

Gas meters with mechanical temperature conversion:

Why give away gas?

The interrelationship between volume and energy changes as a function of temperature because the gas changes its density. The gas temperature can be measured and accounted for in the bill so that the end customer always gets only as much energy as he or she pays for.

Both the gas utility, or future network operators in the case of installations in unheated environments, and the persons connected in the case of installations in heated rooms have an economic interest in allowing differences in gas temperature. This is why it can be anticipated that domestic gas meters in future will be required to feature temperature conversion or volume correction to a greater extent.

Gas meters with mechanical temperature conversion (TC) have been made by Elster-Kromschroder since 1993. The first type was the BK-G4T, more than a million of which have been manufactured in the last 15 years. Diaphragm gas meters with TC are available today in sizes G2.5 to G25.



Fig. 1: Measuring unit V2T for BK-G4T



Fig. 2: Bimetallic element on measuring unit V6 A bimetallic element fitted in the crank mechanism changes the crank radius as the result of a deflection if a temperature change occurs in the measured gas. This changes the diaphragm stroke causing a change in the volume of the measuring chamber proportional to the absolute gas temperature.

Elster has acquired the type-examination certificate (approval) for diaphragm gas meters with temperature conversion in compliance with the MID.

Of course, Elster tests MID-compliant gas meters 100% so that the usual standard of quality is guaranteed. The combination of time-tested BK technology and mechanical TC offers clear advantages both to the gas utility (or network operator) and the end customer:

- The operating volume is compensated for or corrected by (the influence of the temperature) the differential temperature as early as at the measurement stage.

The temperature influence is approx. 0.34% per °C. For billing the gas temperature is presumed to be a fixed value at 15°C (or 20°C) (288.15°K) in the case of meters without temperature conversion. This means that there may be an appreciable deviation as a function of the actual gas temperature.

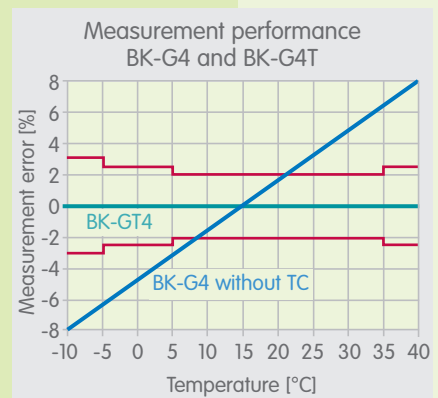


Fig. 3: Measurement performance as a function of temperature (idealised representation) Measurement error curve BK-G4T in the correction range with error limits in accordance with EN 1359:2007

- Gas meters with mechanical TC are retested in Germany in the same way as normal diaphragm gas meters and are subject to the same recalibration intervals.
- The electronic TC is subject to the regulations governing electronic volume correctors, i.e. a recalibration interval of five years, in Germany.
- Mechanical temperature conversion is far cheaper to procure than electronic volume correction.

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GASEX – Conference & Exhibition in Hanoi, Vietnam

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As can be seen from the example calculation, the investment in gas meters with TC may pay off even after a short time if the installation is at an ambient temperature well below 15°C.

Example calculation Single-family dwelling:

Gas consumption: 3,000 m³/year
 Gas meter in unheated cellar, average gas temperature: 10°C,
 Calorific value: 10 kWh/m³
 Gas price: 6.22 ct/kWh
 (RWE Weser Ems, April 2008)
 Billing amount
 Simple gas meter: 1,769 euros
 Gas meter with TC: 1,800 euros
 Difference: 31 euros/year

As for all diaphragm gas meters, the device types with TC are available with the encoder index. This allows easy integration in future meter technologies (e.g. remote meter reading).

Elster currently recommends the use of electronic volume correctors for the industrial diaphragm gas meters G40 – G100. In the event of higher interest, the mechanical solution could also be implemented here.

We are more than happy to advise you in your selection of the right device types for your specific application.

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The biennial GASEX Conference & Exhibition is the only forum dedicated to the natural gas industry in the Western Pacific Asia region. For the last 17 years, GASEX has been fostering the sustainable development of the region's gas industry by facilitating discussions on current business and technological challenges.

With the theme "Sustaining Integration and Development", the GASEX 2008 Conference and Exhibition aims to bring together the best minds in the gas industry to share and exchange their views, knowledge and expertise.

We at Elster-Instromet would like to take this opportunity to present our range of solutions and services, and to discuss the day-to-day issues relating to gas measurement and regulation with our valuable customers.

Throughout the four days of exhibition, our stand will be home to our specialists from various affiliates, who will gladly make themselves available to all visitors.



We look forward to seeing you at stand A20 in the National Convention Centre, Hanoi, Vietnam.

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