

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: P904230

Luminaire Tested: DFN2DIP-SQ4F0-160D070US830-RLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P904230  
REPORT IS A COMBINATION OF REPORTS P900094 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-160D070US830-RLLFLL  
Description: 4 foot, Square Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

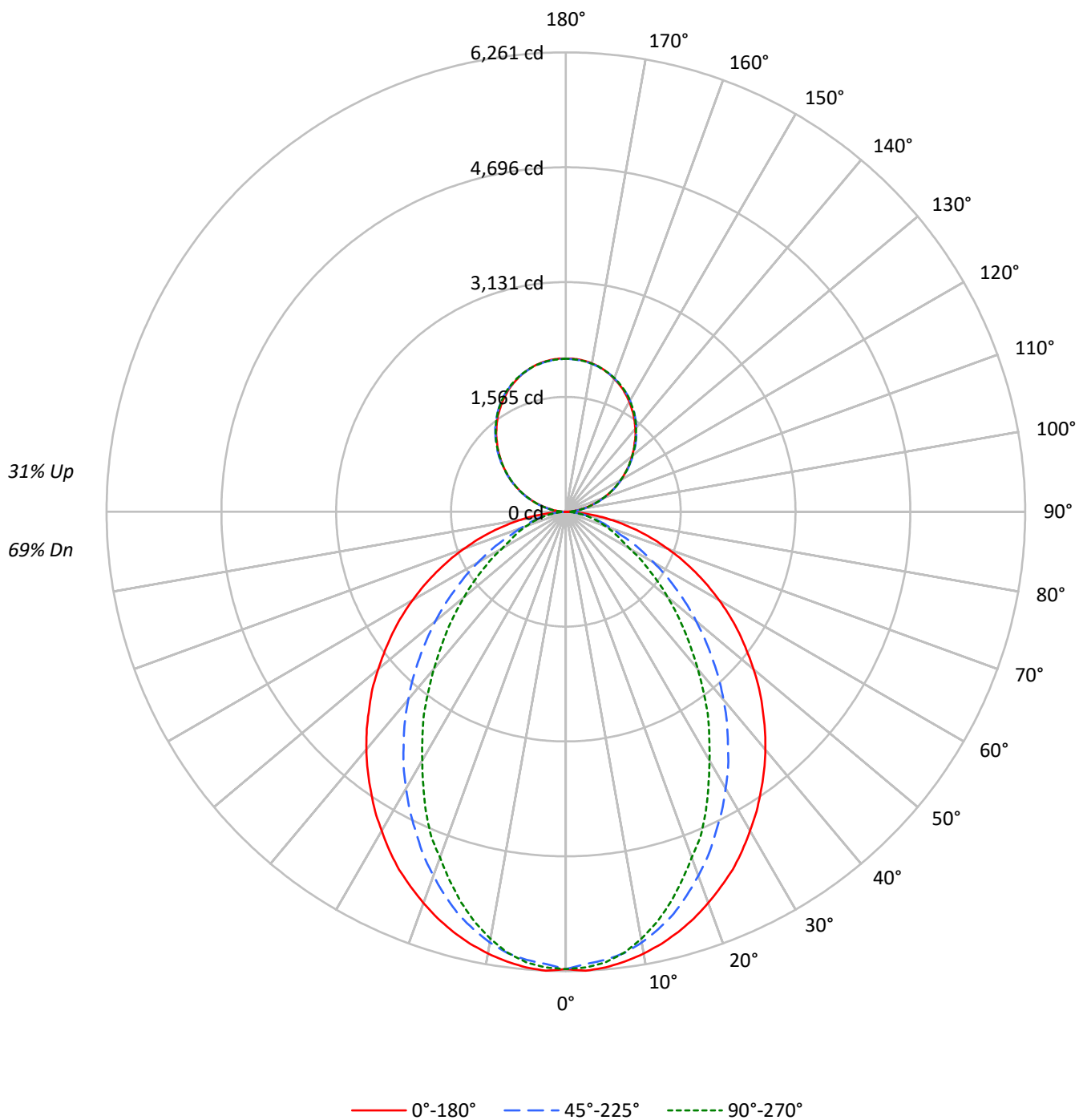
Lumens per Lamp: N/A  
Luminaire Lumens: 18657.6 lumens  
Efficiency: N/A  
Efficacy: 85.2 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Direct

Input Watts (W): 218.9  
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



TEST NUMBER: P904230

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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   | 112 | 112 | 112 | 112 | 105 | 105 | 105 | 105 | 94 | 94 | 94 | 83 | 83 | 83 | 73 | 73 | 73 |
| 1   | 103 | 98  | 95  | 91  | 97  | 93  | 90  | 87  | 83 | 81 | 79 | 74 | 72 | 71 | 66 | 65 | 63 |
| 2   | 94  | 87  | 81  | 76  | 89  | 82  | 77  | 72  | 74 | 70 | 66 | 66 | 63 | 60 | 59 | 56 | 54 |
| 3   | 86  | 77  | 70  | 64  | 81  | 73  | 67  | 61  | 66 | 61 | 56 | 59 | 55 | 52 | 53 | 50 | 47 |
| 4   | 79  | 69  | 61  | 55  | 75  | 65  | 58  | 53  | 59 | 53 | 49 | 53 | 49 | 45 | 48 | 44 | 41 |
| 5   | 73  | 62  | 54  | 48  | 69  | 59  | 51  | 46  | 53 | 47 | 43 | 48 | 43 | 39 | 43 | 39 | 36 |
| 6   | 68  | 56  | 48  | 42  | 64  | 53  | 46  | 40  | 48 | 42 | 38 | 44 | 39 | 35 | 39 | 35 | 32 |
| 7   | 63  | 51  | 43  | 37  | 59  | 48  | 41  | 36  | 44 | 38 | 34 | 40 | 35 | 31 | 36 | 32 | 29 |
| 8   | 59  | 46  | 38  | 33  | 55  | 44  | 37  | 32  | 40 | 34 | 30 | 37 | 32 | 28 | 33 | 29 | 26 |
| 9   | 55  | 42  | 35  | 30  | 52  | 41  | 34  | 29  | 37 | 31 | 27 | 34 | 29 | 26 | 31 | 27 | 24 |
| 10  | 51  | 39  | 32  | 27  | 49  | 38  | 31  | 26  | 34 | 29 | 25 | 32 | 27 | 23 | 29 | 25 | 22 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4373 | 4373 | 4373 |
| 5°  | 4380 | 4305 | 4333 |
| 10° | 4337 | 4221 | 4193 |
| 15° | 4277 | 4083 | 3976 |
| 20° | 4198 | 3891 | 3710 |
| 25° | 4117 | 3676 | 3452 |
| 30° | 4009 | 3456 | 3126 |
| 35° | 3902 | 3219 | 2838 |
| 40° | 3794 | 2974 | 2509 |
| 45° | 3668 | 2701 | 2210 |
| 50° | 3538 | 2426 | 1918 |
| 55° | 3402 | 2133 | 1638 |
| 60° | 3244 | 1825 | 1350 |
| 65° | 3064 | 1512 | 1216 |
| 70° | 2844 | 1221 | 1103 |
| 75° | 2569 | 1078 | 1006 |
| 80° | 2169 | 907  | 877  |
| 85° | 1510 | 611  | 668  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3668 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 584.1   | 3.1       |
| 10°-20°   | 1603.6  | 8.6       |
| 20°-30°   | 2251.4  | 12.1      |
| 30°-40°   | 2454.2  | 13.2      |
| 40°-50°   | 2255.7  | 12.1      |
| 50°-60°   | 1771.5  | 9.5       |
| 60°-70°   | 1153.0  | 6.2       |
| 70°-80°   | 593.5   | 3.2       |
| 80°-90°   | 157.5   | 0.8       |
| 90°-100°  | 129.1   | 0.7       |
| 100°-110° | 410.3   | 2.2       |
| 110°-120° | 702.1   | 3.8       |
| 120°-130° | 923.3   | 4.9       |
| 130°-140° | 1036.4  | 5.6       |
| 140°-150° | 1016.3  | 5.4       |
| 150°-160° | 852.6   | 4.6       |
| 160°-170° | 565.4   | 3.0       |
| 170°-180° | 197.6   | 1.1       |
| 0°-30°    | 4439.2  | 23.8      |
| 0°-40°    | 6893.3  | 36.9      |
| 0°-60°    | 10920.4 | 58.5      |
| 0°-90°    | 12824.5 | 68.7      |
| 90°-120°  | 1241.5  | 6.7       |
| 90°-150°  | 4217.6  | 22.6      |
| 90°-180°  | 5833.0  | 31.3      |
| 0°-180°   | 18657.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 6233 | 6233  | 6233 | 6233  | 6233 |      |
| 5°   | 6233 | 6205  | 6131 | 6182  | 6165 | 591  |
| 15°  | 5928 | 5866  | 5674 | 5567  | 5511 | 1671 |
| 25°  | 5381 | 5200  | 4828 | 4597  | 4512 | 2475 |
| 35°  | 4637 | 4349  | 3853 | 3497  | 3373 | 2902 |
| 45°  | 3790 | 3412  | 2820 | 2420  | 2284 | 2927 |
| 55°  | 2882 | 2442  | 1833 | 1495  | 1388 | 2575 |
| 65°  | 1946 | 1489  | 982  | 790   | 773  | 1929 |
| 75°  | 1038 | 643   | 451  | 412   | 406  | 1098 |
| 85°  | 242  | 124   | 107  | 107   | 107  | 278  |
| 90°  | 2    | 23    | 62   | 58    | 60   | 18   |
| 95°  | 92   | 109   | 113  | 113   | 109  | 102  |
| 105° | 379  | 384   | 388  | 391   | 391  | 400  |
| 115° | 705  | 715   | 712  | 710   | 705  | 697  |
| 125° | 1025 | 1040  | 1036 | 1030  | 1028 | 916  |
| 135° | 1326 | 1345  | 1349 | 1347  | 1342 | 1025 |
| 145° | 1609 | 1622  | 1632 | 1634  | 1627 | 1005 |
| 155° | 1840 | 1845  | 1851 | 1860  | 1854 | 847  |
| 165° | 2002 | 2000  | 2000 | 2012  | 2004 | 565  |
| 175° | 2083 | 2078  | 2074 | 2087  | 2076 | 198  |
| 180° | 2087 | 2087  | 2087 | 2087  | 2087 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 6232.8 | 6232.8 | 6232.8 | 6232.8 | 6232.8 |
| 2.5°   | 6260.9 | 6232.8 | 6170.5 | 6227.5 | 6216.1 |
| 5°     | 6232.8 | 6204.7 | 6131.0 | 6181.9 | 6165.2 |
| 7.5°   | 6181.9 | 6148.4 | 6069.4 | 6091.6 | 6063.5 |
| 10°    | 6114.4 | 6074.9 | 5962.3 | 5945.0 | 5911.4 |
| 12.5°  | 6029.9 | 5979.1 | 5826.5 | 5793.0 | 5730.8 |
| 15°    | 5928.2 | 5866.0 | 5674.5 | 5567.3 | 5511.0 |
| 17.5°  | 5809.7 | 5719.3 | 5482.4 | 5358.4 | 5268.2 |
| 20°    | 5674.5 | 5561.4 | 5279.5 | 5138.8 | 5014.4 |
| 22.5°  | 5527.8 | 5397.9 | 5070.6 | 4879.2 | 4794.7 |
| 25°    | 5381.3 | 5200.5 | 4828.3 | 4597.3 | 4512.3 |
| 27.5°  | 5206.5 | 5014.4 | 4602.6 | 4337.6 | 4207.7 |
| 30°    | 5020.4 | 4805.6 | 4354.3 | 4067.1 | 3914.5 |
| 32.5°  | 4839.7 | 4579.9 | 4117.9 | 3779.2 | 3637.9 |
| 35°    | 4636.7 | 4348.9 | 3852.8 | 3497.3 | 3372.9 |
| 37.5°  | 4439.3 | 4128.7 | 3604.5 | 3214.8 | 3074.2 |
| 40°    | 4230.4 | 3892.3 | 3344.7 | 2944.3 | 2797.7 |
| 42.5°  | 4016.2 | 3655.3 | 3085.6 | 2667.9 | 2527.2 |
| 45°    | 3790.5 | 3412.4 | 2820.5 | 2419.5 | 2284.3 |
| 47.5°  | 3576.3 | 3176.0 | 2566.7 | 2165.8 | 2041.9 |
| 50°    | 3339.3 | 2938.9 | 2318.4 | 1928.8 | 1810.9 |
| 52.5°  | 3107.8 | 2684.6 | 2081.4 | 1709.2 | 1602.0 |
| 55°    | 2882.1 | 2442.2 | 1833.1 | 1494.9 | 1387.8 |
| 57.5°  | 2651.1 | 2199.9 | 1613.4 | 1297.4 | 1207.0 |
| 60°    | 2414.1 | 1962.9 | 1381.8 | 1094.6 | 1004.2 |
| 62.5°  | 2183.1 | 1731.9 | 1184.3 | 913.8  | 868.9  |
| 65°    | 1946.2 | 1488.9 | 981.5  | 789.9  | 772.6  |
| 67.5°  | 1720.5 | 1263.3 | 789.9  | 693.6  | 676.8  |
| 70°    | 1483.6 | 1043.7 | 654.1  | 597.9  | 575.1  |
| 72.5°  | 1257.9 | 840.2  | 547.0  | 502.1  | 490.7  |
| 75°    | 1037.7 | 642.7  | 451.2  | 411.7  | 406.3  |
| 77.5°  | 818.0  | 456.6  | 355.4  | 332.7  | 321.4  |
| 80°    | 614.6  | 327.3  | 270.5  | 248.4  | 248.4  |
| 82.5°  | 428.5  | 220.3  | 186.2  | 174.7  | 174.7  |
| 85°    | 242.3  | 123.9  | 107.2  | 107.2  | 107.2  |
| 87.5°  | 90.4   | 44.9   | 44.9   | 39.5   | 39.5   |
| 90°    | 1.9    | 22.6   | 61.6   | 57.9   | 59.8   |
| 92.5°  | 39.0   | 52.9   | 54.8   | 56.6   | 56.6   |
| 95°    | 91.8   | 109.4  | 112.6  | 112.6  | 109.4  |
| 97.5°  | 152.9  | 169.2  | 176.2  | 176.2  | 176.2  |
| 100°   | 223.3  | 237.8  | 242.8  | 242.8  | 240.9  |
| 102.5° | 297.6  | 308.2  | 315.2  | 317.1  | 315.2  |
| 105°   | 378.7  | 383.7  | 387.5  | 390.7  | 390.7  |
| 107.5° | 459.2  | 466.7  | 466.7  | 468.1  | 459.2  |
| 110°   | 537.2  | 547.3  | 547.3  | 547.3  | 542.2  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 621.5  | 632.3  | 630.4  | 625.3  | 621.5  |
| 115°   | 704.6  | 714.6  | 711.5  | 709.6  | 704.6  |
| 117.5° | 786.9  | 800.8  | 792.0  | 786.9  | 781.9  |
| 120°   | 870.0  | 883.8  | 870.0  | 870.0  | 864.3  |
| 122.5° | 945.5  | 963.1  | 954.3  | 949.2  | 945.5  |
| 125°   | 1024.7 | 1040.5 | 1035.5 | 1029.8 | 1027.9 |
| 127.5° | 1102.1 | 1121.6 | 1114.7 | 1107.2 | 1102.1 |
| 130°   | 1174.5 | 1197.1 | 1194.0 | 1190.2 | 1183.3 |
| 132.5° | 1255.7 | 1273.3 | 1274.5 | 1265.7 | 1260.7 |
| 135°   | 1325.5 | 1344.9 | 1348.8 | 1346.8 | 1341.8 |
| 137.5° | 1403.4 | 1419.2 | 1422.3 | 1421.1 | 1413.5 |
| 140°   | 1472.1 | 1487.8 | 1496.6 | 1496.6 | 1489.7 |
| 142.5° | 1542.5 | 1558.2 | 1563.2 | 1565.1 | 1558.2 |
| 145°   | 1609.2 | 1621.7 | 1631.8 | 1633.7 | 1626.8 |
| 147.5° | 1669.0 | 1684.7 | 1692.2 | 1695.4 | 1688.5 |
| 150°   | 1730.6 | 1741.3 | 1748.2 | 1753.9 | 1748.2 |
| 152.5° | 1785.3 | 1796.0 | 1804.8 | 1811.8 | 1804.8 |
| 155°   | 1840.0 | 1845.0 | 1850.8 | 1859.5 | 1853.9 |
| 157.5° | 1887.3 | 1891.0 | 1894.1 | 1906.8 | 1897.9 |
| 160°   | 1929.4 | 1933.2 | 1935.0 | 1945.7 | 1938.1 |
| 162.5° | 1968.4 | 1968.4 | 1970.3 | 1982.2 | 1973.4 |
| 165°   | 2001.7 | 1999.8 | 1999.8 | 2012.4 | 2003.6 |
| 167.5° | 2031.9 | 2026.3 | 2026.3 | 2038.8 | 2030.0 |
| 170°   | 2054.6 | 2049.6 | 2047.7 | 2060.2 | 2049.6 |
| 172.5° | 2070.3 | 2065.2 | 2063.3 | 2075.9 | 2065.2 |
| 175°   | 2082.8 | 2077.8 | 2074.1 | 2086.6 | 2075.9 |
| 177.5° | 2089.8 | 2084.7 | 2080.9 | 2091.7 | 2080.9 |
| 180°   | 2086.6 | 2086.6 | 2086.6 | 2086.6 | 2086.6 |

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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 | 13.88            | 14.89 | 14.66 | 15.69 | 16.67 | 9.84           | 10.85 | 10.62 | 11.65 | 12.63 |
|                 | 3H   | 15.57            | 16.48 | 16.37 | 17.29 | 18.30 | 11.04          | 11.95 | 11.84 | 12.76 | 13.77 |
|                 | 4H   | 16.19            | 17.05 | 17.01 | 17.87 | 18.89 | 11.50          | 12.35 | 12.32 | 13.17 | 14.19 |
|                 | 6H   | 16.63            | 17.41 | 17.46 | 18.24 | 19.28 | 11.83          | 12.62 | 12.66 | 13.45 | 14.48 |
|                 | 8H   | 16.76            | 17.51 | 17.60 | 18.36 | 19.39 | 11.93          | 12.68 | 12.77 | 13.52 | 14.56 |
|                 | 12H  | 16.83            | 17.54 | 17.67 | 18.38 | 19.44 | 11.98          | 12.69 | 12.82 | 13.53 | 14.59 |
| 4H              | 2H   | 13.92            | 14.77 | 14.74 | 15.59 | 16.61 | 10.46          | 11.31 | 11.28 | 12.13 | 13.15 |
|                 | 3H   | 15.77            | 16.48 | 16.60 | 17.33 | 18.37 | 11.83          | 12.53 | 12.66 | 13.39 | 14.42 |
|                 | 4H   | 16.47            | 17.11 | 17.32 | 17.97 | 19.03 | 12.38          | 13.03 | 13.23 | 13.88 | 14.94 |
|                 | 6H   | 17.00            | 17.56 | 17.86 | 18.43 | 19.50 | 12.81          | 13.37 | 13.67 | 14.24 | 15.31 |
|                 | 8H   | 17.18            | 17.70 | 18.05 | 18.57 | 19.65 | 12.95          | 13.46 | 13.81 | 14.33 | 15.41 |
|                 | 12H  | 17.29            | 17.75 | 18.17 | 18.65 | 19.73 | 13.02          | 13.48 | 13.90 | 14.38 | 15.46 |
| 8H              | 4H   | 16.45            | 16.97 | 17.32 | 17.84 | 18.92 | 12.68          | 13.20 | 13.54 | 14.07 | 15.15 |
|                 | 6H   | 17.03            | 17.46 | 17.92 | 18.37 | 19.45 | 13.20          | 13.63 | 14.10 | 14.55 | 15.63 |
|                 | 8H   | 17.25            | 17.63 | 18.15 | 18.54 | 19.63 | 13.40          | 13.78 | 14.30 | 14.68 | 15.78 |
|                 | 12H  | 17.40            | 17.73 | 18.30 | 18.63 | 19.78 | 13.53          | 13.86 | 14.43 | 14.76 | 15.91 |
| 12H             | 4H   | 16.41            | 16.88 | 17.30 | 17.77 | 18.86 | 12.69          | 13.16 | 13.58 | 14.05 | 15.13 |
|                 | 6H   | 17.01            | 17.39 | 17.91 | 18.29 | 19.39 | 13.26          | 13.64 | 14.16 | 14.54 | 15.64 |
|                 | 8H   | 17.24            | 17.57 | 18.14 | 18.47 | 19.62 | 13.48          | 13.81 | 14.38 | 14.71 | 15.86 |

END OF REPORT