

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: P920937

Luminaire Tested: DFN2DIP-TR4F0-040D100US935-RLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P920937  
REPORT IS A COMBINATION OF REPORTS P901998 AND P898849  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-TR4F0-040D100US935-RLLONL  
Description: 4 foot, Triangle Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

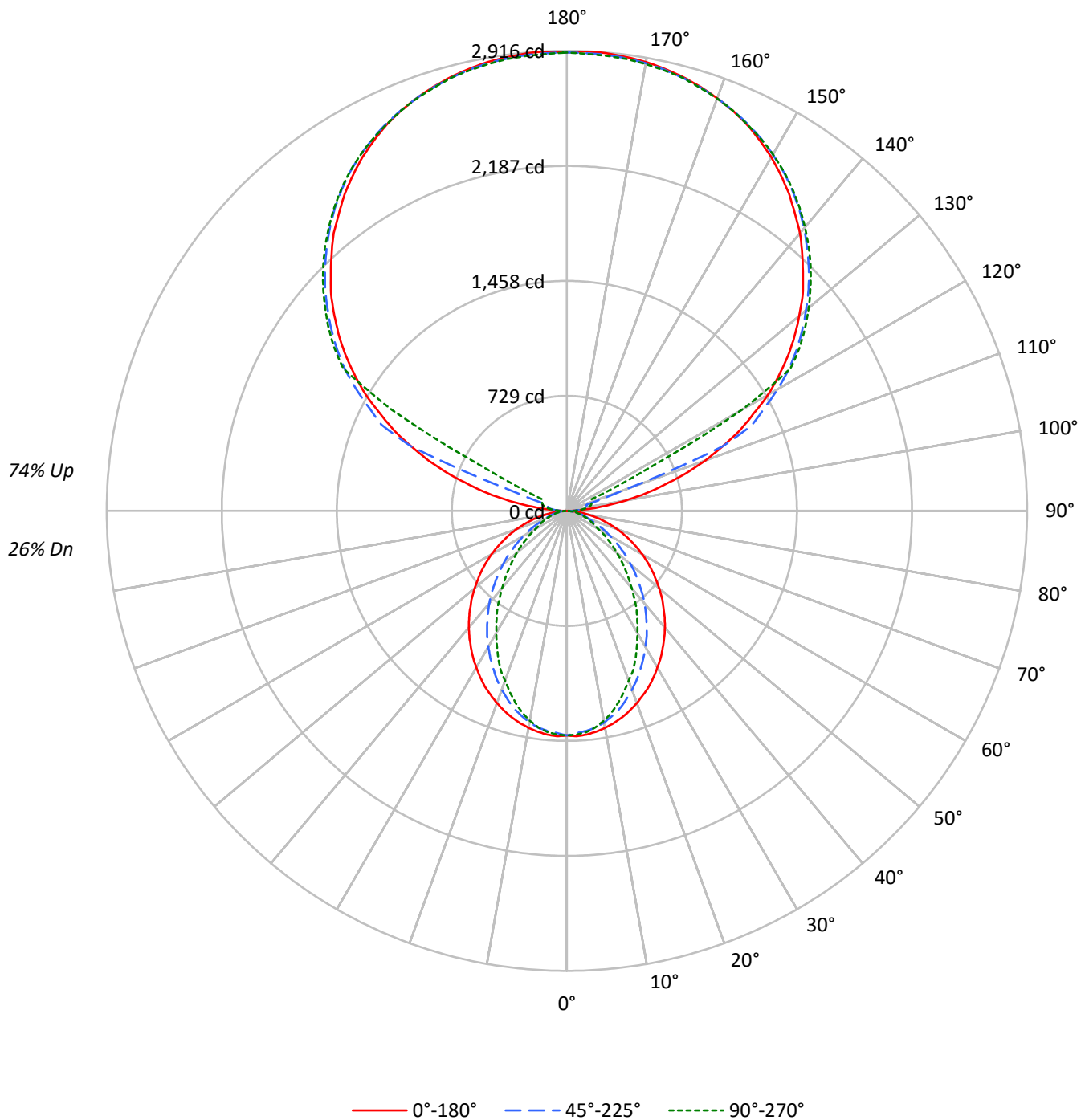
Lumens per Lamp: N/A  
Luminaire Lumens: 11451.3 lumens  
Efficiency: N/A  
Efficacy: 105.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.43' x L: 3.96' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 108.3  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9952  
Total Harmonic Distortion (THDi): 0.069  
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   | 101 | 101 | 101 | 101 | 90 | 90 | 90 | 90 | 70 | 70 | 70 | 51 | 51 | 51 | 34 | 34 | 34 |
| 1   | 93  | 88  | 85  | 82  | 82 | 79 | 76 | 73 | 61 | 59 | 58 | 45 | 44 | 43 | 30 | 29 | 29 |
| 2   | 84  | 77  | 72  | 67  | 75 | 69 | 65 | 60 | 54 | 51 | 48 | 40 | 38 | 36 | 27 | 26 | 25 |
| 3   | 77  | 68  | 61  | 56  | 69 | 61 | 55 | 51 | 48 | 44 | 41 | 35 | 33 | 31 | 24 | 23 | 21 |
| 4   | 71  | 60  | 53  | 47  | 63 | 54 | 48 | 43 | 43 | 38 | 35 | 32 | 29 | 26 | 22 | 20 | 19 |
| 5   | 65  | 54  | 46  | 41  | 58 | 48 | 42 | 37 | 38 | 33 | 30 | 28 | 25 | 23 | 19 | 18 | 16 |
| 6   | 60  | 48  | 41  | 35  | 53 | 43 | 37 | 32 | 34 | 30 | 26 | 26 | 23 | 20 | 18 | 16 | 14 |
| 7   | 55  | 43  | 36  | 31  | 49 | 39 | 33 | 28 | 31 | 26 | 23 | 23 | 20 | 18 | 16 | 14 | 13 |
| 8   | 51  | 39  | 32  | 27  | 45 | 36 | 29 | 25 | 28 | 24 | 20 | 21 | 18 | 16 | 15 | 13 | 12 |
| 9   | 47  | 36  | 29  | 24  | 42 | 32 | 26 | 22 | 26 | 21 | 18 | 20 | 16 | 14 | 14 | 12 | 10 |
| 10  | 44  | 33  | 26  | 21  | 39 | 30 | 24 | 20 | 24 | 19 | 16 | 18 | 15 | 13 | 13 | 11 | 10 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1131 | 1131 | 1131 |
| 5°  | 1133 | 1113 | 1120 |
| 10° | 1121 | 1091 | 1083 |
| 15° | 1106 | 1055 | 1027 |
| 20° | 1086 | 1005 | 958  |
| 25° | 1065 | 949  | 891  |
| 30° | 1037 | 892  | 807  |
| 35° | 1009 | 831  | 732  |
| 40° | 981  | 767  | 647  |
| 45° | 949  | 697  | 570  |
| 50° | 915  | 626  | 494  |
| 55° | 880  | 550  | 421  |
| 60° | 839  | 470  | 347  |
| 65° | 792  | 389  | 312  |
| 70° | 736  | 314  | 282  |
| 75° | 664  | 277  | 257  |
| 80° | 561  | 232  | 223  |
| 85° | 392  | 155  | 167  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°

Vertical Angle: 90°

Luminance: 1543 cd/sqm

TEST NUMBER: P920937

CATALOG NUMBER: DFN2DIP-TR4F0-040D100US935-RLONL

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 133.4   | 1.2       |
| 10°-20°   | 366.2   | 3.2       |
| 20°-30°   | 514.2   | 4.5       |
| 30°-40°   | 560.5   | 4.9       |
| 40°-50°   | 515.1   | 4.5       |
| 50°-60°   | 404.5   | 3.5       |
| 60°-70°   | 263.3   | 2.3       |
| 70°-80°   | 135.6   | 1.2       |
| 80°-90°   | 39.7    | 0.3       |
| 90°-100°  | 95.8    | 0.8       |
| 100°-110° | 357.2   | 3.1       |
| 110°-120° | 947.3   | 8.3       |
| 120°-130° | 1571.2  | 13.7      |
| 130°-140° | 1669.0  | 14.6      |
| 140°-150° | 1551.1  | 13.5      |
| 150°-160° | 1247.1  | 10.9      |
| 160°-170° | 803.6   | 7.0       |
| 170°-180° | 276.6   | 2.4       |
| 0°-30°    | 1013.8  | 8.9       |
| 0°-40°    | 1574.2  | 13.7      |
| 0°-60°    | 2493.9  | 21.8      |
| 0°-90°    | 2932.5  | 25.6      |
| 90°-120°  | 1400.3  | 12.2      |
| 90°-150°  | 6191.6  | 54.1      |
| 90°-180°  | 8519.0  | 74.4      |
| 0°-180°   | 11451.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1423 | 1423  | 1423 | 1423  | 1423 |      |
| 5°   | 1423 | 1417  | 1400 | 1412  | 1408 | 135  |
| 15°  | 1354 | 1340  | 1296 | 1271  | 1259 | 382  |
| 25°  | 1229 | 1188  | 1103 | 1050  | 1030 | 565  |
| 35°  | 1059 | 993   | 880  | 799   | 770  | 663  |
| 45°  | 866  | 779   | 644  | 553   | 522  | 668  |
| 55°  | 658  | 558   | 419  | 341   | 317  | 588  |
| 65°  | 444  | 340   | 224  | 180   | 176  | 441  |
| 75°  | 237  | 147   | 103  | 94    | 93   | 251  |
| 85°  | 55   | 28    | 24   | 24    | 24   | 64   |
| 90°  | 2    | 25    | 42   | 53    | 57   | 11   |
| 95°  | 137  | 67    | 82   | 93    | 90   | 162  |
| 105° | 639  | 702   | 128  | 151   | 160  | 683  |
| 115° | 1209 | 1245  | 1297 | 324   | 172  | 1190 |
| 125° | 1709 | 1737  | 1777 | 1792  | 1798 | 1524 |
| 135° | 2115 | 2149  | 2168 | 2189  | 2185 | 1634 |
| 145° | 2454 | 2452  | 2487 | 2502  | 2492 | 1535 |
| 155° | 2702 | 2683  | 2708 | 2721  | 2704 | 1245 |
| 165° | 2847 | 2834  | 2841 | 2855  | 2841 | 804  |
| 175° | 2912 | 2897  | 2902 | 2916  | 2895 | 277  |
| 180° | 2906 | 2906  | 2906 | 2906  | 2906 |      |

TEST NUMBER: P920937

CATALOG NUMBER: DFN2DIP-TR4F0-040D100US935-RLLONL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 1423.4 | 1423.4 | 1423.4 | 1423.4 | 1423.4 |
| 2.5°   | 1429.9 | 1423.4 | 1409.2 | 1422.2 | 1419.5 |
| 5°     | 1423.4 | 1416.9 | 1400.2 | 1411.8 | 1408.0 |
| 7.5°   | 1411.8 | 1404.1 | 1386.1 | 1391.1 | 1384.7 |
| 10°    | 1396.4 | 1387.3 | 1361.6 | 1357.6 | 1350.0 |
| 12.5°  | 1377.1 | 1365.5 | 1330.6 | 1322.9 | 1308.7 |
| 15°    | 1353.8 | 1339.6 | 1295.9 | 1271.4 | 1258.6 |
| 17.5°  | 1326.8 | 1306.1 | 1252.0 | 1223.7 | 1203.1 |
| 20°    | 1295.9 | 1270.1 | 1205.7 | 1173.5 | 1145.1 |
| 22.5°  | 1262.4 | 1232.8 | 1158.0 | 1114.2 | 1095.0 |
| 25°    | 1228.9 | 1187.7 | 1102.6 | 1049.9 | 1030.4 |
| 27.5°  | 1189.0 | 1145.1 | 1051.1 | 990.6  | 960.9  |
| 30°    | 1146.5 | 1097.4 | 994.4  | 928.8  | 894.0  |
| 32.5°  | 1105.3 | 1045.9 | 940.4  | 863.1  | 830.8  |
| 35°    | 1058.9 | 993.2  | 879.9  | 798.7  | 770.2  |
| 37.5°  | 1013.8 | 942.9  | 823.1  | 734.2  | 702.1  |
| 40°    | 966.1  | 888.9  | 763.9  | 672.4  | 638.9  |
| 42.5°  | 917.1  | 834.7  | 704.6  | 609.2  | 577.1  |
| 45°    | 865.6  | 779.3  | 644.1  | 552.6  | 521.7  |
| 47.5°  | 816.7  | 725.3  | 586.2  | 494.6  | 466.3  |
| 50°    | 762.6  | 671.1  | 529.4  | 440.5  | 413.5  |
| 52.5°  | 709.7  | 613.1  | 475.4  | 390.3  | 365.8  |
| 55°    | 658.2  | 557.8  | 418.6  | 341.4  | 316.9  |
| 57.5°  | 605.5  | 502.4  | 368.4  | 296.3  | 275.7  |
| 60°    | 551.3  | 448.2  | 315.6  | 249.9  | 229.4  |
| 62.5°  | 498.6  | 395.5  | 270.4  | 208.7  | 198.5  |
| 65°    | 444.4  | 340.0  | 224.1  | 180.4  | 176.4  |
| 67.5°  | 393.0  | 288.5  | 180.4  | 158.4  | 154.5  |
| 70°    | 338.8  | 238.3  | 149.4  | 136.6  | 131.3  |
| 72.5°  | 287.3  | 191.9  | 124.9  | 114.7  | 112.1  |
| 75°    | 236.9  | 146.8  | 103.1  | 94.0   | 92.8   |
| 77.5°  | 186.8  | 104.3  | 81.2   | 76.0   | 73.4   |
| 80°    | 140.3  | 74.7   | 61.7   | 56.7   | 56.7   |
| 82.5°  | 97.9   | 50.3   | 42.5   | 39.9   | 39.9   |
| 85°    | 55.4   | 28.3   | 24.5   | 24.5   | 24.5   |
| 87.5°  | 20.7   | 10.2   | 10.2   | 9.0    | 9.0    |
| 90°    | 2.0    | 25.2   | 41.9   | 52.7   | 56.7   |
| 92.5°  | 52.7   | 44.2   | 50.5   | 54.7   | 56.7   |
| 95°    | 136.6  | 67.2   | 81.9   | 92.6   | 90.4   |
| 97.5°  | 245.9  | 73.6   | 107.1  | 113.6  | 115.6  |
| 100°   | 372.3  | 84.1   | 119.9  | 136.6  | 140.9  |
| 102.5° | 510.8  | 506.9  | 124.1  | 147.1  | 153.5  |
| 105°   | 639.2  | 702.3  | 128.4  | 151.3  | 159.8  |
| 107.5° | 788.5  | 840.9  | 132.6  | 155.6  | 164.0  |
| 110°   | 931.5  | 975.5  | 368.0  | 157.8  | 166.0  |

TEST NUMBER: P920937

CATALOG NUMBER: DFN2DIP-TR4F0-040D100US935-RLLONL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1066.1 | 1103.8 | 1068.2 | 161.8  | 168.3  |
| 115°   | 1208.9 | 1244.7 | 1297.4 | 323.8  | 172.5  |
| 117.5° | 1333.0 | 1375.0 | 1410.9 | 1110.1 | 559.3  |
| 120°   | 1471.9 | 1503.3 | 1541.3 | 1566.5 | 1282.6 |
| 122.5° | 1589.5 | 1623.2 | 1665.3 | 1677.8 | 1680.1 |
| 125°   | 1709.3 | 1736.8 | 1776.8 | 1791.5 | 1797.7 |
| 127.5° | 1818.7 | 1848.1 | 1879.8 | 1900.8 | 1902.8 |
| 130°   | 1921.7 | 1955.5 | 1978.5 | 2001.6 | 1999.7 |
| 132.5° | 2026.9 | 2054.3 | 2077.3 | 2096.3 | 2094.3 |
| 135°   | 2115.3 | 2149.0 | 2167.7 | 2188.9 | 2184.7 |
| 137.5° | 2207.7 | 2232.9 | 2254.1 | 2275.1 | 2268.8 |
| 140°   | 2298.0 | 2315.1 | 2338.0 | 2357.0 | 2346.5 |
| 142.5° | 2373.9 | 2388.7 | 2415.9 | 2432.6 | 2422.2 |
| 145°   | 2453.8 | 2451.6 | 2487.3 | 2502.1 | 2491.6 |
| 147.5° | 2523.0 | 2516.8 | 2552.4 | 2562.9 | 2554.8 |
| 150°   | 2590.4 | 2575.7 | 2609.4 | 2621.9 | 2611.4 |
| 152.5° | 2647.1 | 2630.3 | 2661.9 | 2674.5 | 2659.8 |
| 155°   | 2701.8 | 2683.0 | 2708.3 | 2720.8 | 2704.0 |
| 157.5° | 2746.0 | 2729.3 | 2748.2 | 2762.9 | 2746.0 |
| 160°   | 2784.0 | 2771.2 | 2784.0 | 2796.4 | 2781.7 |
| 162.5° | 2817.4 | 2804.9 | 2815.4 | 2830.1 | 2811.2 |
| 165°   | 2846.8 | 2834.3 | 2840.6 | 2855.3 | 2840.6 |
| 167.5° | 2870.1 | 2857.3 | 2863.9 | 2878.6 | 2859.5 |
| 170°   | 2889.0 | 2876.3 | 2880.6 | 2895.3 | 2876.3 |
| 172.5° | 2901.5 | 2889.0 | 2893.3 | 2908.0 | 2889.0 |
| 175°   | 2912.0 | 2897.3 | 2901.5 | 2916.3 | 2895.3 |
| 177.5° | 2916.3 | 2901.5 | 2903.8 | 2918.5 | 2899.5 |
| 180°   | 2905.8 | 2905.8 | 2905.8 | 2905.8 | 2905.8 |

TEST NUMBER: P920937

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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 | 4.69             | 5.36 | 5.84 | 6.49 | 8.07  | 0.67           | 1.33 | 1.81 | 2.46 | 4.05 |
|                 | 3H   | 6.36             | 6.95 | 7.51 | 8.09 | 9.69  | 1.84           | 2.44 | 3.00 | 3.58 | 5.18 |
|                 | 4H   | 6.96             | 7.52 | 8.12 | 8.66 | 10.27 | 2.29           | 2.85 | 3.45 | 3.99 | 5.60 |
|                 | 6H   | 7.37             | 7.89 | 8.54 | 9.03 | 10.65 | 2.60           | 3.12 | 3.77 | 4.26 | 5.88 |
|                 | 8H   | 7.49             | 7.99 | 8.67 | 9.14 | 10.75 | 2.69           | 3.18 | 3.86 | 4.34 | 5.94 |
|                 | 12H  | 7.55             | 8.02 | 8.73 | 9.17 | 10.80 | 2.73           | 3.19 | 3.90 | 4.34 | 5.97 |
| 4H              | 2H   | 4.69             | 5.26 | 5.86 | 6.40 | 8.00  | 1.24           | 1.81 | 2.41 | 2.95 | 4.55 |
|                 | 3H   | 6.51             | 6.97 | 7.68 | 8.14 | 9.76  | 2.58           | 3.05 | 3.75 | 4.21 | 5.83 |
|                 | 4H   | 7.19             | 7.62 | 8.37 | 8.78 | 10.41 | 3.12           | 3.55 | 4.30 | 4.71 | 6.34 |
|                 | 6H   | 7.70             | 8.07 | 8.88 | 9.24 | 10.87 | 3.53           | 3.90 | 4.71 | 5.08 | 6.70 |
|                 | 8H   | 7.87             | 8.21 | 9.05 | 9.38 | 11.02 | 3.66           | 4.00 | 4.84 | 5.17 | 6.81 |
|                 | 12H  | 7.96             | 8.27 | 9.15 | 9.45 | 11.09 | 3.72           | 4.03 | 4.91 | 5.21 | 6.85 |
| 8H              | 4H   | 7.15             | 7.49 | 8.33 | 8.66 | 10.30 | 3.39           | 3.73 | 4.57 | 4.90 | 6.54 |
|                 | 6H   | 7.71             | 7.99 | 8.91 | 9.20 | 10.84 | 3.90           | 4.18 | 5.10 | 5.40 | 7.03 |
|                 | 8H   | 7.92             | 8.17 | 9.13 | 9.36 | 11.02 | 4.09           | 4.34 | 5.30 | 5.53 | 7.19 |
|                 | 12H  | 8.05             | 8.27 | 9.26 | 9.46 | 11.15 | 4.20           | 4.42 | 5.41 | 5.61 | 7.30 |
| 12H             | 4H   | 7.09             | 7.40 | 8.29 | 8.58 | 10.23 | 3.38           | 3.70 | 4.58 | 4.88 | 6.52 |
|                 | 6H   | 7.68             | 7.93 | 8.88 | 9.12 | 10.77 | 3.95           | 4.20 | 5.15 | 5.38 | 7.04 |
|                 | 8H   | 7.89             | 8.11 | 9.10 | 9.30 | 10.99 | 4.15           | 4.37 | 5.36 | 5.56 | 7.25 |

END OF REPORT