

LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State  
Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: HALO

Report Number: P601230

Luminaire Tested: **ML408LSAWW95FS1E - TIR4D25AWW - TL41R\_ TL42S\_ 3000K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601230  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Issue Date: 7/29/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: HALO  
 Catalog Number: ML408LSAWW95FS1E - TIR4D25AWW - TL41R\_ TL42S\_ 3000K  
 Description: RETROFIT, 25D WW OPTIC, OPEN TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 95CRI / 3000K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 593.8 lumens  
 Efficiency: N/A  
 Efficacy: 57.6 lumens/watt  
 Spacing Criteria (0/90/45): 1.31 / 0.61 / 0.81  
 Luminous Opening: Circular (Dia: 0.21' x H: 0')  
 CIE Type: Direct

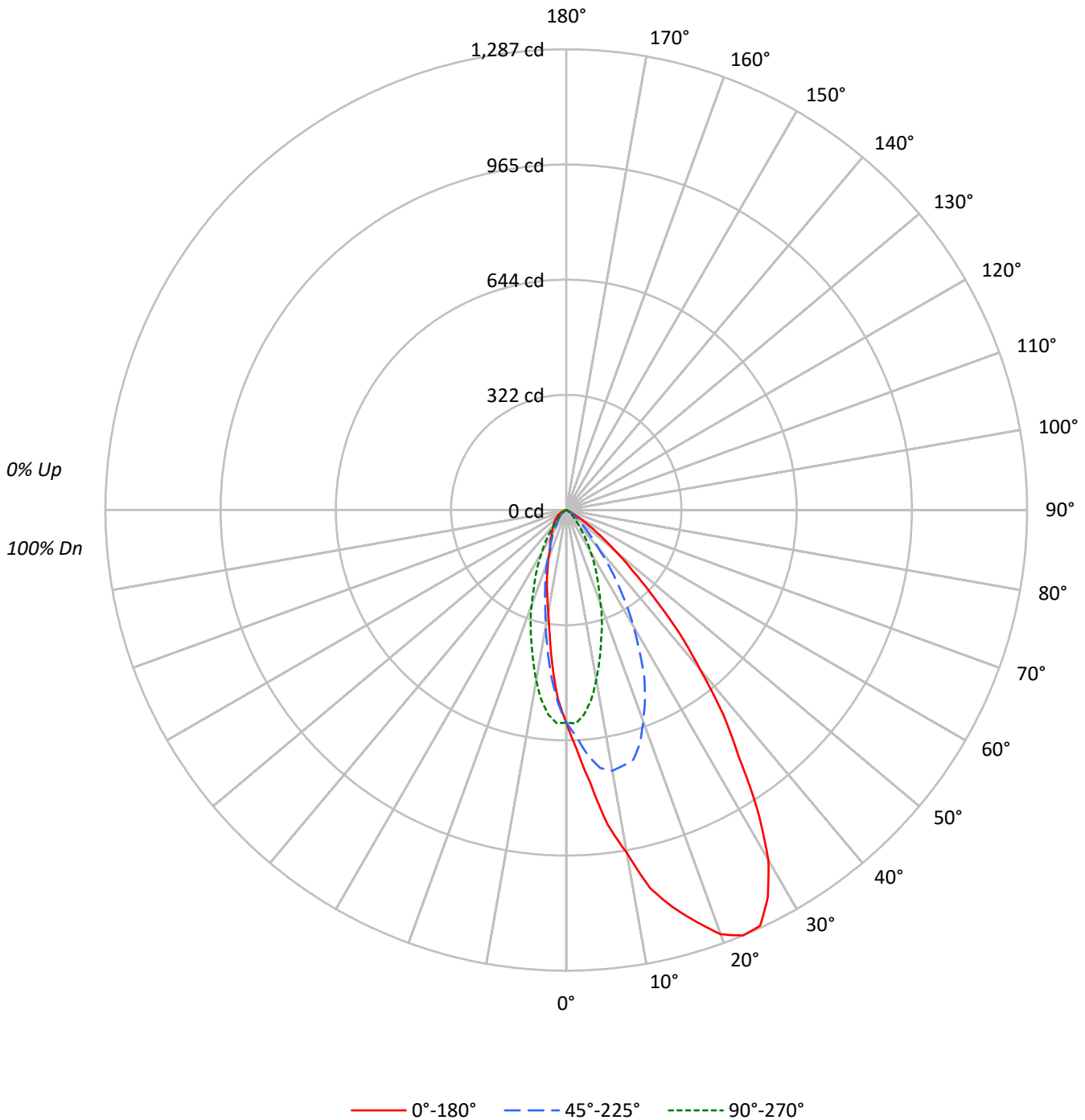
Input Watts (W): 10.3  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



| Meas             |                       | Calibration Due Date |            |
|------------------|-----------------------|----------------------|------------|
| Instrument       | Identificatio         |                      |            |
| Photometer       | GONIO 1 11111111      | 4/22/2021            | 10/22/2021 |
| Power Meter      | XITRON 2801 IN0197    | 12/1/2020            | 12/1/2021  |
| AC Power Source  | CHROMA 61505 IN0196   | 12/1/2020            | 12/1/2021  |
| DC Power Supply  | AGILENT E3634A IN0198 | 11/30/2020           | 11/30/2021 |
| Room Thermometer | ONSET IN0143          | 12/1/2020            | 12/1/2021  |

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### Luminous Intensity Polar Plot



TEST NUMBER: P601230

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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| RF  | 20  |     |     |     |     | 20  |     |     |     |     | 20  |     |     |     |     | 20  |     |     |     |     | 20  |   |
| RC  | 80  |     |     |     |     | 70  |     |     |     |     | 50  |     |     |     |     | 30  |     |     |     |     | 10  | 0 |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 0   |   |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 | 100 | 100 | 100 |   |
| 1   | 113 | 110 | 107 | 105 | 111 | 108 | 106 | 103 | 104 | 102 | 100 | 100 | 99  | 97  | 97  | 96  | 94  | 93  | 93  | 93  | 93  |   |
| 2   | 107 | 102 | 97  | 94  | 105 | 100 | 96  | 93  | 97  | 93  | 91  | 94  | 91  | 89  | 91  | 89  | 87  | 85  | 85  | 85  | 85  |   |
| 3   | 101 | 94  | 89  | 84  | 99  | 93  | 88  | 84  | 90  | 86  | 82  | 87  | 84  | 81  | 85  | 82  | 80  | 78  | 78  | 78  | 78  |   |
| 4   | 95  | 87  | 81  | 77  | 93  | 86  | 80  | 76  | 84  | 79  | 75  | 82  | 78  | 74  | 80  | 76  | 73  | 72  | 72  | 72  | 72  |   |
| 5   | 90  | 81  | 75  | 70  | 88  | 80  | 74  | 70  | 78  | 73  | 69  | 76  | 72  | 68  | 75  | 71  | 68  | 66  | 66  | 66  | 66  |   |
| 6   | 85  | 75  | 69  | 64  | 83  | 75  | 68  | 64  | 73  | 68  | 64  | 72  | 67  | 63  | 70  | 66  | 63  | 61  | 61  | 61  | 61  |   |
| 7   | 80  | 70  | 64  | 59  | 79  | 70  | 64  | 59  | 68  | 63  | 59  | 67  | 62  | 59  | 66  | 62  | 58  | 57  | 57  | 57  | 57  |   |
| 8   | 76  | 66  | 60  | 55  | 75  | 65  | 59  | 55  | 64  | 59  | 55  | 63  | 58  | 55  | 62  | 58  | 54  | 53  | 53  | 53  | 53  |   |
| 9   | 72  | 62  | 56  | 51  | 71  | 61  | 55  | 51  | 60  | 55  | 51  | 60  | 54  | 51  | 59  | 54  | 51  | 49  | 49  | 49  | 49  |   |
| 10  | 69  | 58  | 52  | 48  | 68  | 58  | 52  | 48  | 57  | 52  | 48  | 56  | 51  | 48  | 55  | 51  | 48  | 46  | 46  | 46  | 46  |   |

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

|     | 0°     | 90°    | 180°   |
|-----|--------|--------|--------|
| 0°  | 187470 | 187470 | 187470 |
| 5°  | 242166 | 181688 | 139436 |
| 10° | 311723 | 154771 | 92375  |
| 15° | 375417 | 123112 | 68094  |
| 20° | 423835 | 94828  | 49396  |
| 25° | 446555 | 70204  | 36966  |
| 30° | 411613 | 50025  | 29789  |
| 35° | 323378 | 33768  | 25904  |
| 40° | 240314 | 20445  | 22877  |
| 45° | 155135 | 13888  | 20408  |
| 50° | 90831  | 10021  | 18176  |
| 55° | 48226  | 6992   | 16075  |
| 60° | 20272  | 3663   | 14146  |
| 65° | 7247   | 2914   | 10909  |
| 70° | 923    | 1754   | 6278   |
| 75° | 1220   | 1220   | 0      |
| 80° | 0      | 0      | 0      |
| 85° | 0      | 0      | 0      |

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 54.8   | 9.2       |
| 10°-20°   | 141.7  | 23.9      |
| 20°-30°   | 173.2  | 29.2      |
| 30°-40°   | 129.6  | 21.8      |
| 40°-50°   | 64.2   | 10.8      |
| 50°-60°   | 23.7   | 4.0       |
| 60°-70°   | 5.9    | 1.0       |
| 70°-80°   | 0.8    | 0.1       |
| 80°-90°   | 0.0    | 0.0       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-30°    | 369.6  | 62.2      |
| 0°-40°    | 499.2  | 84.1      |
| 0°-60°    | 587.1  | 98.9      |
| 0°-90°    | 593.8  | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 593.8  | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°   | 45° | 90° | 135° | 180° | Flux |
|-----|------|-----|-----|------|------|------|
| 0°  | 594  | 594 | 594 | 594  | 594  |      |
| 5°  | 764  | 687 | 573 | 470  | 440  | 80   |
| 15° | 1148 | 722 | 377 | 229  | 208  | 327  |
| 25° | 1282 | 515 | 202 | 101  | 106  | 575  |
| 35° | 839  | 247 | 88  | 47   | 67   | 529  |
| 45° | 347  | 81  | 31  | 26   | 46   | 277  |
| 55° | 88   | 22  | 13  | 11   | 29   | 83   |
| 65° | 10   | 3   | 4   | 4    | 15   | 12   |
| 75° | 1    | 1   | 1   | 0    | 0    | 1    |
| 85° | 0    | 0   | 0   | 0    | 0    | 0    |
| 90° | 0    | 0   | 0   | 0    | 0    | 0    |

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 10°    | 15°    | 20°    | 22.5°  | 45°   | 67.5° | 90°   | 112.5° | 135°  |
|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|-------|
| 0°    | 593.7  | 593.7  | 593.7  | 593.7  | 593.7  | 593.7  | 593.7 | 593.7 | 593.7 | 593.7  | 593.7 |
| 2.5°  | 668.6  | 668.6  | 676.4  | 663.7  | 663.7  | 659.8  | 631.6 | 615.1 | 596.6 | 569.3  | 537.2 |
| 5°    | 764.0  | 783.4  | 767.9  | 746.5  | 759.1  | 753.3  | 687.1 | 626.7 | 573.2 | 520.7  | 470.1 |
| 7.5°  | 886.6  | 891.5  | 877.8  | 850.6  | 844.7  | 840.9  | 727.0 | 627.7 | 534.3 | 455.5  | 397.1 |
| 10°   | 972.2  | 979.1  | 973.2  | 963.5  | 930.4  | 922.6  | 739.6 | 590.7 | 482.7 | 399.0  | 328.9 |
| 12.5° | 1082.2 | 1080.3 | 1071.5 | 1043.3 | 1005.3 | 994.6  | 731.9 | 557.7 | 428.2 | 335.8  | 269.6 |
| 15°   | 1148.4 | 1160.1 | 1147.4 | 1072.5 | 1055.0 | 1027.7 | 722.1 | 512.9 | 376.6 | 291.0  | 228.7 |
| 17.5° | 1205.8 | 1200.9 | 1176.6 | 1128.9 | 1084.2 | 1059.8 | 684.2 | 447.7 | 330.9 | 242.3  | 188.8 |
| 20°   | 1261.3 | 1262.3 | 1224.3 | 1165.9 | 1093.9 | 1050.1 | 627.7 | 402.9 | 282.2 | 199.5  | 156.7 |
| 22.5° | 1286.6 | 1284.6 | 1236.0 | 1149.4 | 1065.7 | 1020.9 | 574.2 | 352.3 | 236.5 | 161.6  | 125.5 |
| 25°   | 1281.7 | 1246.7 | 1214.6 | 1112.4 | 1018.0 | 963.5  | 514.8 | 308.5 | 201.5 | 136.2  | 101.2 |
| 27.5° | 1219.4 | 1201.9 | 1147.4 | 1045.2 | 936.2  | 880.8  | 440.9 | 263.7 | 168.4 | 107.1  | 82.7  |
| 30°   | 1128.9 | 1108.5 | 1043.3 | 958.6  | 815.6  | 771.8  | 375.7 | 216.1 | 137.2 | 91.5   | 68.1  |
| 32.5° | 994.6  | 979.1  | 911.9  | 801.0  | 689.0  | 639.4  | 311.4 | 172.3 | 110.9 | 67.2   | 55.5  |
| 35°   | 838.9  | 837.9  | 778.6  | 688.1  | 571.3  | 520.7  | 247.2 | 138.2 | 87.6  | 53.5   | 46.7  |
| 37.5° | 720.2  | 694.9  | 636.5  | 552.8  | 454.5  | 412.6  | 193.7 | 108.0 | 65.2  | 41.8   | 38.9  |
| 40°   | 583.0  | 572.2  | 510.9  | 439.9  | 353.3  | 322.1  | 143.1 | 80.8  | 49.6  | 34.1   | 35.0  |
| 42.5° | 469.1  | 454.5  | 403.9  | 334.8  | 273.5  | 248.2  | 109.0 | 62.3  | 38.9  | 29.2   | 31.1  |
| 45°   | 347.4  | 340.6  | 311.4  | 249.1  | 202.4  | 184.9  | 80.8  | 48.7  | 31.1  | 24.3   | 26.3  |
| 47.5° | 253.0  | 245.2  | 224.8  | 184.9  | 147.0  | 136.2  | 62.3  | 38.0  | 25.3  | 19.5   | 20.4  |
| 50°   | 184.9  | 180.0  | 166.4  | 134.3  | 108.0  | 99.3   | 46.7  | 29.2  | 20.4  | 15.6   | 17.5  |
| 52.5° | 127.5  | 129.4  | 117.8  | 95.4   | 76.9   | 71.0   | 35.0  | 21.4  | 16.5  | 12.7   | 14.6  |
| 55°   | 87.6   | 85.6   | 80.8   | 62.3   | 49.6   | 45.7   | 22.4  | 14.6  | 12.7  | 9.7    | 10.7  |
| 57.5° | 53.5   | 53.5   | 49.6   | 38.9   | 31.1   | 29.2   | 13.6  | 9.7   | 8.8   | 6.8    | 8.8   |
| 60°   | 32.1   | 32.1   | 27.2   | 22.4   | 18.5   | 16.5   | 7.8   | 5.8   | 5.8   | 4.9    | 6.8   |
| 62.5° | 17.5   | 17.5   | 15.6   | 12.7   | 9.7    | 8.8    | 4.9   | 4.9   | 3.9   | 3.9    | 5.8   |
| 65°   | 9.7    | 8.8    | 7.8    | 5.8    | 4.9    | 4.9    | 2.9   | 3.9   | 3.9   | 3.9    | 3.9   |
| 67.5° | 3.9    | 3.9    | 3.9    | 2.9    | 2.9    | 2.9    | 1.9   | 2.9   | 2.9   | 2.9    | 2.9   |
| 70°   | 1.0    | 1.9    | 1.9    | 1.9    | 1.0    | 1.0    | 1.9   | 1.9   | 1.9   | 1.9    | 1.9   |
| 72.5° | 1.0    | 1.0    | 1.0    | 1.0    | 1.0    | 1.0    | 1.0   | 1.0   | 1.0   | 1.0    | 1.0   |
| 75°   | 1.0    | 1.0    | 1.0    | 1.0    | 1.0    | 1.0    | 1.0   | 1.0   | 1.0   | 1.0    | 0.0   |
| 77.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 1.0   | 1.0   | 0.0   | 0.0    | 0.0   |
| 80°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   |
| 82.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   |
| 85°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   |

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**CANDELA DISTRIBUTION (continued):**

|       | 157.5°       | 180°         |
|-------|--------------|--------------|
| 0°    | 593.7        | 593.7        |
| 2.5°  | 538.2        | 529.4        |
| 5°    | 450.6        | 439.9        |
| 7.5°  | 358.1        | 351.3        |
| 10°   | 292.9        | 288.1        |
| 12.5° | 247.2        | 244.3        |
| 15°   | 209.2        | 208.3        |
| 17.5° | 176.2        | 173.2        |
| 20°   | 144.0        | 147.0        |
| 22.5° | <b>118.7</b> | <b>116.8</b> |
| 25°   | 100.2        | 106.1        |
| 27.5° | 85.6         | 93.4         |
| 30°   | 74.9         | 81.7         |
| 32.5° | 64.2         | 74.9         |
| 35°   | 56.4         | 67.2         |
| 37.5° | 50.6         | 60.3         |
| 40°   | 46.7         | 55.5         |
| 42.5° | 40.9         | 51.6         |
| 45°   | 36.0         | 45.7         |
| 47.5° | 31.1         | 40.9         |
| 50°   | 28.2         | 37.0         |
| 52.5° | 24.3         | 33.1         |
| 55°   | 20.4         | 29.2         |
| 57.5° | 18.5         | 26.3         |
| 60°   | 15.6         | 22.4         |
| 62.5° | 11.7         | 18.5         |
| 65°   | 8.8          | 14.6         |
| 67.5° | 5.8          | 10.7         |
| 70°   | 2.9          | 6.8          |
| 72.5° | 1.0          | 1.9          |
| 75°   | 0.0          | 0.0          |
| 77.5° | 0.0          | 0.0          |
| 80°   | 0.0          | 0.0          |
| 82.5° | 0.0          | 0.0          |
| 85°   | 0.0          | 0.0          |
| 87.5° | 0.0          | 0.0          |
| 90°   | 0.0          | 0.0          |

(END OF REPORT)