 2146 |
| 135° | 2977 | 3024  | 3051 | 3081  | 3075 | 2300 |
| 145° | 3454 | 3450  | 3501 | 3521  | 3506 | 2160 |
| 155° | 3802 | 3776  | 3812 | 3829  | 3806 | 1752 |
| 165° | 4007 | 3989  | 3998 | 4019  | 3998 | 1132 |
| 175° | 4098 | 4078  | 4084 | 4104  | 4075 | 390  |
| 180° | 4090 | 4090  | 4090 | 4090  | 4090 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3929.2 | 3929.2 | 3929.2 | 3929.2 | 3929.2 |
| 2.5°   | 3952.1 | 3933.2 | 3891.5 | 3929.2 | 3922.0 |
| 5°     | 3929.2 | 3914.4 | 3872.7 | 3902.8 | 3895.5 |
| 7.5°   | 3902.8 | 3880.3 | 3838.6 | 3869.0 | 3861.5 |
| 10°    | 3861.5 | 3835.0 | 3789.7 | 3819.8 | 3808.6 |
| 12.5°  | 3804.5 | 3782.1 | 3736.8 | 3755.6 | 3748.0 |
| 15°    | 3740.4 | 3718.0 | 3668.6 | 3683.9 | 3665.1 |
| 17.5°  | 3661.0 | 3638.6 | 3589.2 | 3608.1 | 3589.2 |
| 20°    | 3574.0 | 3551.6 | 3498.7 | 3509.9 | 3495.0 |
| 22.5°  | 3487.4 | 3453.4 | 3404.0 | 3404.0 | 3396.5 |
| 25°    | 3385.3 | 3355.2 | 3291.0 | 3298.2 | 3291.0 |
| 27.5°  | 3271.8 | 3245.3 | 3196.4 | 3185.2 | 3166.3 |
| 30°    | 3158.8 | 3128.3 | 3071.7 | 3060.5 | 3045.3 |
| 32.5°  | 3037.7 | 3015.3 | 2954.7 | 2931.9 | 2916.6 |
| 35°    | 2920.6 | 2883.0 | 2822.4 | 2799.6 | 2780.7 |
| 37.5°  | 2788.4 | 2754.2 | 2693.7 | 2667.3 | 2648.4 |
| 40°    | 2652.4 | 2621.9 | 2561.5 | 2527.8 | 2512.6 |
| 42.5°  | 2520.2 | 2489.7 | 2429.6 | 2391.5 | 2369.1 |
| 45°    | 2376.7 | 2350.2 | 2293.3 | 2252.0 | 2236.8 |
| 47.5°  | 2236.8 | 2210.4 | 2149.8 | 2108.1 | 2085.6 |
| 50°    | 2089.3 | 2070.4 | 2017.5 | 1964.6 | 1945.8 |
| 52.5°  | 1945.8 | 1919.3 | 1870.4 | 1828.7 | 1802.3 |
| 55°    | 1798.7 | 1775.8 | 1730.5 | 1685.2 | 1666.4 |
| 57.5°  | 1651.1 | 1632.2 | 1583.0 | 1537.7 | 1522.5 |
| 60°    | 1503.6 | 1488.7 | 1435.8 | 1394.1 | 1382.9 |
| 62.5°  | 1360.1 | 1333.6 | 1296.0 | 1258.3 | 1243.1 |
| 65°    | 1213.0 | 1190.2 | 1152.5 | 1118.4 | 1099.6 |
| 67.5°  | 1061.9 | 1042.6 | 1009.0 | 982.5  | 967.3  |
| 70°    | 921.9  | 906.7  | 872.7  | 846.2  | 831.4  |
| 72.5°  | 778.5  | 763.2  | 744.4  | 718.0  | 706.7  |
| 75°    | 634.6  | 627.4  | 608.1  | 585.7  | 593.3  |
| 77.5°  | 506.3  | 491.1  | 483.4  | 472.2  | 461.0  |
| 80°    | 378.0  | 374.0  | 366.4  | 355.1  | 347.6  |
| 82.5°  | 257.0  | 257.0  | 253.4  | 238.1  | 238.1  |
| 85°    | 154.7  | 151.2  | 147.5  | 135.9  | 132.3  |
| 87.5°  | 68.2   | 60.5   | 52.9   | 41.7   | 37.7   |
| 90°    | 2.8    | 35.4   | 59.1   | 74.1   | 79.8   |
| 92.5°  | 74.1   | 62.2   | 71.0   | 76.9   | 79.8   |
| 95°    | 192.2  | 94.5   | 115.2  | 130.4  | 127.2  |
| 97.5°  | 346.2  | 103.7  | 150.8  | 159.9  | 162.7  |
| 100°   | 523.9  | 118.4  | 168.6  | 192.2  | 198.2  |
| 102.5° | 719.0  | 713.3  | 174.6  | 207.0  | 216.1  |
| 105°   | 899.5  | 988.5  | 180.7  | 213.0  | 224.9  |
| 107.5° | 1109.7 | 1183.5 | 186.6  | 218.9  | 230.8  |
| 110°   | 1311.0 | 1372.9 | 517.9  | 222.1  | 233.7  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1500.5 | 1553.5 | 1503.3 | 227.7  | 236.8  |
| 115°   | 1701.4 | 1751.7 | 1825.8 | 455.7  | 242.9  |
| 117.5° | 1876.1 | 1935.2 | 1985.8 | 1562.3 | 787.1  |
| 120°   | 2071.5 | 2115.7 | 2169.2 | 2204.7 | 1805.1 |
| 122.5° | 2237.0 | 2284.5 | 2343.8 | 2361.4 | 2364.5 |
| 125°   | 2405.6 | 2444.3 | 2500.6 | 2521.3 | 2530.1 |
| 127.5° | 2559.5 | 2601.0 | 2645.7 | 2675.2 | 2678.0 |
| 130°   | 2704.6 | 2752.1 | 2784.4 | 2817.1 | 2814.3 |
| 132.5° | 2852.6 | 2891.3 | 2923.6 | 2950.3 | 2947.5 |
| 135°   | 2977.0 | 3024.5 | 3050.8 | 3080.7 | 3074.7 |
| 137.5° | 3107.1 | 3142.5 | 3172.4 | 3201.9 | 3193.1 |
| 140°   | 3234.3 | 3258.1 | 3290.4 | 3317.2 | 3302.4 |
| 142.5° | 3341.0 | 3361.8 | 3400.1 | 3423.6 | 3408.9 |
| 145°   | 3453.5 | 3450.4 | 3500.6 | 3521.4 | 3506.5 |
| 147.5° | 3550.9 | 3542.1 | 3592.4 | 3607.1 | 3595.5 |
| 150°   | 3645.7 | 3625.0 | 3672.4 | 3690.0 | 3675.3 |
| 152.5° | 3725.5 | 3701.9 | 3746.3 | 3764.1 | 3743.4 |
| 155°   | 3802.4 | 3776.0 | 3811.6 | 3829.2 | 3805.6 |
| 157.5° | 3864.6 | 3841.1 | 3867.8 | 3888.5 | 3864.6 |
| 160°   | 3918.0 | 3900.2 | 3918.0 | 3935.6 | 3914.9 |
| 162.5° | 3965.2 | 3947.6 | 3962.4 | 3983.1 | 3956.4 |
| 165°   | 4006.6 | 3989.0 | 3997.8 | 4018.6 | 3997.8 |
| 167.5° | 4039.3 | 4021.3 | 4030.5 | 4051.2 | 4024.6 |
| 170°   | 4066.0 | 4048.1 | 4054.0 | 4074.7 | 4048.1 |
| 172.5° | 4083.5 | 4066.0 | 4072.0 | 4092.7 | 4066.0 |
| 175°   | 4098.3 | 4077.6 | 4083.5 | 4104.3 | 4074.7 |
| 177.5° | 4104.3 | 4083.5 | 4086.8 | 4107.5 | 4080.8 |
| 180°   | 4089.6 | 4089.6 | 4089.6 | 4089.6 | 4089.6 |

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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 | 10.57            | 11.39 | 11.56 | 12.39 | 13.73 | 10.13          | 10.96 | 11.13 | 11.96 | 13.30 |
|                 | 3H   | 12.22            | 12.96 | 13.23 | 13.98 | 15.33 | 11.75          | 12.49 | 12.76 | 13.50 | 14.86 |
|                 | 4H   | 12.81            | 13.51 | 13.83 | 14.53 | 15.89 | 12.34          | 13.03 | 13.36 | 14.05 | 15.42 |
|                 | 6H   | 13.21            | 13.85 | 14.24 | 14.87 | 16.25 | 12.73          | 13.38 | 13.76 | 14.40 | 15.77 |
|                 | 8H   | 13.31            | 13.93 | 14.35 | 14.96 | 16.34 | 12.84          | 13.45 | 13.87 | 14.49 | 15.86 |
|                 | 12H  | 13.36            | 13.94 | 14.40 | 14.98 | 16.37 | 12.88          | 13.46 | 13.92 | 14.49 | 15.89 |
| 4H              | 2H   | 11.02            | 11.72 | 12.05 | 12.74 | 14.10 | 10.68          | 11.38 | 11.70 | 12.40 | 13.76 |
|                 | 3H   | 12.89            | 13.47 | 13.92 | 14.52 | 15.89 | 12.49          | 13.08 | 13.53 | 14.12 | 15.50 |
|                 | 4H   | 13.60            | 14.13 | 14.64 | 15.17 | 16.57 | 13.19          | 13.73 | 14.23 | 14.77 | 16.17 |
|                 | 6H   | 14.11            | 14.57 | 15.16 | 15.64 | 17.03 | 13.70          | 14.16 | 14.75 | 15.23 | 16.62 |
|                 | 8H   | 14.26            | 14.69 | 15.31 | 15.75 | 17.16 | 13.85          | 14.28 | 14.90 | 15.33 | 16.74 |
|                 | 12H  | 14.34            | 14.72 | 15.40 | 15.79 | 17.21 | 13.91          | 14.30 | 14.98 | 15.37 | 16.78 |
| 8H              | 4H   | 13.79            | 14.22 | 14.85 | 15.28 | 16.69 | 13.43          | 13.86 | 14.49 | 14.92 | 16.33 |
|                 | 6H   | 14.43            | 14.78 | 15.50 | 15.88 | 17.28 | 14.06          | 14.42 | 15.14 | 15.51 | 16.92 |
|                 | 8H   | 14.65            | 14.96 | 15.73 | 16.04 | 17.46 | 14.28          | 14.59 | 15.36 | 15.67 | 17.10 |
|                 | 12H  | 14.78            | 15.05 | 15.86 | 16.13 | 17.59 | 14.39          | 14.67 | 15.48 | 15.74 | 17.21 |
| 12H             | 4H   | 13.78            | 14.17 | 14.85 | 15.23 | 16.65 | 13.43          | 13.81 | 14.50 | 14.88 | 16.30 |
|                 | 6H   | 14.46            | 14.77 | 15.54 | 15.85 | 17.27 | 14.10          | 14.42 | 15.19 | 15.50 | 16.92 |
|                 | 8H   | 14.70            | 14.97 | 15.78 | 16.05 | 17.51 | 14.34          | 14.61 | 15.42 | 15.69 | 17.16 |

END OF REPORT