Service Information Letter 09_2010

1 MAS-100 CG Ex

Instruments affected: all MAS-100 CG Ex

Change level:
- ☐ optional
- ☐ recommend by MBV
- ☒ mandatory

2 Reason

MBV AG has changed the calibration equipment for the MAS-100 CG Ex. This Service Information Letter explains the changes and how it impacts your future calibrations.

Calibration Equipment

Until midyear of 2010 re-calibration of MAS-100 CG Ex was done with a « Turbinenradialrad-Gaszähler » from Gas und Wasserfabrik in Lucern (GWF). This unit was yearly sent back to GWF for recalibration.

The measurement principle is based on a propeller which is driven by the airflow. This mechanical setup shows a certain amount of inertia and the measured value is dependent on ambient conditions which must be normalized to 20℃ ; 1013.25 m bar.

The new re-calibration method is using a Bürkert mass flow meter (Type 8006). The measurement principle is based on a heated probe which is cooled by the air flow. As this is directly related to mass rather than volume the ambient conditions are already compensated. As there is no mechanical inertia it is better suited to measure changing flow rates. The mass flow meter will be recalibrated on a yearly base.

Now that mass flow sensors are available in a suitable low range and precision MBV decided to upgrade the calibration equipment from a volume to a mass based priciple.

Measurement procedure

The measurement cycle did not change: The MAS-100 CG Ex has a self-adjusting flow valve to automatically match the detected pressure with the necessary flow. To cover a larger operation range MBV AG is using a multi point calibration. The pass criterion of +/- 5% is then applied to the total volume of 1000l.

Steps at 100% flow

	Flow rate [l/min @ ambient]	**Volume [l]**
	150	100
	300	200
	450	300
	600	400
TOTAL		**1000**

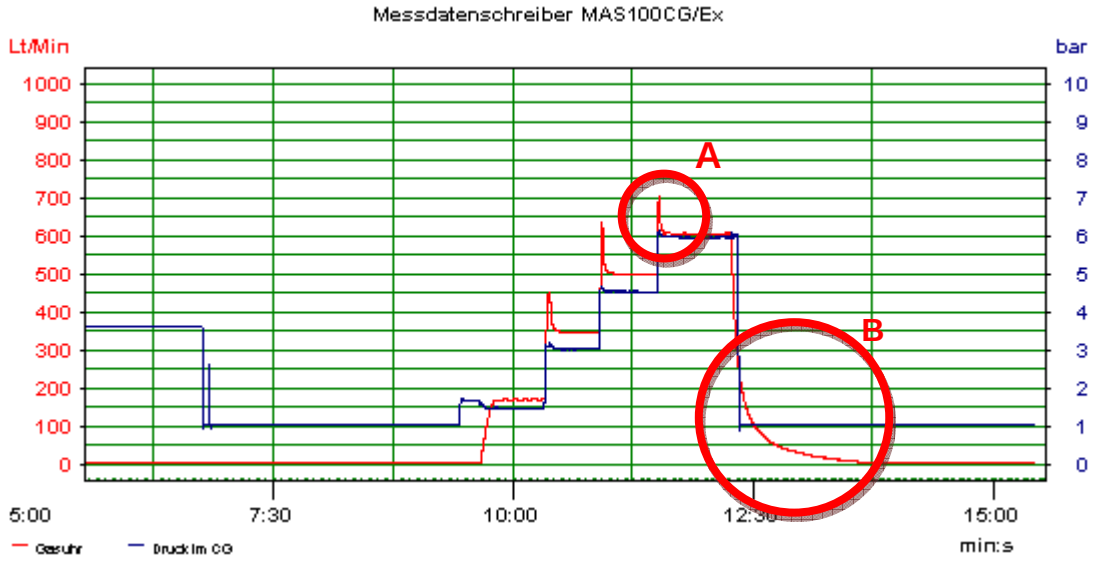
Steps at 50% flow

	Flow rate [l/min @ ambient]	**Volume [l]**
	75	100
	150	200
	225	300
	300	400
TOTAL		**1000**

Service Information Letter 09_2010

Comparing results from Gas Turbine to Mass Flow Meter

Below a typical pressure / flow diagram measured with the gas turbine:



Note the overshooting peak at “A”. Every time the pressure is switched by the calibration equipment a pressure surge is created. While the surge is very quick (and not a problem per se) it shows as a broad peak on the measurement due to the gas turbine inertia.

This inertia is even more obvious at the end of the measurement (“B”). This is for explanation only: the volume recording is stopped before the tail occurs and has no influence to the result.

Due to this peaks the readings from the gas turbine are approx. 1.5% higher than from the mass flow meter.

While there is a difference on the dynamic behavior of the two systems they are very similar for the static measurements.

Microbiological effect

With the new calibration method the instrument will accumulate approx. 1.5% more air due to the effect described above. This is within the uncertainty band of the instrument and will not lead to a different result interpretation of the number of microorganisms found.

3 Procedure

When your MAS-100 CG Ex is returned to MBV for the next recalibration it will be recalibrated using the new equipment but additionally the results from the former method are included to ensure a complete traceability.

Each step is executed for 50% and 100% flow.

4 Documents supplied

1. Incoming measurement
This is done with the gas turbine (same principle as used for last calibration) to monitor the changes in the instrument since the last calibration.

2. Adjustment of instrument
This is performed with the new mass flow sensor based measurement system as described in the chapter *Measurement Procedure*.

3. Calibration Check of instrument
Next the adjustment of the instrument is checked with the mass flow sensor. Based on this measurement the calibration certificate is issued.

The incoming measurement next year will be performed with the mass flow sensor.

Stäfa, September 10th 2010

Beat Glauser
CTO, MBV AG