

**SIEMENS**

ULTRAMAT 23

# A legacy mainstay continues with performance enhancements...

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The Ultramat 23 gas analyzer continues its world-renowned legacy for dependability, performance, and versatility in online gas analysis applications serving countless industries worldwide. Ultramat 23 throughout its product lifecycle has advanced in both sensor technology and measurement performance capability. Originally offering the measurement of up to (3) IR active gas components such as (CO, CO<sub>2</sub>, NO...) using NDIR and in addition able to measure Oxygen with either an electrochemical fuel cell or paramagnetic O<sub>2</sub> dumbbell sensor. Advancement continued with the addition of low ppm H<sub>2</sub>S electrochemical fuel cell for upgraded biogas application and most recently came the addition of an Ultraviolet photometer module for low ppm SO<sub>2</sub> measurement meeting Europe's TÜV requirement for emissions monitoring application.

So there you have it...but wait there's more and it's all about measurement drift performance improvement of the NDIR channels which is important when measuring low concentration ppm levels for example such as CO and NO and perhaps for applicable stationary source emissions monitoring application. Siemens R&D headquarters recently published test data shows outstanding performance over a seven-day continuous period with the only interruption being initiation of the Ultramat 23 integral Autocal feature being performed once every 24 hours. As is often said... **the results speak for themselves** and so shown below is the actual testing criteria and performance results data.



## Ultramat 23 drift performance test report

Two ULTRAMAT 23 units with the configuration 7MB2337-4AD86-5PE1-Z C11 tested to examine the drift performance for one week.

The measured components and concentration ranges were:

- CO                            0 ... 50/250 ppm
- NO                            0 ... 100/500 ppm
- O<sub>2</sub> paramagnetic        0 ... 25Vol-%

Environmental conditions were room temperature with app. +/- 2° C smooth variation.

The applicable tolerances are:

|                | Tolerance<br>(%measuring range) | Tolerance smallest MR  | Tolerance greatest MR  |
|----------------|---------------------------------|------------------------|------------------------|
| NO             | 2.5%                            | 2.5vpm                 | 12.5vpm                |
| CO             | 3.0%                            | 1.5vpm                 | 7.5vpm                 |
| O <sub>2</sub> | 0.5%                            | 0.03vol%O <sub>2</sub> | 0.13vol%O <sub>2</sub> |

## Test results:

### CO (Results in ppm):

#### Device 1:

|        | Zero  | Span small measuring range | Limit small range | Span great measuring range | Limit great range | Result |
|--------|-------|----------------------------|-------------------|----------------------------|-------------------|--------|
| Day 0  | -0.3  | 47.8                       | 12.5vpm           | 253.5                      |                   |        |
| Day 7  | -0.28 | 47.52                      | 7.5vpm            | 254                        |                   |        |
| Result | 0.02  | -0.28                      | 1.5 ppm           | 0.5                        | 7.5 ppm           | Pass ✓ |

#### Device 2:

|        | Zero  | Span small measuring range | Limit Small Range | Span great measuring range | Limit Great Range | Result |
|--------|-------|----------------------------|-------------------|----------------------------|-------------------|--------|
| Day 0  | -0.3  | 47.8                       | 12.5vpm           | 253.5                      |                   |        |
| Day 7  | -0.28 | 47.52                      | 7.5vpm            | 254                        |                   |        |
| Result | 0.02  | -0.28                      | 1.5 ppm           | 0.5                        | 7.5 ppm           | Pass ✓ |

### NO (Results in ppm):

#### Device 1:

|        | Zero | Span small measuring range | Limit small range | Span great measuring range | Limit great range | Result |
|--------|------|----------------------------|-------------------|----------------------------|-------------------|--------|
| Day 0  | 0.2  | 101.5                      |                   | 493.7                      |                   |        |
| Day 7  | 1.3  | 100.9                      |                   | 492.9                      |                   |        |
| Result | 1.1  | -0.6                       | 2.5 ppm           | -0.8                       | 12.5 ppm          | Pass ✓ |

#### Device 2:

|        | Zero | Span small measuring range | Limit Small Range | Span great measuring range | Limit Great Range | Result |
|--------|------|----------------------------|-------------------|----------------------------|-------------------|--------|
| Day 0  | -0.2 | 101.57                     |                   | 493.3                      |                   |        |
| Day 7  | 0.8  | 101                        |                   | 492.9                      |                   |        |
| Result | 1.0  | -0.57                      | 2.5 ppm           | -0.4                       | 12.5 ppm          | Pass ✓ |

### O2 (Results in vol%O2):

#### Device 1:

|        | Zero | Span small measuring range | Limit small range | Span great measuring range | Limit great range | Result |
|--------|------|----------------------------|-------------------|----------------------------|-------------------|--------|
| Day 0  | 0    | 5.0                        |                   | 20.96                      |                   |        |
| Day 7  | 0    | 5.023                      |                   | 21.0                       |                   |        |
| Result | 0    | 0.023                      | 0.03vol%O2        | 0.04                       | 0.13vol%)2        | Pass ✓ |

#### Device 2:

|        | Zero  | Span small measuring range | Limit Small Range | Span great measuring range | Limit Great Range | Result |
|--------|-------|----------------------------|-------------------|----------------------------|-------------------|--------|
| Day 0  | 0     | 5.0                        |                   | 20.95                      |                   |        |
| Day 7  | -0.03 | 4.98                       |                   | 21                         |                   |        |
| Result | -0.03 | -0.02                      | 0.03vol%O2        | 0.05                       | 0.13vol%)2        | Pass ✓ |

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