

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: P920336

Luminaire Tested: DFN2DIP-SQ4F0-060D160US935-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P920336  
REPORT IS A COMBINATION OF REPORTS P900203 AND P896915  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-060D160US935-FLLFLL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

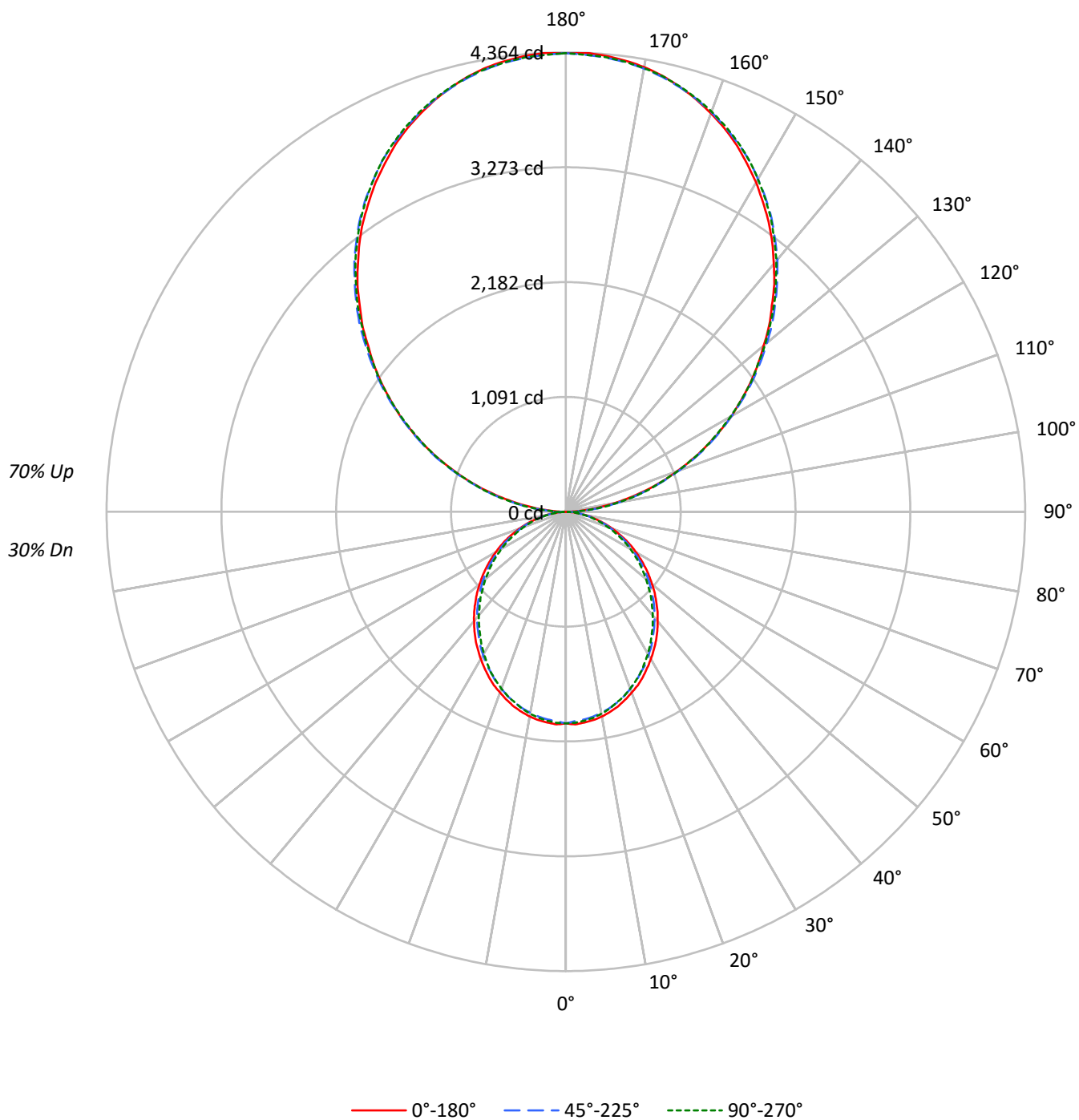
Lumens per Lamp: N/A  
Luminaire Lumens: 17306.9 lumens  
Efficiency: N/A  
Efficacy: 100.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 172.1  
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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CATALOG NUMBER: DFN2DIP-SQ4F0-060D160US935-FLLFLL

### Luminous Intensity Polar Plot



TEST NUMBER: P920336

CATALOG NUMBER: DFN2DIP-SQ4F0-060D160US935-FLLFL

**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   | 102 | 102 | 102 | 102 | 92 | 92 | 92 | 92 | 72 | 72 | 72 | 54 | 54 | 54 | 37 | 37 | 37 |
| 1   | 93  | 89  | 85  | 82  | 83 | 80 | 77 | 74 | 63 | 61 | 59 | 47 | 46 | 45 | 33 | 32 | 32 |
| 2   | 85  | 78  | 72  | 67  | 76 | 70 | 65 | 61 | 55 | 52 | 49 | 42 | 39 | 37 | 29 | 28 | 27 |
| 3   | 77  | 68  | 61  | 56  | 69 | 61 | 55 | 51 | 49 | 44 | 41 | 37 | 34 | 32 | 26 | 24 | 23 |
| 4   | 71  | 60  | 53  | 47  | 63 | 54 | 48 | 43 | 43 | 38 | 35 | 33 | 30 | 27 | 23 | 21 | 19 |
| 5   | 65  | 54  | 46  | 40  | 58 | 48 | 42 | 37 | 38 | 34 | 30 | 29 | 26 | 23 | 21 | 19 | 17 |
| 6   | 60  | 48  | 40  | 34  | 53 | 43 | 37 | 32 | 35 | 30 | 26 | 26 | 23 | 20 | 19 | 17 | 15 |
| 7   | 55  | 43  | 35  | 30  | 49 | 39 | 32 | 28 | 31 | 26 | 23 | 24 | 20 | 18 | 17 | 15 | 13 |
| 8   | 51  | 39  | 32  | 26  | 46 | 35 | 29 | 24 | 28 | 24 | 20 | 22 | 18 | 16 | 16 | 13 | 12 |
| 9   | 47  | 35  | 28  | 23  | 42 | 32 | 26 | 22 | 26 | 21 | 18 | 20 | 17 | 14 | 14 | 12 | 11 |
| 10  | 44  | 32  | 25  | 21  | 40 | 29 | 23 | 19 | 24 | 19 | 16 | 18 | 15 | 13 | 13 | 11 | 10 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1410 | 1410 | 1410 |
| 5°  | 1413 | 1391 | 1401 |
| 10° | 1401 | 1373 | 1382 |
| 15° | 1381 | 1350 | 1353 |
| 20° | 1353 | 1319 | 1323 |
| 25° | 1325 | 1282 | 1288 |
| 30° | 1290 | 1247 | 1244 |
| 35° | 1257 | 1206 | 1197 |
| 40° | 1217 | 1165 | 1153 |
| 45° | 1177 | 1124 | 1107 |
| 50° | 1132 | 1080 | 1055 |
| 55° | 1086 | 1030 | 1006 |
| 60° | 1034 | 970  | 951  |
| 65° | 977  | 909  | 885  |
| 70° | 904  | 833  | 815  |
| 75° | 803  | 743  | 751  |
| 80° | 683  | 629  | 628  |
| 85° | 493  | 430  | 422  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 3430 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 189.2   | 1.1       |
| 10°-20°   | 532.3   | 3.1       |
| 20°-30°   | 782.3   | 4.5       |
| 30°-40°   | 908.6   | 5.2       |
| 40°-50°   | 907.5   | 5.2       |
| 50°-60°   | 791.3   | 4.6       |
| 60°-70°   | 584.9   | 3.4       |
| 70°-80°   | 330.9   | 1.9       |
| 80°-90°   | 99.7    | 0.6       |
| 90°-100°  | 269.6   | 1.6       |
| 100°-110° | 856.6   | 4.9       |
| 110°-120° | 1466.0  | 8.5       |
| 120°-130° | 1928.1  | 11.1      |
| 130°-140° | 2164.2  | 12.5      |
| 140°-150° | 2122.2  | 12.3      |
| 150°-160° | 1780.2  | 10.3      |
| 160°-170° | 1180.6  | 6.8       |
| 170°-180° | 412.7   | 2.4       |
| 0°-30°    | 1503.8  | 8.7       |
| 0°-40°    | 2412.4  | 13.9      |
| 0°-60°    | 4111.1  | 23.8      |
| 0°-90°    | 5126.7  | 29.6      |
| 90°-120°  | 2592.3  | 15.0      |
| 90°-150°  | 8806.7  | 50.9      |
| 90°-180°  | 12180.0 | 70.4      |
| 0°-180°   | 17306.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 2010 | 2010  | 2010 | 2010  | 2010 |      |
| 5°   | 2010 | 2002  | 1981 | 1997  | 1993 | 191  |
| 15°  | 1914 | 1902  | 1877 | 1885  | 1875 | 539  |
| 25°  | 1732 | 1716  | 1684 | 1687  | 1684 | 797  |
| 35°  | 1494 | 1475  | 1444 | 1432  | 1422 | 933  |
| 45°  | 1216 | 1202  | 1173 | 1152  | 1144 | 938  |
| 55°  | 920  | 908   | 885  | 862   | 852  | 823  |
| 65°  | 620  | 609   | 590  | 572   | 562  | 614  |
| 75°  | 325  | 321   | 311  | 300   | 304  | 347  |
| 85°  | 79   | 77    | 75   | 70    | 68   | 88   |
| 90°  | 4    | 47    | 129  | 121   | 125  | 17   |
| 95°  | 192  | 229   | 235  | 235   | 229  | 213  |
| 105° | 791  | 801   | 809  | 816   | 816  | 834  |
| 115° | 1471 | 1492  | 1486 | 1482  | 1471 | 1455 |
| 125° | 2140 | 2173  | 2162 | 2150  | 2146 | 1912 |
| 135° | 2768 | 2808  | 2816 | 2812  | 2802 | 2139 |
| 145° | 3360 | 3386  | 3407 | 3411  | 3397 | 2099 |
| 155° | 3842 | 3853  | 3864 | 3883  | 3871 | 1768 |
| 165° | 4180 | 4176  | 4176 | 4202  | 4184 | 1179 |
| 175° | 4349 | 4339  | 4331 | 4357  | 4335 | 413  |
| 180° | 4357 | 4357  | 4357 | 4357  | 4357 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 2010.1 | 2010.1 | 2010.1 | 2010.1 | 2010.1 |
| 2.5°   | 2021.8 | 2012.2 | 1990.8 | 2010.1 | 2006.4 |
| 5°     | 2010.1 | 2002.5 | 1981.2 | 1996.6 | 1992.9 |
| 7.5°   | 1996.6 | 1985.1 | 1963.8 | 1979.3 | 1975.5 |
| 10°    | 1975.5 | 1962.0 | 1938.7 | 1954.1 | 1948.4 |
| 12.5°  | 1946.4 | 1934.8 | 1911.7 | 1921.3 | 1917.4 |
| 15°    | 1913.5 | 1902.0 | 1876.8 | 1884.6 | 1875.0 |
| 17.5°  | 1872.9 | 1861.5 | 1836.3 | 1845.8 | 1836.3 |
| 20°    | 1828.4 | 1817.0 | 1789.8 | 1795.6 | 1788.0 |
| 22.5°  | 1784.2 | 1766.7 | 1741.5 | 1741.5 | 1737.6 |
| 25°    | 1731.8 | 1716.5 | 1683.6 | 1687.3 | 1683.6 |
| 27.5°  | 1673.8 | 1660.3 | 1635.2 | 1629.5 | 1619.9 |
| 30°    | 1616.0 | 1600.3 | 1571.5 | 1565.7 | 1557.9 |
| 32.5°  | 1554.0 | 1542.6 | 1511.6 | 1499.9 | 1492.1 |
| 35°    | 1494.2 | 1474.9 | 1443.9 | 1432.2 | 1422.5 |
| 37.5°  | 1426.5 | 1409.0 | 1378.1 | 1364.5 | 1354.9 |
| 40°    | 1356.9 | 1341.3 | 1310.4 | 1293.2 | 1285.4 |
| 42.5°  | 1289.3 | 1273.7 | 1242.9 | 1223.5 | 1211.9 |
| 45°    | 1215.9 | 1202.3 | 1173.2 | 1152.1 | 1144.3 |
| 47.5°  | 1144.3 | 1130.7 | 1099.8 | 1078.5 | 1066.9 |
| 50°    | 1068.8 | 1059.2 | 1032.2 | 1005.0 | 995.4  |
| 52.5°  | 995.4  | 981.9  | 956.8  | 935.6  | 922.0  |
| 55°    | 920.1  | 908.4  | 885.3  | 862.1  | 852.5  |
| 57.5°  | 844.7  | 835.1  | 809.9  | 786.7  | 778.9  |
| 60°    | 769.2  | 761.6  | 734.6  | 713.3  | 707.5  |
| 62.5°  | 695.8  | 682.3  | 663.0  | 643.7  | 635.9  |
| 65°    | 620.5  | 608.9  | 589.6  | 572.1  | 562.5  |
| 67.5°  | 543.2  | 533.4  | 516.2  | 502.7  | 494.8  |
| 70°    | 471.7  | 463.9  | 446.4  | 432.9  | 425.3  |
| 72.5°  | 398.2  | 390.5  | 380.8  | 367.3  | 361.5  |
| 75°    | 324.6  | 321.0  | 311.1  | 299.6  | 303.5  |
| 77.5°  | 259.0  | 251.2  | 247.3  | 241.6  | 235.8  |
| 80°    | 193.4  | 191.3  | 187.4  | 181.7  | 177.8  |
| 82.5°  | 131.5  | 131.5  | 129.6  | 121.8  | 121.8  |
| 85°    | 79.1   | 77.3   | 75.4   | 69.5   | 67.7   |
| 87.5°  | 34.9   | 31.0   | 27.0   | 21.4   | 19.3   |
| 90°    | 4.0    | 47.3   | 128.7  | 120.9  | 124.8  |
| 92.5°  | 81.5   | 110.4  | 114.3  | 118.2  | 118.2  |
| 95°    | 191.7  | 228.6  | 235.1  | 235.1  | 228.6  |
| 97.5°  | 319.2  | 353.4  | 367.8  | 367.8  | 367.8  |
| 100°   | 466.3  | 496.5  | 507.0  | 507.0  | 503.1  |
| 102.5° | 621.3  | 643.7  | 658.1  | 662.0  | 658.1  |
| 105°   | 790.7  | 801.2  | 809.2  | 815.7  | 815.7  |
| 107.5° | 958.9  | 974.6  | 974.6  | 977.3  | 958.9  |
| 110°   | 1121.8 | 1142.8 | 1142.8 | 1142.8 | 1132.3 |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1297.8 | 1320.2 | 1316.2 | 1305.7 | 1297.8 |
| 115°   | 1471.2 | 1492.2 | 1485.7 | 1481.7 | 1471.2 |
| 117.5° | 1643.3 | 1672.1 | 1653.8 | 1643.3 | 1632.8 |
| 120°   | 1816.7 | 1845.5 | 1816.7 | 1816.7 | 1804.8 |
| 122.5° | 1974.3 | 2011.1 | 1992.7 | 1982.2 | 1974.3 |
| 125°   | 2139.8 | 2172.6 | 2162.1 | 2150.3 | 2146.4 |
| 127.5° | 2301.4 | 2342.1 | 2327.6 | 2311.9 | 2301.4 |
| 130°   | 2452.5 | 2499.7 | 2493.2 | 2485.3 | 2470.8 |
| 132.5° | 2621.9 | 2658.7 | 2661.3 | 2642.9 | 2632.4 |
| 135°   | 2767.7 | 2808.4 | 2816.3 | 2812.4 | 2801.9 |
| 137.5° | 2930.6 | 2963.4 | 2970.0 | 2967.3 | 2951.6 |
| 140°   | 3073.8 | 3106.6 | 3125.0 | 3125.0 | 3110.5 |
| 142.5° | 3220.9 | 3253.7 | 3264.2 | 3268.2 | 3253.7 |
| 145°   | 3360.1 | 3386.4 | 3407.4 | 3411.4 | 3396.9 |
| 147.5° | 3484.9 | 3517.8 | 3533.5 | 3540.1 | 3525.6 |
| 150°   | 3613.6 | 3636.0 | 3650.5 | 3662.3 | 3650.5 |
| 152.5° | 3727.9 | 3750.2 | 3768.7 | 3783.1 | 3768.7 |
| 155°   | 3842.2 | 3852.7 | 3864.5 | 3882.9 | 3871.1 |
| 157.5° | 3940.7 | 3948.6 | 3955.2 | 3981.4 | 3963.1 |
| 160°   | 4028.7 | 4036.6 | 4040.6 | 4062.9 | 4047.1 |
| 162.5° | 4110.1 | 4110.1 | 4114.1 | 4139.1 | 4120.6 |
| 165°   | 4179.8 | 4175.8 | 4175.8 | 4202.1 | 4183.8 |
| 167.5° | 4242.8 | 4231.0 | 4231.0 | 4257.3 | 4238.9 |
| 170°   | 4290.1 | 4279.6 | 4275.7 | 4302.0 | 4279.6 |
| 172.5° | 4323.0 | 4312.5 | 4308.5 | 4334.8 | 4312.5 |
| 175°   | 4349.2 | 4338.7 | 4330.8 | 4357.2 | 4334.8 |
| 177.5° | 4363.7 | 4353.2 | 4345.3 | 4367.7 | 4345.3 |
| 180°   | 4357.2 | 4357.2 | 4357.2 | 4357.2 | 4357.2 |

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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 | 6.21             | 6.91  | 7.33  | 8.02  | 9.56  | 5.77           | 6.47  | 6.88  | 7.58  | 9.11  |
|                 | 3H   | 7.86             | 8.49  | 8.99  | 9.61  | 11.16 | 7.37           | 8.00  | 8.50  | 9.12  | 10.67 |
|                 | 4H   | 8.45             | 9.04  | 9.58  | 10.16 | 11.72 | 7.95           | 8.55  | 9.08  | 9.67  | 11.23 |
|                 | 6H   | 8.84             | 9.39  | 9.98  | 10.51 | 12.08 | 8.34           | 8.89  | 9.48  | 10.01 | 11.58 |
|                 | 8H   | 8.94             | 9.47  | 10.09 | 10.60 | 12.17 | 8.44           | 8.97  | 9.59  | 10.10 | 11.66 |
|                 | 12H  | 8.99             | 9.49  | 10.14 | 10.62 | 12.20 | 8.48           | 8.98  | 9.63  | 10.11 | 11.69 |
| 4H              | 2H   | 6.65             | 7.25  | 7.79  | 8.37  | 9.93  | 6.30           | 6.90  | 7.44  | 8.01  | 9.57  |
|                 | 3H   | 8.51             | 9.01  | 9.65  | 10.15 | 11.72 | 8.10           | 8.60  | 9.25  | 9.74  | 11.31 |
|                 | 4H   | 9.22             | 9.68  | 10.37 | 10.81 | 12.40 | 8.80           | 9.26  | 9.94  | 10.39 | 11.98 |
|                 | 6H   | 9.73             | 10.12 | 10.88 | 11.28 | 12.86 | 9.30           | 9.69  | 10.45 | 10.85 | 12.43 |
|                 | 8H   | 9.88             | 10.25 | 11.03 | 11.39 | 12.99 | 9.44           | 9.81  | 10.59 | 10.96 | 12.55 |
|                 | 12H  | 9.95             | 10.28 | 11.12 | 11.44 | 13.04 | 9.50           | 9.83  | 10.67 | 10.99 | 12.59 |
| 8H              | 4H   | 9.40             | 9.77  | 10.56 | 10.92 | 12.52 | 9.03           | 9.39  | 10.18 | 10.54 | 12.14 |
|                 | 6H   | 10.03            | 10.34 | 11.21 | 11.53 | 13.12 | 9.65           | 9.95  | 10.82 | 11.14 | 12.74 |
|                 | 8H   | 10.26            | 10.52 | 11.43 | 11.69 | 13.30 | 9.86           | 10.13 | 11.04 | 11.30 | 12.91 |
|                 | 12H  | 10.38            | 10.62 | 11.57 | 11.78 | 13.43 | 9.97           | 10.20 | 11.15 | 11.37 | 13.02 |
| 12H             | 4H   | 9.38             | 9.72  | 10.55 | 10.87 | 12.48 | 9.01           | 9.35  | 10.18 | 10.51 | 12.11 |
|                 | 6H   | 10.06            | 10.33 | 11.24 | 11.50 | 13.11 | 9.69           | 9.96  | 10.87 | 11.12 | 12.74 |
|                 | 8H   | 10.30            | 10.53 | 11.48 | 11.70 | 13.34 | 9.92           | 10.15 | 11.10 | 11.32 | 12.96 |

END OF REPORT