

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: P915782

Luminaire Tested: DFN2DIP-4P2F0-020D030US930-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P915782  
REPORT IS A COMBINATION OF REPORTS P899017 AND P895899  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P2F0-020D030US930-FLLFLL  
Description: 2 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

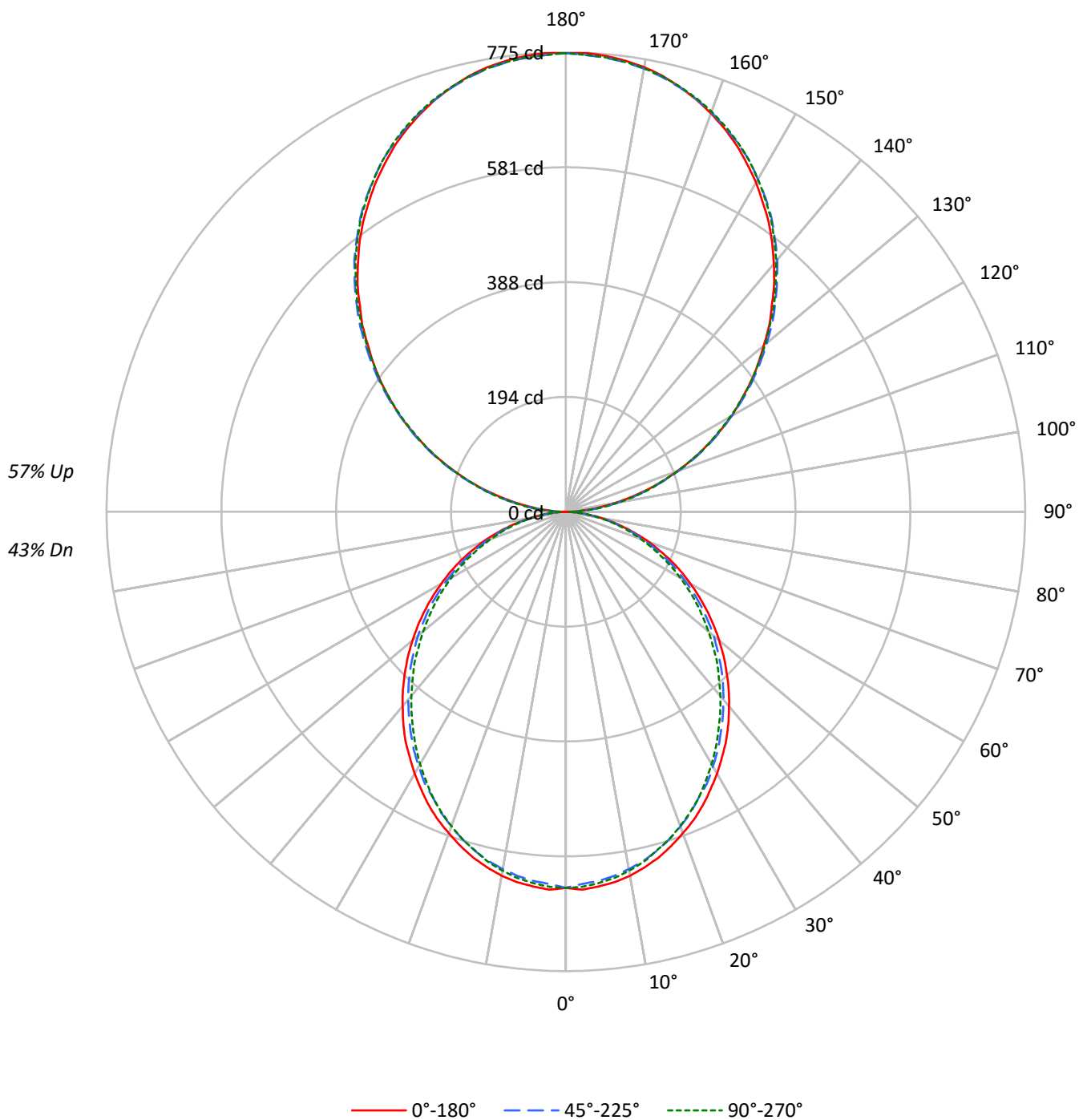
Lumens per Lamp: N/A  
Luminaire Lumens: 3778.9 lumens  
Efficiency: N/A  
Efficacy: 94.5 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 2.07' x L: 2.07' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 40  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9967  
Total Harmonic Distortion (THDi): 0.063  
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   | 105 | 105 | 105 | 105 | 96 | 96 | 96 | 96 | 79 | 79 | 79 | 64 | 64 | 64 | 49 | 49 | 49 |
| 1   | 96  | 92  | 88  | 85  | 88 | 84 | 81 | 78 | 69 | 67 | 65 | 56 | 54 | 53 | 44 | 43 | 42 |
| 2   | 88  | 80  | 74  | 69  | 80 | 73 | 68 | 64 | 61 | 57 | 54 | 49 | 47 | 44 | 38 | 37 | 35 |
| 3   | 80  | 70  | 63  | 57  | 73 | 65 | 58 | 53 | 54 | 49 | 45 | 44 | 40 | 37 | 34 | 32 | 30 |
| 4   | 73  | 62  | 55  | 49  | 66 | 57 | 50 | 45 | 48 | 43 | 39 | 39 | 35 | 32 | 30 | 28 | 26 |
| 5   | 67  | 56  | 47  | 42  | 61 | 51 | 44 | 39 | 43 | 37 | 33 | 35 | 31 | 28 | 27 | 25 | 22 |
| 6   | 62  | 50  | 42  | 36  | 56 | 46 | 39 | 34 | 38 | 33 | 29 | 31 | 27 | 24 | 25 | 22 | 20 |
| 7   | 57  | 45  | 37  | 31  | 52 | 41 | 34 | 29 | 35 | 29 | 25 | 29 | 24 | 21 | 23 | 20 | 18 |
| 8   | 53  | 41  | 33  | 28  | 48 | 38 | 31 | 26 | 32 | 26 | 23 | 26 | 22 | 19 | 21 | 18 | 16 |
| 9   | 49  | 37  | 30  | 25  | 45 | 34 | 28 | 23 | 29 | 24 | 20 | 24 | 20 | 17 | 19 | 16 | 14 |
| 10  | 46  | 34  | 27  | 22  | 42 | 31 | 25 | 21 | 27 | 22 | 18 | 22 | 18 | 15 | 18 | 15 | 13 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1589 | 1589 | 1589 |
| 5°  | 1588 | 1562 | 1574 |
| 10° | 1572 | 1538 | 1551 |
| 15° | 1546 | 1508 | 1515 |
| 20° | 1511 | 1469 | 1478 |
| 25° | 1477 | 1423 | 1436 |
| 30° | 1435 | 1380 | 1383 |
| 35° | 1395 | 1330 | 1328 |
| 40° | 1346 | 1279 | 1275 |
| 45° | 1297 | 1228 | 1220 |
| 50° | 1243 | 1174 | 1157 |
| 55° | 1186 | 1111 | 1099 |
| 60° | 1122 | 1039 | 1032 |
| 65° | 1051 | 962  | 954  |
| 70° | 963  | 869  | 868  |
| 75° | 840  | 757  | 785  |
| 80° | 692  | 616  | 635  |
| 85° | 461  | 384  | 396  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1297 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 59.7   | 1.6       |
| 10°-20°   | 168.0  | 4.4       |
| 20°-30°   | 246.9  | 6.5       |
| 30°-40°   | 286.8  | 7.6       |
| 40°-50°   | 286.4  | 7.6       |
| 50°-60°   | 249.7  | 6.6       |
| 60°-70°   | 184.6  | 4.9       |
| 70°-80°   | 104.5  | 2.8       |
| 80°-90°   | 29.8   | 0.8       |
| 90°-100°  | 47.9   | 1.3       |
| 100°-110° | 152.1  | 4.0       |
| 110°-120° | 260.3  | 6.9       |
| 120°-130° | 342.3  | 9.1       |
| 130°-140° | 384.2  | 10.2      |
| 140°-150° | 376.8  | 10.0      |
| 150°-160° | 316.1  | 8.4       |
| 160°-170° | 209.6  | 5.5       |
| 170°-180° | 73.3   | 1.9       |
| 0°-30°    | 474.7  | 12.6      |
| 0°-40°    | 761.5  | 20.2      |
| 0°-60°    | 1297.6 | 34.3      |
| 0°-90°    | 1616.5 | 42.8      |
| 90°-120°  | 460.2  | 12.2      |
| 90°-150°  | 1563.5 | 41.4      |
| 90°-180°  | 2162.0 | 57.2      |
| 0°-180°   | 3778.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|------|-----|-------|-----|-------|-----|------|
| 0°   | 634 | 634   | 634 | 634   | 634 |      |
| 5°   | 634 | 632   | 625 | 630   | 629 | 60   |
| 15°  | 604 | 600   | 592 | 595   | 592 | 170  |
| 25°  | 547 | 542   | 531 | 533   | 531 | 252  |
| 35°  | 472 | 466   | 456 | 452   | 449 | 295  |
| 45°  | 384 | 380   | 370 | 364   | 361 | 296  |
| 55°  | 290 | 287   | 279 | 272   | 269 | 260  |
| 65°  | 196 | 192   | 186 | 181   | 178 | 194  |
| 75°  | 102 | 101   | 98  | 95    | 96  | 109  |
| 85°  | 25  | 24    | 24  | 22    | 21  | 28   |
| 90°  | 1   | 8     | 23  | 21    | 22  | 4    |
| 95°  | 34  | 41    | 42  | 42    | 41  | 38   |
| 105° | 140 | 142   | 144 | 145   | 145 | 148  |
| 115° | 261 | 265   | 264 | 263   | 261 | 258  |
| 125° | 380 | 386   | 384 | 382   | 381 | 339  |
| 135° | 491 | 499   | 500 | 499   | 497 | 380  |
| 145° | 597 | 601   | 605 | 606   | 603 | 373  |
| 155° | 682 | 684   | 686 | 689   | 687 | 314  |
| 165° | 742 | 741   | 741 | 746   | 743 | 209  |
| 175° | 772 | 770   | 769 | 774   | 770 | 73   |
| 180° | 774 | 774   | 774 | 774   | 774 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 0°     | 634.5 | 634.5 | 634.5 | 634.5 | 634.5 |
| 2.5°   | 638.1 | 635.1 | 628.4 | 634.5 | 633.3 |
| 5°     | 634.5 | 632.1 | 625.3 | 630.2 | 629.0 |
| 7.5°   | 630.2 | 626.6 | 619.9 | 624.8 | 623.5 |
| 10°    | 623.5 | 619.3 | 612.0 | 616.8 | 615.0 |
| 12.5°  | 614.3 | 610.7 | 603.4 | 606.4 | 605.2 |
| 15°    | 604.0 | 600.4 | 592.4 | 594.8 | 591.8 |
| 17.5°  | 591.2 | 587.6 | 579.6 | 582.6 | 579.6 |
| 20°    | 577.1 | 573.5 | 564.9 | 566.8 | 564.3 |
| 22.5°  | 563.1 | 557.7 | 549.7 | 549.7 | 548.5 |
| 25°    | 546.7 | 541.8 | 531.4 | 532.6 | 531.4 |
| 27.5°  | 528.3 | 524.1 | 516.2 | 514.4 | 511.3 |
| 30°    | 510.1 | 505.2 | 496.0 | 494.2 | 491.7 |
| 32.5°  | 490.5 | 486.9 | 477.1 | 473.4 | 471.0 |
| 35°    | 471.7 | 465.5 | 455.8 | 452.1 | 449.0 |
| 37.5°  | 450.3 | 444.7 | 435.0 | 430.7 | 427.6 |
| 40°    | 428.3 | 423.4 | 413.6 | 408.2 | 405.7 |
| 42.5°  | 406.9 | 402.0 | 392.3 | 386.2 | 382.5 |
| 45°    | 383.8 | 379.5 | 370.3 | 363.6 | 361.2 |
| 47.5°  | 361.2 | 356.9 | 347.2 | 340.4 | 336.8 |
| 50°    | 337.4 | 334.4 | 325.8 | 317.2 | 314.2 |
| 52.5°  | 314.2 | 309.9 | 302.0 | 295.3 | 291.1 |
| 55°    | 290.4 | 286.7 | 279.4 | 272.1 | 269.0 |
| 57.5°  | 266.6 | 263.6 | 255.6 | 248.3 | 245.8 |
| 60°    | 242.8 | 240.4 | 231.9 | 225.1 | 223.3 |
| 62.5°  | 219.6 | 215.3 | 209.3 | 203.2 | 200.7 |
| 65°    | 195.8 | 192.2 | 186.1 | 180.6 | 177.6 |
| 67.5°  | 171.5 | 168.4 | 162.9 | 158.7 | 156.2 |
| 70°    | 148.9 | 146.4 | 140.9 | 136.6 | 134.3 |
| 72.5°  | 125.7 | 123.3 | 120.2 | 115.9 | 114.1 |
| 75°    | 102.5 | 101.3 | 98.2  | 94.6  | 95.8  |
| 77.5°  | 81.8  | 79.3  | 78.0  | 76.2  | 74.4  |
| 80°    | 61.1  | 60.4  | 59.2  | 57.3  | 56.1  |
| 82.5°  | 41.5  | 41.5  | 40.9  | 38.5  | 38.5  |
| 85°    | 24.9  | 24.4  | 23.8  | 21.9  | 21.4  |
| 87.5°  | 11.0  | 9.8   | 8.6   | 6.8   | 6.1   |
| 90°    | 0.7   | 8.4   | 22.8  | 21.4  | 22.2  |
| 92.5°  | 14.4  | 19.6  | 20.3  | 21.0  | 21.0  |
| 95°    | 34.1  | 40.6  | 41.7  | 41.7  | 40.6  |
| 97.5°  | 56.7  | 62.7  | 65.3  | 65.3  | 65.3  |
| 100°   | 82.8  | 88.1  | 90.0  | 90.0  | 89.4  |
| 102.5° | 110.3 | 114.3 | 116.8 | 117.6 | 116.8 |
| 105°   | 140.4 | 142.3 | 143.7 | 144.8 | 144.8 |
| 107.5° | 170.2 | 173.0 | 173.0 | 173.5 | 170.2 |
| 110°   | 199.2 | 202.9 | 202.9 | 202.9 | 201.1 |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 230.4 | 234.4 | 233.7 | 231.8 | 230.4 |
| 115°   | 261.2 | 264.9 | 263.7 | 263.1 | 261.2 |
| 117.5° | 291.7 | 296.9 | 293.6 | 291.7 | 289.8 |
| 120°   | 322.5 | 327.7 | 322.5 | 322.5 | 320.4 |
| 122.5° | 350.5 | 357.0 | 353.8 | 351.9 | 350.5 |
| 125°   | 379.9 | 385.7 | 383.8 | 381.7 | 381.1 |
| 127.5° | 408.5 | 415.8 | 413.3 | 410.4 | 408.5 |
| 130°   | 435.4 | 443.8 | 442.6 | 441.2 | 438.6 |
| 132.5° | 465.5 | 472.0 | 472.5 | 469.2 | 467.3 |
| 135°   | 491.4 | 498.6 | 500.0 | 499.3 | 497.4 |
| 137.5° | 520.2 | 526.1 | 527.3 | 526.8 | 524.0 |
| 140°   | 545.7 | 551.5 | 554.8 | 554.8 | 552.2 |
| 142.5° | 571.9 | 577.6 | 579.5 | 580.2 | 577.6 |
| 145°   | 596.6 | 601.2 | 605.0 | 605.6 | 603.1 |
| 147.5° | 618.7 | 624.5 | 627.3 | 628.5 | 625.9 |
| 150°   | 641.6 | 645.6 | 648.1 | 650.2 | 648.1 |
| 152.5° | 661.9 | 665.8 | 669.0 | 671.6 | 669.0 |
| 155°   | 682.2 | 684.0 | 686.1 | 689.3 | 687.3 |
| 157.5° | 699.6 | 701.0 | 702.2 | 706.9 | 703.6 |
| 160°   | 715.3 | 716.6 | 717.4 | 721.3 | 718.5 |
| 162.5° | 729.7 | 729.7 | 730.4 | 734.8 | 731.6 |
| 165°   | 742.1 | 741.4 | 741.4 | 746.0 | 742.7 |
| 167.5° | 753.3 | 751.1 | 751.1 | 755.8 | 752.5 |
| 170°   | 761.7 | 759.8 | 759.1 | 763.8 | 759.8 |
| 172.5° | 767.4 | 765.6 | 764.9 | 769.6 | 765.6 |
| 175°   | 772.2 | 770.3 | 768.9 | 773.6 | 769.6 |
| 177.5° | 774.7 | 772.8 | 771.4 | 775.4 | 771.4 |
| 180°   | 773.6 | 773.6 | 773.6 | 773.6 | 773.6 |

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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 | 8.04             | 8.84  | 9.05  | 9.86  | 11.23 | 7.59           | 8.39  | 8.61  | 9.42  | 10.79 |
|                 | 3H   | 9.67             | 10.39 | 10.70 | 11.42 | 12.81 | 9.18           | 9.90  | 10.21 | 10.93 | 12.32 |
|                 | 4H   | 10.24            | 10.92 | 11.28 | 11.96 | 13.36 | 9.75           | 10.43 | 10.79 | 11.46 | 12.86 |
|                 | 6H   | 10.62            | 11.25 | 11.67 | 12.29 | 13.70 | 10.12          | 10.74 | 11.17 | 11.79 | 13.20 |
|                 | 8H   | 10.71            | 11.31 | 11.77 | 12.37 | 13.77 | 10.21          | 10.81 | 11.27 | 11.87 | 13.27 |
|                 | 12H  | 10.75            | 11.32 | 11.81 | 12.37 | 13.80 | 10.24          | 10.81 | 11.30 | 11.86 | 13.29 |
| 4H              | 2H   | 8.48             | 9.16  | 9.52  | 10.20 | 11.59 | 8.12           | 8.80  | 9.17  | 9.84  | 11.24 |
|                 | 3H   | 10.31            | 10.88 | 11.37 | 11.94 | 13.36 | 9.90           | 10.47 | 10.96 | 11.54 | 12.95 |
|                 | 4H   | 11.01            | 11.53 | 12.07 | 12.58 | 14.02 | 10.58          | 11.10 | 11.64 | 12.16 | 13.59 |
|                 | 6H   | 11.50            | 11.94 | 12.57 | 13.02 | 14.45 | 11.06          | 11.51 | 12.13 | 12.59 | 14.02 |
|                 | 8H   | 11.63            | 12.05 | 12.70 | 13.12 | 14.57 | 11.20          | 11.61 | 12.27 | 12.68 | 14.13 |
|                 | 12H  | 11.69            | 12.07 | 12.78 | 13.16 | 14.60 | 11.24          | 11.62 | 12.33 | 12.71 | 14.16 |
| 8H              | 4H   | 11.18            | 11.60 | 12.25 | 12.67 | 14.12 | 10.81          | 11.22 | 11.88 | 12.29 | 13.74 |
|                 | 6H   | 11.79            | 12.13 | 12.88 | 13.24 | 14.68 | 11.40          | 11.74 | 12.49 | 12.86 | 14.30 |
|                 | 8H   | 11.99            | 12.29 | 13.09 | 13.39 | 14.85 | 11.60          | 11.90 | 12.70 | 12.99 | 14.46 |
|                 | 12H  | 12.10            | 12.37 | 13.21 | 13.46 | 14.96 | 11.69          | 11.96 | 12.80 | 13.05 | 14.55 |
| 12H             | 4H   | 11.16            | 11.54 | 12.25 | 12.63 | 14.08 | 10.79          | 11.17 | 11.88 | 12.26 | 13.71 |
|                 | 6H   | 11.81            | 12.11 | 12.91 | 13.21 | 14.67 | 11.43          | 11.74 | 12.53 | 12.83 | 14.29 |
|                 | 8H   | 12.03            | 12.30 | 13.13 | 13.39 | 14.89 | 11.65          | 11.91 | 12.75 | 13.01 | 14.51 |

END OF REPORT