

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: P906985

Luminaire Tested: DFN2DIP-SQ4F0-160D160US835-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P906985  
REPORT IS A COMBINATION OF REPORTS P901739 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-160D160US835-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

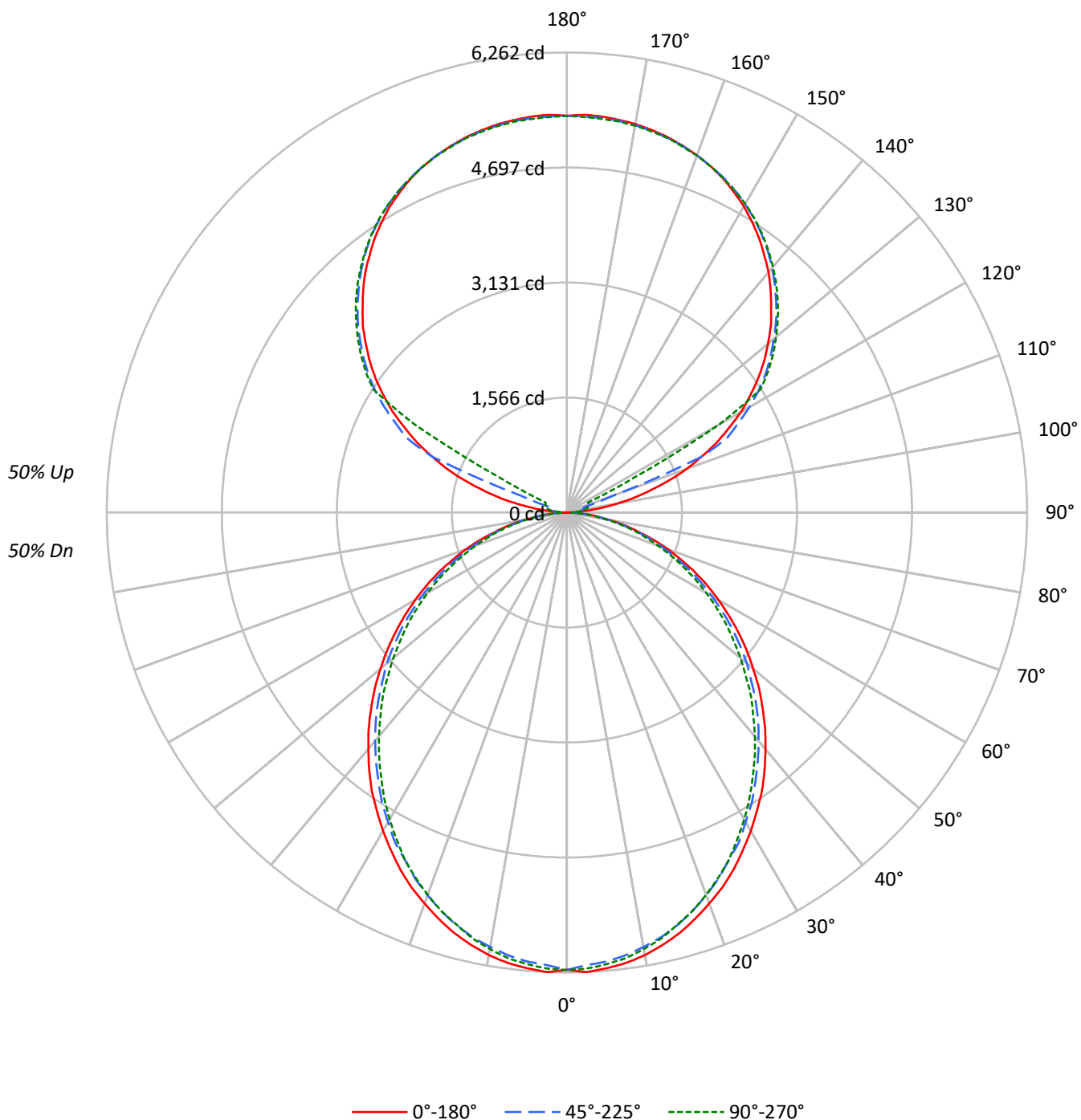
Lumens per Lamp: N/A  
Luminaire Lumens: 31680.0 lumens  
Efficiency: N/A  
Efficacy: 109.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 288.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9971  
Total Harmonic Distortion (THDi): 0.049  
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   | 107 | 107 | 107 | 107 | 99 | 99 | 99 | 99 | 83 | 83 | 83 | 69 | 69 | 69 | 56 | 56 | 56 |
| 1   | 98  | 93  | 90  | 86  | 90 | 86 | 83 | 80 | 73 | 71 | 68 | 61 | 59 | 58 | 50 | 48 | 47 |
| 2   | 89  | 82  | 75  | 70  | 82 | 76 | 70 | 66 | 64 | 60 | 57 | 53 | 51 | 48 | 44 | 42 | 40 |
| 3   | 81  | 72  | 64  | 59  | 75 | 66 | 60 | 55 | 56 | 52 | 48 | 47 | 44 | 41 | 39 | 36 | 34 |
| 4   | 74  | 64  | 56  | 50  | 68 | 59 | 52 | 47 | 50 | 45 | 41 | 42 | 38 | 35 | 35 | 32 | 29 |
| 5   | 68  | 57  | 48  | 42  | 63 | 53 | 45 | 40 | 45 | 39 | 35 | 38 | 34 | 30 | 31 | 28 | 26 |
| 6   | 63  | 51  | 43  | 37  | 58 | 47 | 40 | 35 | 40 | 35 | 31 | 34 | 30 | 27 | 28 | 25 | 23 |
| 7   | 58  | 46  | 38  | 32  | 53 | 43 | 36 | 30 | 37 | 31 | 27 | 31 | 27 | 23 | 26 | 23 | 20 |
| 8   | 54  | 42  | 34  | 29  | 50 | 39 | 32 | 27 | 33 | 28 | 24 | 28 | 24 | 21 | 24 | 20 | 18 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 29 | 24 | 31 | 25 | 21 | 26 | 22 | 19 | 22 | 19 | 16 |
| 10  | 47  | 35  | 28  | 23  | 43 | 33 | 26 | 22 | 28 | 23 | 19 | 24 | 20 | 17 | 20 | 17 | 15 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4368 | 4368 | 4368 |
| 5°  | 4375 | 4308 | 4338 |
| 10° | 4340 | 4251 | 4280 |
| 15° | 4276 | 4182 | 4190 |
| 20° | 4190 | 4086 | 4097 |
| 25° | 4104 | 3970 | 3990 |
| 30° | 3996 | 3863 | 3853 |
| 35° | 3894 | 3736 | 3708 |
| 40° | 3769 | 3608 | 3570 |
| 45° | 3644 | 3480 | 3429 |
| 50° | 3507 | 3346 | 3266 |
| 55° | 3364 | 3190 | 3116 |
| 60° | 3202 | 3005 | 2945 |
| 65° | 3025 | 2814 | 2742 |
| 70° | 2800 | 2581 | 2525 |
| 75° | 2489 | 2302 | 2327 |
| 80° | 2114 | 1947 | 1944 |
| 85° | 1528 | 1332 | 1306 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3644 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 586.0   | 1.8       |
| 10°-20°   | 1648.7  | 5.2       |
| 20°-30°   | 2422.9  | 7.6       |
| 30°-40°   | 2814.1  | 8.9       |
| 40°-50°   | 2810.6  | 8.9       |
| 50°-60°   | 2450.7  | 7.7       |
| 60°-70°   | 1811.6  | 5.7       |
| 70°-80°   | 1025.0  | 3.2       |
| 80°-90°   | 280.0   | 0.9       |
| 90°-100°  | 178.0   | 0.6       |
| 100°-110° | 663.8   | 2.1       |
| 110°-120° | 1760.4  | 5.6       |
| 120°-130° | 2919.7  | 9.2       |
| 130°-140° | 3101.5  | 9.8       |
| 140°-150° | 2882.5  | 9.1       |
| 150°-160° | 2317.4  | 7.3       |
| 160°-170° | 1493.3  | 4.7       |
| 170°-180° | 514.0   | 1.6       |
| 0°-30°    | 4657.5  | 14.7      |
| 0°-40°    | 7471.6  | 23.6      |
| 0°-60°    | 12732.9 | 40.2      |
| 0°-90°    | 15849.5 | 50.0      |
| 90°-120°  | 2602.2  | 8.2       |
| 90°-150°  | 11505.9 | 36.3      |
| 90°-180°  | 15831.0 | 50.0      |
| 0°-180°   | 31680.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 6226 | 6226  | 6226 | 6226  | 6226 |      |
| 5°   | 6226 | 6202  | 6136 | 6184  | 6172 | 591  |
| 15°  | 5926 | 5891  | 5813 | 5837  | 5807 | 1669 |
| 25°  | 5364 | 5316  | 5214 | 5226  | 5214 | 2468 |
| 35°  | 4628 | 4568  | 4472 | 4436  | 4406 | 2890 |
| 45°  | 3766 | 3724  | 3634 | 3568  | 3544 | 2906 |
| 55°  | 2850 | 2814  | 2742 | 2670  | 2640 | 2548 |
| 65°  | 1922 | 1886  | 1826 | 1772  | 1742 | 1900 |
| 75°  | 1005 | 994   | 964  | 928   | 940  | 1073 |
| 85°  | 245  | 239   | 234  | 215   | 210  | 273  |
| 90°  | 4    | 47    | 78   | 98    | 105  | 29   |
| 95°  | 254  | 125   | 152  | 172   | 168  | 301  |
| 105° | 1188 | 1305  | 238  | 281   | 297  | 1269 |
| 115° | 2247 | 2313  | 2411 | 602   | 321  | 2212 |
| 125° | 3176 | 3227  | 3302 | 3329  | 3341 | 2833 |
| 135° | 3931 | 3994  | 4028 | 4068  | 4060 | 3036 |
| 145° | 4560 | 4556  | 4622 | 4650  | 4630 | 2852 |
| 155° | 5021 | 4986  | 5033 | 5056  | 5025 | 2314 |
| 165° | 5290 | 5267  | 5279 | 5306  | 5279 | 1495 |
| 175° | 5411 | 5384  | 5392 | 5419  | 5380 | 515  |
| 180° | 5400 | 5400  | 5400 | 5400  | 5400 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 6225.7 | 6225.7 | 6225.7 | 6225.7 | 6225.7 |
| 2.5°   | 6261.9 | 6232.0 | 6166.0 | 6225.7 | 6214.2 |
| 5°     | 6225.7 | 6202.2 | 6136.1 | 6183.8 | 6172.3 |
| 7.5°   | 6183.8 | 6148.2 | 6082.1 | 6130.4 | 6118.3 |
| 10°    | 6118.3 | 6076.4 | 6004.7 | 6052.3 | 6034.5 |
| 12.5°  | 6028.2 | 5992.6 | 5920.8 | 5950.7 | 5938.6 |
| 15°    | 5926.5 | 5891.0 | 5812.8 | 5837.0 | 5807.1 |
| 17.5°  | 5800.8 | 5765.2 | 5687.1 | 5716.9 | 5687.1 |
| 20°    | 5662.9 | 5627.4 | 5543.5 | 5561.3 | 5537.8 |
| 22.5°  | 5525.8 | 5471.8 | 5393.6 | 5393.6 | 5381.6 |
| 25°    | 5363.8 | 5316.2 | 5214.5 | 5226.0 | 5214.5 |
| 27.5°  | 5184.0 | 5142.1 | 5064.6 | 5046.9 | 5017.0 |
| 30°    | 5004.9 | 4956.7 | 4867.1 | 4849.3 | 4825.2 |
| 32.5°  | 4813.1 | 4777.6 | 4681.6 | 4645.4 | 4621.3 |
| 35°    | 4627.7 | 4568.0 | 4472.0 | 4435.8 | 4406.0 |
| 37.5°  | 4418.1 | 4364.1 | 4268.2 | 4226.2 | 4196.4 |
| 40°    | 4202.7 | 4154.5 | 4058.6 | 4005.2 | 3981.1 |
| 42.5°  | 3993.2 | 3944.9 | 3849.6 | 3789.3 | 3753.7 |
| 45°    | 3765.8 | 3723.8 | 3633.7 | 3568.2 | 3544.1 |
| 47.5°  | 3544.1 | 3502.2 | 3406.3 | 3340.2 | 3304.7 |
| 50°    | 3310.4 | 3280.5 | 3196.7 | 3112.8 | 3083.0 |
| 52.5°  | 3083.0 | 3041.1 | 2963.6 | 2897.5 | 2855.6 |
| 55°    | 2849.9 | 2813.7 | 2741.9 | 2670.1 | 2640.3 |
| 57.5°  | 2616.2 | 2586.3 | 2508.2 | 2436.4 | 2412.3 |
| 60°    | 2382.4 | 2358.9 | 2275.1 | 2209.0 | 2191.2 |
| 62.5°  | 2155.0 | 2113.1 | 2053.4 | 1993.7 | 1969.6 |
| 65°    | 1921.9 | 1885.7 | 1826.0 | 1772.1 | 1742.2 |
| 67.5°  | 1682.5 | 1652.0 | 1598.7 | 1556.7 | 1532.6 |
| 70°    | 1460.8 | 1436.7 | 1382.7 | 1340.8 | 1317.3 |
| 72.5°  | 1233.4 | 1209.3 | 1179.5 | 1137.5 | 1119.8 |
| 75°    | 1005.4 | 994.0  | 963.5  | 927.9  | 940.0  |
| 77.5°  | 802.2  | 778.1  | 766.0  | 748.2  | 730.4  |
| 80°    | 598.9  | 592.6  | 580.5  | 562.7  | 550.7  |
| 82.5°  | 407.1  | 407.1  | 401.4  | 377.3  | 377.3  |
| 85°    | 245.2  | 239.4  | 233.7  | 215.3  | 209.6  |
| 87.5°  | 108.0  | 95.9   | 83.8   | 66.1   | 59.7   |
| 90°    | 3.7    | 46.9   | 77.9   | 97.9   | 105.3  |
| 92.5°  | 97.9   | 82.1   | 93.7   | 101.6  | 105.3  |
| 95°    | 253.8  | 124.8  | 152.2  | 172.1  | 168.0  |
| 97.5°  | 457.0  | 136.9  | 199.0  | 211.1  | 214.8  |
| 100°   | 691.8  | 156.4  | 222.7  | 253.8  | 261.7  |
| 102.5° | 949.3  | 941.9  | 230.6  | 273.3  | 285.3  |
| 105°   | 1187.8 | 1305.2 | 238.5  | 281.2  | 296.9  |
| 107.5° | 1465.2 | 1562.7 | 246.4  | 289.1  | 304.8  |
| 110°   | 1731.1 | 1812.8 | 683.9  | 293.2  | 308.5  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1981.2 | 2051.3 | 1984.9 | 300.7  | 312.7  |
| 115°   | 2246.6 | 2312.9 | 2410.8 | 601.8  | 320.6  |
| 117.5° | 2477.2 | 2555.1 | 2622.0 | 2062.9 | 1039.3 |
| 120°   | 2735.2 | 2793.6 | 2864.1 | 2911.0 | 2383.5 |
| 122.5° | 2953.7 | 3016.3 | 3094.7 | 3117.9 | 3122.1 |
| 125°   | 3176.4 | 3227.4 | 3301.7 | 3329.1 | 3340.7 |
| 127.5° | 3379.6 | 3434.4 | 3493.3 | 3532.3 | 3536.0 |
| 130°   | 3571.3 | 3633.9 | 3676.6 | 3719.7 | 3716.0 |
| 132.5° | 3766.6 | 3817.6 | 3860.3 | 3895.6 | 3891.9 |
| 135°   | 3930.8 | 3993.5 | 4028.3 | 4067.7 | 4059.8 |
| 137.5° | 4102.5 | 4149.4 | 4188.8 | 4227.8 | 4216.2 |
| 140°   | 4270.5 | 4302.0 | 4344.7 | 4380.0 | 4360.5 |
| 142.5° | 4411.5 | 4438.9 | 4489.5 | 4520.6 | 4501.1 |
| 145°   | 4560.0 | 4555.8 | 4622.2 | 4649.5 | 4630.1 |
| 147.5° | 4688.5 | 4676.9 | 4743.3 | 4762.8 | 4747.4 |
| 150°   | 4813.8 | 4786.4 | 4849.1 | 4872.3 | 4852.8 |
| 152.5° | 4919.1 | 4888.0 | 4946.5 | 4970.2 | 4942.8 |
| 155°   | 5020.7 | 4985.9 | 5032.8 | 5056.0 | 5024.9 |
| 157.5° | 5102.9 | 5071.8 | 5107.0 | 5134.4 | 5102.9 |
| 160°   | 5173.4 | 5149.7 | 5173.4 | 5196.6 | 5169.2 |
| 162.5° | 5235.6 | 5212.4 | 5231.8 | 5259.2 | 5224.0 |
| 165°   | 5290.3 | 5267.1 | 5278.7 | 5306.1 | 5278.7 |
| 167.5° | 5333.5 | 5309.8 | 5321.9 | 5349.2 | 5314.0 |
| 170°   | 5368.7 | 5345.1 | 5352.9 | 5380.3 | 5345.1 |
| 172.5° | 5391.9 | 5368.7 | 5376.6 | 5404.0 | 5368.7 |
| 175°   | 5411.4 | 5384.0 | 5391.9 | 5419.3 | 5380.3 |
| 177.5° | 5419.3 | 5391.9 | 5396.1 | 5423.5 | 5388.2 |
| 180°   | 5399.8 | 5399.8 | 5399.8 | 5399.8 | 5399.8 |

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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 | 12.41            | 13.27 | 13.37 | 14.24 | 15.51 | 11.97          | 12.83 | 12.92 | 13.80 | 15.07 |
|                 | 3H   | 14.07            | 14.85 | 15.04 | 15.83 | 17.12 | 13.58          | 14.36 | 14.55 | 15.34 | 16.63 |
|                 | 4H   | 14.67            | 15.40 | 15.65 | 16.38 | 17.68 | 14.17          | 14.90 | 15.15 | 15.89 | 17.19 |
|                 | 6H   | 15.07            | 15.74 | 16.06 | 16.73 | 18.05 | 14.57          | 15.24 | 15.56 | 16.23 | 17.55 |
|                 | 8H   | 15.18            | 15.82 | 16.17 | 16.82 | 18.14 | 14.67          | 15.32 | 15.67 | 16.32 | 17.63 |
|                 | 12H  | 15.23            | 15.84 | 16.23 | 16.84 | 18.17 | 14.72          | 15.33 | 15.72 | 16.33 | 17.66 |
| 4H              | 2H   | 12.87            | 13.60 | 13.86 | 14.59 | 15.89 | 12.52          | 13.25 | 13.50 | 14.23 | 15.54 |
|                 | 3H   | 14.74            | 15.35 | 15.74 | 16.37 | 17.68 | 14.33          | 14.95 | 15.33 | 15.96 | 17.27 |
|                 | 4H   | 15.46            | 16.02 | 16.47 | 17.03 | 18.36 | 15.04          | 15.59 | 16.04 | 16.60 | 17.94 |
|                 | 6H   | 15.98            | 16.46 | 17.00 | 17.49 | 18.83 | 15.55          | 16.03 | 16.56 | 17.06 | 18.39 |
|                 | 8H   | 16.13            | 16.58 | 17.15 | 17.60 | 18.96 | 15.69          | 16.14 | 16.71 | 17.17 | 18.52 |
|                 | 12H  | 16.21            | 16.61 | 17.24 | 17.65 | 19.01 | 15.76          | 16.16 | 16.79 | 17.20 | 18.56 |
| 8H              | 4H   | 15.66            | 16.11 | 16.67 | 17.13 | 18.48 | 15.28          | 15.73 | 16.30 | 16.75 | 18.10 |
|                 | 6H   | 16.29            | 16.66 | 17.34 | 17.73 | 19.08 | 15.91          | 16.28 | 16.95 | 17.35 | 18.70 |
|                 | 8H   | 16.52            | 16.84 | 17.57 | 17.89 | 19.26 | 16.12          | 16.45 | 17.17 | 17.50 | 18.87 |
|                 | 12H  | 16.65            | 16.94 | 17.71 | 17.98 | 19.40 | 16.24          | 16.53 | 17.29 | 17.57 | 18.98 |
| 12H             | 4H   | 15.64            | 16.05 | 16.68 | 17.09 | 18.44 | 15.27          | 15.68 | 16.31 | 16.72 | 18.08 |
|                 | 6H   | 16.32            | 16.65 | 17.37 | 17.70 | 19.07 | 15.95          | 16.28 | 17.00 | 17.33 | 18.70 |
|                 | 8H   | 16.57            | 16.86 | 17.62 | 17.90 | 19.31 | 16.19          | 16.48 | 17.24 | 17.52 | 18.93 |

END OF REPORT