

## Natural Gas Monitoring Applications

### Analysis of H<sub>2</sub>S, Mercaptans and/or THT with MEDOR Exp

#### Context & Challenges

Natural gas used for household consumption typically contains odorant sulfur components for safety reasons. As natural gas is normally odorless, the sulfur components are artificially added. When natural gas is transported between various companies, regions or countries, gas companies have to verify that the sulfur species are present as specified.

For more than 30 years, Chromatotec® has manufactured the energyMEDOR, based on the gas chromatography principles, to measure H<sub>2</sub>S, mercaptans and THT in natural gas. Due to the advantages of the “MEDOR” technology, a new guideline was defined, ASTM D7493-08 (as the Standard Test Method for Online Measurement of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatograph and Electrochemical Detection). The energyMEDOR by Chromatotec® is fully compliant with this guideline.

In most cases and despite the hazards related to natural gas, the analyzers are installed in safe areas where risks are minimized. In this particular instance, Chromatotec® was asked to supply a system to measure H<sub>2</sub>S, mercaptans and THT in a Class 1, div 2, group B, C & D hazardous environment or/and ATEX zone 1 group IIC T4.

Class 1: Flammable gases, vapors or liquids  
Division 2: where ignitable concentrations of flammable gases, vapors or liquids are not likely to exist under normal operating conditions  
Group B, C&D: Ethylene, propane gas group.

#### Chromatotec® Solutions



#### Instrument: Medor Exp

The energyMEDOR, normally manufactured as a 19” rack design, has been re-packaged in a 144L ATEX rated 316 SS enclosure. The system is wall-mounted. A Z- or X-purge is installed and creates a constant positive flow of air inside the enclosure, thus making a positive pressure inside enclosure. The effect of this purge is to prevent toxic fumes from going inside the instrument in case of hazardous leakage.

A device located on the side of the analyzer with visual display activates the analyzer if the out-coming air flow supplied to the instrument is sufficient at minimum 2 Bars (70 psi). To be sure that there is a positive pressure inside the analyzer, a **pressure probe** has been placed inside the instrument and the pressure value is displayed at all times on the monitor.

The temperature inside the enclosure is also monitored and displayed at all times. Additionally, a **temperature probe** is placed in the instrument to correct the effect of the air flow on the chromatographic separation. A type **CSA (US and Canada) or ATEX** certificate is provided with this instrument.

Beside the additional Z- or X-purging, the components and the operation of the instrument is mostly identical to that of our standard energyMEDOR.

An industrial computer is located inside the enclosure and has internal mouse and keyboard available in case local maintenance is required in non-hazardous conditions. The computer can transmit data to a local central room via RS-485 or to an Ethernet connection. In this case, network connection between central controls located 46 meters away can be done via RS-485. Data can be sent by the computer either via 4-20 mA output or Modbus RTU protocol.

**Data acquisition**

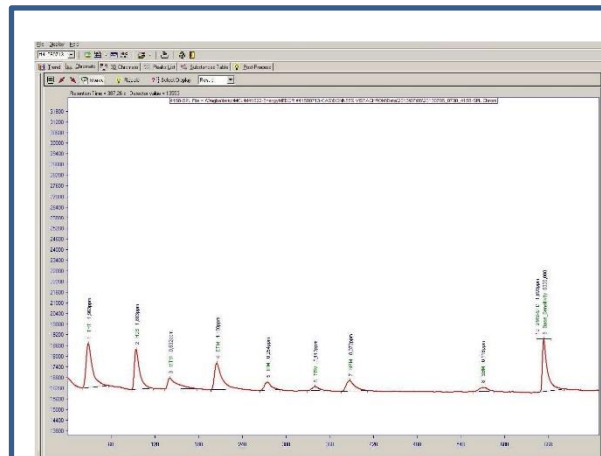
Thanks to an internal or external industrial computer, it is possible to save data for years. Concentrations, TOS calculations, status (calibrations, streams, default analyzer, temperatures) can be sent via Modbus protocol to the control room.

**Calculation Module**

This module has the capacity to perform daily averages (on 24 hours) of selected components. This information can be provided to the Modbus driver as well as the component analysis.

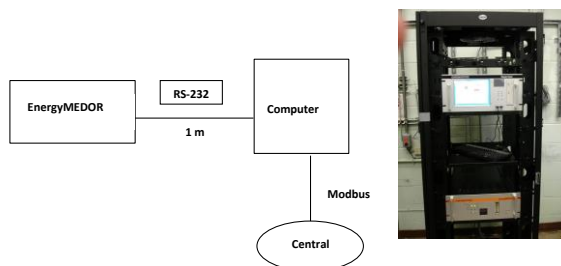
**Conclusion:**

- Speciation with chromatography technique.
- Unique sulfur specific detector technology recognized in natural gas industry which responds directly to H2S, mercaptans and THT.
- Linearity for each sulfur component.
- Robust and compact instrument, minimum maintenance needed.
- Compliant with ASTM D7493-08 guidelines and designed for Class 1 div 2 group B, C&D or ATEX hazardous areas.
- State of the art PC and software solutions (Modbus, calculation modules, Windows embedded based software).
- Embedded calibration device with DMS permeation tube for automatic data validation.
- ppb or ppm analyzer version available.



Chromatogram obtained with Medor Exp

**General purpose set-up**



**Safety set-up**

