

ONLINE GAS AND LIQUID ANALYZER EXPERTS

Continuous monitoring of natural gas and permanent gases

Permanent gas analysis covers a wide range of applications in the petrochemical, chemical, and energy industry fields. For example, permanent gases such as O₂, CO₂, N₂, Ar, CH₄ or ethane are common in pure gas manufacturing, refinery gases, natural gas, fuel cell gases, and many other industrial processes.

Automatic identification and quantification of the concentration of these components can be important for the control of manufacturing processes and production quality. Chromatotec® has developed a method for the measurement of C1-C6+ in natural gas (H₂S can be measured as an option).

The system uses N₂ (produced by our Nitroxychrom Nitrogen generator) as its carrier gas and a thermal conductivity detector (TCD). To run the analytical system, only an electric supply is necessary. The analytical columns are manufactured at Chromatotec® and ensure the good and repeatable separation of the analytes.

The system operates in a manner which enables the detection of the analytes, while other possible interferences are not injected in the main column thanks to a timely commutation.

It is available with a custom configuration for safe and hazardous areas: ATEX, IECEx, CSA and CSA international certifications for its application in refineries and petrochemical plants.

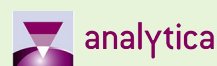


ChromEnergy Analyzer
in rack and wall-mounted box

Tradeshows 2022



Rotterdam (Netherlands)
8 & 9 June 2022
Booth #C2



Munich (Germany)
21 to 24 June 2022
French Pavillon - Hall A3 #A3526.2



Frankfurt am Main (Germany)
22 to 26 August 2022
Hall 11.1, Booth #G86

Analysis of trace-level impurities in hydrogen



To achieve sustainable development goals related to climate change and to improve air quality, the reduction of carbon emissions due to transport and mobility

are fundamental. Transport is currently responsible for over a quarter of greenhouse gas emissions in developed countries and is worldwide the primary source of urban air pollution.

The deployment of hydrogen as a sustainable fuel has the potential to substantially reduce emissions of greenhouse gases and harmful air pollutants. In 2050, hydrogen may account for 32% of the fuel demand in Europe. The fuel cell system in a hydrogen vehicle requires very high-quality hydrogen because trace levels of impurities can adversely affect fuel cell performance and durability. For example, formaldehyde and formic acid at concentrations higher than 200 nmol/mol can cause significant fuel cell performance degradation. To ensure the hydrogen quality, a specification has been developed (ISO 14687), setting upper concentrations of a series of impurities.

To demonstrate the conformity with this standard it is required to validate by measurement that the levels of the impurities are below the required thresholds. Existing analytical methods suitable for measuring ISO 14687 impurities in fuel cell graded hydrogen mainly involve techniques based on gas chromatography. However, a combination of several analytical techniques and methodologies are necessary to perform the full scope of analysis required.

Chromatotec® propose a panel of analytical solutions allowing the best mix between high level of performance and cost-effective solution. Chromatotec® solutions for impurities in hydrogen are compliant with fuel cell energy norm EN17124. They are based on GC-FID and HPLC systems and use different analytical methods for the characterization of hydrogen impurities: Total Hydrocarbon measurement, CO and CO₂ measurement and formaldehyde and formic acid measurement.

This includes the following solutions:

- Humidity in pure H₂ with ou DET H₂O range 0-10 ppm
- chromaTHC for CH₄ and NMTHC range 0-100 ppm
- CO and CO₂ with chromaCO
- Formaldehyde 0,2 ppm with airmoHCHO
- Total halogenated compounds 50 ppb (hydrogen bromide, hydrogen chloride and chlorine)
- Sulfur in hydrogen : H₂S only by H₂S MEDOR form 1 ppb to ppm range (with specific column and heart cut for H₂), Total Sulfur by chromaS 1ppb
- N₂, Ar, He and O₂ with chromaDID for range 0,1 – 10 ppm or higher, or with chromaTCD for range 5-10 000 ppm
- NH₃ by FTUV analyzer for 0 – 10 ppm range

So cost-effective and fully automatic turnkey solutions for the measurement of trace level impurities in hydrogen may be proposed. A combination of several analytical techniques and methodologies are necessary to perform the full scope but it can be done automatically using industrial automatic gas chromatograph systems.

CO₂ quality control for food and beverage industries

using Chromatotec® chromaS-COS and airmoVOC BTEX

Carbon dioxide (CO₂) is a commonly used additive in food and beverage industry. Its fabrication process can lead to the presence of impurities such as Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and sulfur compounds.

Gas Chromatography (GC) is one of the most commonly used techniques for CO₂ quality monitoring to ensure meeting legal requirements. Chromatotec® has developed a GC analytical system for impurities measurement in CO₂.

It consists of a fully independent, highly stable and automatic cabinet including the following modules :

- chromaS-COS for Total Sulfur analysis.
- Speciation of H₂S, mercaptans,



ChromoS-COS

DMS, DMDS, COS, CS₂ and SO₂ by dual Flame Photometric Detector (FPD).

- airmoVOC BTEX for acetaldehyde and BTEX analysis using a Flame Ionization Detector (FID).



airmoVOC BTEX

- Internal calibration system for the validation of the results.

In compliance with the International Society of Beverage Technologists (ISBT) and the Compressed Gas Association of America (CGA) guidelines, Chromatotec® can also provide solutions for O₂, CO, NH₃ and THC (Total Hydrocarbon) monitoring.

Moisture Monitoring in Gaseous Matrices

In 2020, Chromatotec® introduced into its lineup, the DET H₂O Electrolytic Moisture Monitor Hygrometer; available in process or portable versions. These hygrometers, with pressure reducers allow moisture measurement by electrolyzing residual amounts of water (between 0 and 1500 ppmV) contained in gaseous matrices.



The instrument's function is based on the fundamental measuring principle of humidity, Faraday's Law of Electrolysis and does not require calibration. It offers high moisture measurement accuracy thanks to two programmable concentration ranges between 0-10 ppm (v) or 0-1500 ppm (V/p). It also offers a fast response (<10 minutes) with direct on-line connection and no additional sampling equipment required. The system is also very resistant to contamination, even with corrosive gases such as chlorine or H₂S.



A main type of application for this solution is the calibration of the other moisture monitors on the market, such as aluminum oxide sensors requiring validation. But it is also relevant for moisture monitoring of Chlorine gas drier outlets, measurement of moisture in natural gas or in a refinery's catalytic reformer.

The complete sampling system is engineered for the previously-mentioned applications. An ATEX-certified version for Zones 1 & 2 is also available upon request.

Turnkey solutions for biogas quality control

Chromatotec® proposes an autonomous, robust and reliable solution aimed at biogas quality control produced in continuous.

This solution is based on a reference technology, gas chromatography with TCD detector (GC TCD), allowing to obtain precise results without interferences. It integrates a hydrogen generator which provide the carrier gas that the GC-TCD needs, making the instrument completely autonomous since it does not need electricity to operate.

It can analyze from 1 to 32 ways of analysis in automatic with a single system allowing multiple points of control.

The miniaturization and the hardening of this technology offers a compact analyzer that can be installed in an industrial environment with small footprint and low level of maintenance. It can be installed in a 19" rack, in a cabinet or in wall-mounted box with a protection

index from IP54 to IP66. This mounted box can be temperature-regulated in order to ensure optimum performances even in outdoor. An ATEX version until Zone1 allow to install the instrument in hazardous areas.



This solution has already been deployed on household waste methanation sites to monitor levels of CH₄, CO₂ and H₂S for example: this in order to follow in continuous the biogas conformity produced and alert in case the concentration limit is exceeded.

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