Le Bulletin

May 2022

ONLINE GAS AND LIQUID ANALYZER EXPERTS

Turnkey Global Analytical Solutions for Gas and Liquid Analysis: A New Challenge for Instrumentation in the Energy Market

In the previous years the Oil and Gas industry has experienced important evolutions that have changed the needs in terms of analysis and control. Reinforcement in regulations, policies and compliance has led the industry to ask for more tailored applications dedicated to specific-compounds monitoring. Standard instruments are not fitted to answer all these new challenges and the instrumentation market has to be able to propose customized advanced solutions dedicated to unique analysis context.

Constant investment in research and development is then essential for manufacturers and providers to maintain focus on the accuracy of the analysis at low levels and the sustainability of the instruments. Working in collaboration with industrial R&D centers can help to design accurate dedicated solutions relying on new or emerging technologies.

Projects for major chemical and petrochemical industries have successfully been developed in the past two years, based on industrial automatic auto-GC solutions including online analysis and artificial intelligence. This includes for instance the development of transportable ATEX analyzers for monitoring the sulfurizing process of catalytic units used in the oil industry, the production of process GC for VOCs analysis in liquid matrices, GPC-UV analysis through compact liquid analyzer, biogas monitoring by miniGC TCD with integrated carrier gas generators for hazardous industrial areas or micro-portable instruments for VOCs, BTEX or Formaldehyde on-field analysis.

Sulfur compounds monitoring in hazardous areas

Tradeshows 2022

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

Analytica - *Munich (Germany)*
21 to 24 June 2022
French Pavilion - Hall A3 #A3-526.2

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

Detection and quantification of formaldehyde on line

Known for its irritative effects, Formaldehyde originates mainly from anthropic activities, such as wooden-composite material plants, paints, dissolvents, glues and textiles. As an example, car interiors are the most common places where formaldehyde is detected at levels higher than recommended by the World Health Organization. According to the INERIS report (DRC-18-173500-10929A), indoor air quality guide-values are of 30ppb since 2015, and will be of 10ppb from 2023.
Regarding the (UE) 2019/983 directive, the professional exposition limit values for formaldehyde are now of 0,3 ppm during 8 consecutive hours, and of 0,6 ppm during fifteen minutes.

In order to prevent any risks for human beings, manufacturers, builders and industrials started to implement directives and solutions to reduce the exposition to those chemical species. To ensure daily and continuously the efficiency of such recommendations, Chromatotec proposes different solutions in order to quantify formaldehyde in indoor and outdoor air:

- **Continuous and on-line monitoring:** Chromatotec started years ago, the development of a GC FID-based analyzer. Chromatotec's® airmo HCHO is an on-line system which allows the continuous monitoring of formaldehyde and acetaldehyde, directly into processes like solvent distillations or composite materials manufacturing. Provided with hydrogen and nitrogen generators, this analyzer requires only power supply to run 24h a day and 7 days a week. With its pre-concentration trap, the airmo HCHO is able to monitor Formaldehyde, Acetaldehyde and Methanol at low concentrations (0-100ppb), with an excellent linearity and without any interferents. The results are automatically validated thanks to an internal HCHO calibration standard.

- **Portable system for in-field measurements:** With more than two hours autonomy and a detection limit of 1ppb, this compact microfluidic formaldehyde analyzer is the perfect mix between laboratory and continuous monitoring of Formaldehyde emissions. Integrated in a carrying case with battery charger/power supplier, eluents and sampling pipes the system weighs only 6,5 kg. This system is able to analyze DNPH cartridges by extracting aldehydes contained in it.

- **Transportable HPLC system:** Chromatotec® has developed a HPLC system which can be operated in a laboratory or directly in the field. The system, which is equipped with C18 column and UV detector, allows the quantification of aldehydes down to ppt level with very good linearity up to high ppb values. This system is the most sensitive analytical technique but requires the use of solvent and trained people. In addition to this solution, a sampling device with DNPH cartridges offers the possibility to trap Formaldehyde and Acetaldehyde traces in any place, to perform a lab analysis at ultra-trace levels (ppt) or directly on the field with the transportable analytical unit.

Development of a miniature and air-transportable liquid chromatograph with UV detector: Crude oil characterization by GPC-UV

The miniaturization and the strengthening of laboratory-based analytical instruments and methods to the field is a major effort in instrument development. To reach this goal, researchers and companies from various fields have made significant progress within a variety of technologies. For some applications, the transportation of samples (unstable or difficult to ship) is a significant problem. GPC is widely used in the crude oil industry to characterize samples.

Chromatotec has developed a new and transportable GPC-UV that provides accurate analysis of seven samples. The transportable system operates in isocratic elution mode (200 µl/min and 20 bars) with columns heated to 35 °C. The system is standalone, robust and transportable on airplanes since its total weight is less than 20 kg (each suitcase). The liquid consumption for this application is only 200 µl/min. The system is fully controlled by custom electronics and software, which ensures data acquisitions, storage, processing and data transfer (Modbus, Profibus, 4-20 mA).

The transportable system offers the possibility of using different columns with pressure ranging from 10 to 400 bars and flow ranging from 0.50 to 10 ml/min. The temperature of the oven can be set up to 100 °C. In addition, different detectors can be added to the system for other applications.

Chromatotec® has been selected by TOTAL for the design and manufacturing of customized chromatographic analytical solutions.

Portable analyzers and detectors for moisture, BTEX and formaldehyde analysis

Chromatotec has recently integrated portable analyzers for BTEX and Formaldehyde monitoring. These portable instruments offer rapid and accurate measurements with detection limit lower than 1 ppb. Compact, they allow continuous and real-time qualification and quantification of Benzene, Toluene, Ethylbenzene (ETB), Xylene, Acrolein, Phenol and 1.3 Butadiene (for microVOC analyzer) and of Formaldehyde (for microF analyzer).

This range of portable instruments also includes an automatic multitubes air sampler (4 channels) allowing to program sampling sequences with fast implementation in every environment.

microVOC
VOC portable analyzer

4WAYS
4 ways sampling pumps

Previously, Chromatotec had expanded its offer with trace moisture probe to propose complete solutions for measurement of humidity in chlorine (CL2), in pure gases including gases with more than 30% oxygen (O2) or hydrogen (H2), as well as in medical air and gases.

Analyzing and monitoring water and wastewater quality

Historically specialized in gas chromatography, Chromatotec® has launched an analytical system, from liquid chromatography which has already proved its worth: the airmoVOC WMS. This unique and efficient Mcerts certified GC-FID solution measures and analyzes VOCs and BTEX (Benzene, Toluene, Ethylbenzene and Xylene) dissolved in liquid matrices.

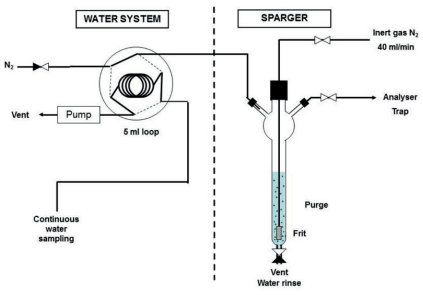
This instrument is today used for multiple applications like the analysis and monitoring of the quality of wastewater in refining processes or the analysis of trace BTEX in source water.

The airmoVOC WMS performs well in the analysis of contaminants in source water. The water may contain chemical species such as Benzene, Toluene, Ethylbenzene and Xylene, as well as other VOCs, including halogens. These compounds can result from various treatment processes, including iron removal.

This iron removing is perform by reaction between iron and ozone, which also reacts with various compounds present in the water, such as Bromides and Chlorides, to form Bromoform and Chloroform.

Subject to regulation, these levels, although minimal, must be followed closely, before and after the process. The airmoVOC WMS can either be adapted to take samples in stagnant water, or with a continuous and controlled flow, as in the example above.

This autonomous airmoVOC WMS is also used in the water markets for the food processing, the pharmaceutical industry, cosmetics and perfumery but also for monitoring drinking water (beverages or source water), surfaces and wastewater as well as other type of food liquids (milk, soda, wine, spirits, etc.) and organics liquids.



Système Purge and Trap

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