

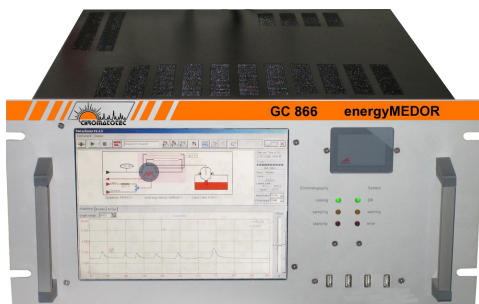
EXPERTS IN GAS ANALYSIS



Metrology and online Gas Chromatography on sulfur compounds in Natural Gas

The need for accurate, reliable and cost effective means for odorant and sulfur measurements in NG pipelines has led to the installation of this cutting edge yet established technology. Understanding the needs of the users and operators and tailoring a system to perform the direct measurement of sulphurs and mercaptan allows for immediate adjustment of your odorant injection rates, and an accurate defensible record of the amount of odorant and naturally occurring sulphurs in NG.

With a simple low cost solution for installation, maintenance and operation combined with online validation of the results the energyMEDOR® gas chromatograph performs in the most stringent application with the lowest cost of ownership on the market.



Presentation and analysis principle of the energyMEDOR®

The energyMEDOR® is the fully automated Gas Chromatograph for sulfur monitoring. With only a need for nitrogen carrier gas and standard electrical power, installation can be made into your current monitoring enclosure or installed in a standalone system. The energyMEDOR® is equipped with two columns, heated in isothermal oven with a preset temperature of 45°C, a 10-ports pneumatic valve,

electrochemical detector and an internal permeation standard or external cylinder to validate your results. The energyMEDOR® automatically samples the NG from the pipeline continuously in low volume, the NG travels through a loop, the loop is injected onto the chromatographic columns where the sulfurs are separated, after the columns the sample is detected on the electrochemical detector without additional conversion or sample manipulation.

Following the detection of the compounds the on-board system processes the data and provides the operator with data in either analog or digital formats. In addition the operator can review all data with the software installed into the energy MEDOR®.

Performance criteria on calibration and validation of results:

The energyMEDOR® has been proven by our partners globally to provide the most accurate and reliable analysis in the industry:

- USA, ASTM standard work, linearity and repeatability of several compounds have been tested.
- Spain, EN ISO 19739 test method for repeatability and linearity in addition.
- France, tests on intercomparison for response factors

The energyMEDOR® NG specific detector is sensitive to sulfur compounds at ppm or ppb levels. The technique results in unsurpassed separation of the sulfur compounds, exceptional stability of the results, combined with the ease of an automatic platform.

The MEDORs are fully automated rugged industrial analyzers that provide an ideal solution for companies and operators looking to increase data capture and maximize efficiency. Our partners validate the energyMEDOR® measurement of sulfur compounds for odorization of natural gas and pipeline integrity monitoring.

EXHIBITIONS 2015 - 2016

- **ACHEMA - GERMANY**, Frankfurt am Main
15-19 June 2015
- **AWMA - USA**, Raleigh
22-25 June 2015
- **EUROANALYSIS - FRANCE**, Bordeaux
6-10 September 2015
- **ISPAC (International Symposium on Polycyclic Aromatic Compounds conference) - FRANCE**, Bordeaux
13-17 September 2015
- **OMCTS - CANADA**, Toronto
14-15 September 2015
- **ADIPEC - UAE**, Abu Dabi
9-12 November 2015
- **IWA ODOUR & AIR EMISSIONS CONFERENCE - FRANCE**, Paris
16-18 November 2015
- **PITTCON - USA**, Atlanta
6-10 March 2016
- **ARAB LAB - UAE**, Dubai
20-23 March 2016

MEDOR®: Reference from USA

By William Jackson, Philadelphia Gas, PA

Philadelphia Gas Works has 2 MEDOR® units that each monitor up to 4 separate Gas streams at two different locations. We are pleased with the MEDOR® unit and its performance. The simplicity of the MEDOR® Instrument by not requiring Hydrogen Gas supply or a high vacuum pump made our purchase choice very easy. With the factory sponsored service in America the use of the MEDOR® System has become fabulous.

The Philadelphia Gas Works serves 550 000 customers.

H2S / TOS / TS analysis in 2 minutes

For many applications, the time of analysis and the number of sulfurs to be analyzed are very important. Therefore new applications have been developed to either decrease the time of analysis or increase the number of compounds without coelution. For the **odorization of gas**, not only odorant species but the total sulfur content must be quantified.

Therefore CHROMATOTEC® has developed

a special instrument to measure H2S and the total amount of sulfur. This analysis can be carried out within 2 minutes.

This instrument can be used to control the process of odorization upstream and downstream.

Furthermore, it is equipped with alarm systems and remote controls which allows operator to follow and control the process.

Sulfurs monitoring at ppb level in hazardous area with MEDOR® Exp analyzer

In 2009, Chromatotec® has launched his first version of MEDOR® Exp cabinet dedicated for **sulfur monitoring in hazardous areas**.

Initially, the MEDOR® analyzer was Class 1 Div 2, group C&D USA certified. It received CSA International recognition on second time.

Chromatotec® has then extended his offer with a full package including MEDOR® and ChromENERGY for Gas Quality control dedicated to Petrochemistry, refineries and Gas storage areas where **ATEX zone 2 Ex II 3G Ex pz IIC T4** is required.

The MEDOR® unit allows to detect sulfurs at trace levels, the ChromENERGY allows to quantify Hydrocarbons C1-C6+ and provides Calorific Power Index value at the same time. Results are obtained at a glance with VISTACHROM software installed on unique embedded computer.

Now Chromatotec® technologies are under process to obtain higher certification level for ATEX and CSA.

The Exp cabinet is protected by continuous flow with an X or Z purge system certified for zone 1 and zone 2 respectively. This purging system includes pressure regulator with a flow restrictor to control the inlet dilution. A flow controller is located at the valve outlet to validate the flow out of the cabinet. The cabinet is pressurized and diluted continuously.

IP 66 class allows the use of the unit in waterproof case environment and reduces the instrument air consumption volume needed for the continuous dilution. H₂S, mercaptans and total sulfur can be analyzed by MEDOR® Exp with only nitrogen used for analysis and integrated calibration device.

One of the main advantages of MEDOR® is that there no additional hazardous area is created in the analyzer as it could be the case with hydrogen or air presence and a flame. The worst case is taken into account to calculate the dilution flow to stay under the explosive condition.

If pressure inside the cabinet is not higher than ambient pressure the power is switched off by the X-purge system. For service there is a by-pass key to open the cabinet without pressure inside.

Due to its new improvements, Chromatotec® provides a full analytical solution for natural gas monitoring in hazardous area.



MEDOR® Exp analyzer

Features & benefits of the MEDOR® Exp system

Electrochemical detection

The use of our sulphur specific electrochemical cell ensures no interference of results. The only gas required by the system is a feed of Nitrogen and instrument air to purge the cabinet.

Internal calibration system

All MEDOR® Exp instruments are supplied with internal calibration by permeation tube. Results are thus automatically validated. No external calibration cylinders are required for operation.

VistaChrom Software

The VistaChrom operating software developed by CHROMATOTEC® offers a user-friendly interface for easy operation and processing of data. Alarms, status reports and results are easily transferred through a range of options including MODBUS and 4-20mA. Automatic calibration and sampling can be easily set-up and modified, directly or remotely as required.

Low maintenance

The MEDOR® Exp is an extremely low maintenance system offering considerable cost savings over the lifetime of the system.

Capillary columns and the Electrochemical detection system have lifetimes in excess of 10 years ensuring users have minimal annual maintenance procedures.

Norms & Certifications of MEDOR® Exp

Conforms to ASTM D7493-08, ISO 6362/2, DIN 51855

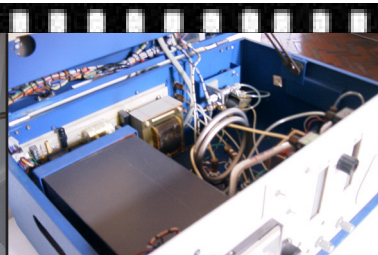
CSA Class 1 Division 2 group C&D



40 years of sulfur compounds monitoring by GC



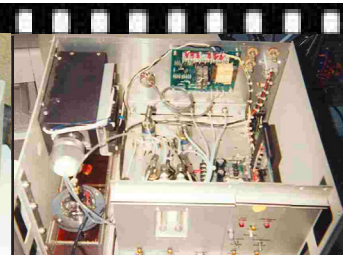
MEDOR 1975



Inside view - MEDOR 1975



MEDOR 8000 - 1985



American MEDOR with permeation tube - 1990



American MEDOR - 1997



American Cabinet 2000



energyMEDOR 4U with its supervisor 5U - 2005



energyMEDOR 5U - 2007



MEDOR EX in Exp Box 2009



MEDOR in Philadelphia, PA - 2009



MEDOR® Exp 2015

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