

## EXPERTS IN GAS ANALYSIS

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### EXHIBITIONS 2012 / 2013

#### ACHEMA 2012 - GERMANY

Frankfurt am Main  
(18 - 22 June 2012)

#### POLLUTEC 2012 - FRANCE

Lyon Eurexpo  
(27 - 30 November 2012)

#### ARAB LAB 2013 - UAE

Dubai - Convention & Exhibition Centre  
(10 - 13 March 2013)

#### Air Quality and Emissions Show - UK

Telford, England  
(13 - 14 March 2013)

### Total Hydrocarbons : THC & BTEX Discover more about our ChromaTHC

The ChromaTHC is a ppm range **methane and non methane total hydrocarbon (THC)** analyzer which uses **flame ionization detection (FID)**.

It is a continuous online fully automatic gas chromatograph with a cycle time of 5 minutes and an extremely low detection level.

Whether it is used in an **ambient air, emission, industrial hygiene or pure gas applications**, the ChromaTHC consistently delivers accurate, reliable results with unattended operation 24/24.

Furthermore it can be installed together with our **airmoBTX FID** or **airmoVOC C<sub>6</sub>-C<sub>12</sub> FID** to provide an extremely versatile system that can measure total hydrocarbon concentration and also the concentrations of specific **VOCs** of concern such as **Benzene, Toluene and Cyclohexane**.

Large cost savings can be achieved with a combined installation. The ChromaTHC can use the **airmoBTX's** internal computer and both analyzers can share the same hydrogen and pure air supply (supplied by our **Hydroxychom** and **airmoPURE gas generators**).



ChromaTHC  
analyzer

### Pure Gas Analysis

There are different modes of **CO<sub>2</sub> production** frequently used in **foods and beverages** industry.

These various CO<sub>2</sub> production mechanisms induce a variety of **specific impurities** that have to be controlled.

The analytical method mainly used to prove compliance with the specification is **gas chromatography** for these parameters:

Component	Concentration
Acetaldehyde	0,2 ppm v/v max.
Benzene	0,02 ppm v/v max.
Total sulphur ( as S ) *	0,1 ppm v/v max.
* if the total sulphur content exceeds 0,1 ppm v/v as sulphur then the species must be determined separately and the following limits apply :	
Carbonyl Sulphide	0,1 ppm v/v max.
Hydrogen Sulphide	0,1 ppm v/v max.
Sulphur dioxide	1,0 ppm v/v max.

source : *CGA/EIGA limiting characteristics commodity specification for carbon dioxide from "carbon dioxide source certification, quality standards and verification", IGC Doc 70/99/E*

Recently, Chromatotec Group has installed three instruments in a world-wide soft drinks Manufacturer to control the quality of its CO<sub>2</sub> production. The three analyzers, installed in a cabinet, continuously monitor levels of:

- **BTEX compounds (Benzene, Toluene, Xylene)** and **Acetaldehyde** with the **AirmoBTX** analyzer with **FID** detector
- **Volatile Organic Compounds (VOCs)** and **Total Hydrocarbons** with the **Chroma THC** analyzer with **FID** detector
- **Sulfur Compounds** with the **Chroma S** analyzer with **FPD** detector

contained in the CO<sub>2</sub> streams destined to be added to the manufacturer beverages.

Via **VistaCHROM**, the supervision program of Chromatotec instruments, the activation of four alarms has been incorporated into the analysis bay. These alarms alert the Production Department when the compounds detected levels exceed those defined by the regulatory body (International society of Beverage Technologists).

The Alarm 1 concerns Acetaldehyde and Benzene levels in µg/m<sup>3</sup>.  
The Alarm 2 is about Total Sulfur levels in µg/m<sup>3</sup> or in sulfur equivalent.  
The Alarm 3 concerns Total Hydrocarbons level (**THC = CH<sub>4</sub> + NMTHC**) in ppb or in µg/m<sup>3</sup>.  
The Alarm 4 is about levels of **H<sub>2</sub>S** in µg/m<sup>3</sup>.  
Humidity level is also analyzed in this cabinet.

This efficient collaboration is the result of many years of experience between Chromatotec Group and **pure gas** manufacturers worldwide.



Issue – June 2012



Booth G54 - Hall 11.1

### Analysis of Sulfur Compounds in Air

**Problems of odor emissions from local paper plant**

Analysis of **sulfur compounds** in **ambient air** at ppb levels is requested. Client has **SO<sub>2</sub>** analyzer in situ, showing levels of approx 0-10 ppb in general.

The concentration variations of SO<sub>2</sub> for our analyzer and the current system followed the same trend throughout the 10 days period. However, our **TRS Medor** has a much higher response to SO<sub>2</sub> which is seen in the higher concentration values obtained.



GC PROCESS  
Cabinet

Unlike the competitor, our TRS Medor offers measurement & speciation of other sulfur compounds: In this instance:

<b>Methyl-mercaptan</b>	<b>(Me-SH)</b>
<b>Ethyl-mercaptan</b>	<b>(Et-SH)</b>
<b>Hydrogen sulphide</b>	<b>(H<sub>2</sub>S)</b>
<b>Di-methylsulphide</b>	<b>(DMS)</b>
<b>Di-methyl di-sulphide</b>	<b>(DMDS)</b>

From the results obtained, we have found that not only SO<sub>2</sub> was present, but also other harmful Sulfur species which are causing the high odor levels in the area.

### TRSMEDOR: integration in an industrial process

The **recycling and valuation of wastes** is a major challenge for the conservation of the **environment**. **Chromatotec** currently works with the research center of a large French industrial group to add an analyzer in their **composting process**.

The system includes a supervisor, 6-stream multiplexer and a cabinet of analysis with a TRSMEDOR, an analyzer for **total hydrocarbons** and an analyzer for **NH<sub>3</sub> (ammonia)**.

The **TRSMEDOR** along with the **industrial system** enables follow-up of concentrations of **sulfur compounds** like **DMDS, H<sub>2</sub>S, Methyl-SH** and **DMS** from **10 ppb to 20 ppm**.



Analysis cabinet for  
water cleaning plant

## Certification of in situ gas chromatographs measuring Benzene in compliance with EN 14662-3 under UK MCERTS scheme



MCERTS scheme under Environment Agency and SIRA **certification** service was chosen with NPL laboratory to operate the required tests. The choice criteria is almost the **ISO 17025** accreditation that is the assurance of European acknowledgement. The MCERTS Scheme certifies that the **CAMS (Continuous Ambient air Monitoring System)** of a manufacturer complies with the performance criteria of **EN 14662-part 3 (Ambient Air Quality)** Standard method for the measurement of **Benzene concentration** - automated pumped sampling with in situ gas chromatography.

The substance tested is Benzene but the number of substances tested has been increased in reference to the **31 VOC** on the European list. The measurement range is between  $5 \mu\text{g}/\text{m}^3$  (and 1/10 of this limit value for several tests) and  $45 \mu\text{g}/\text{m}^3$ .

Chromatotec has decided to certify 2 types of analysers at same time which increases the challenge of the certification because one single sample or standard cylinder is analysed by 4 instruments at same time.

- AirToxic (**PID detector**) for Benzene **Toluène, Ethylbenzene, m&p-Xylene, o-Xylene**
- AirmoVOC  $\text{C}_6\text{C}_{12}$  (**FID detector**) for 12 VOC from European VOC list ranging from  $\text{C}_6$  to  $\text{C}_{12}$

These CAMS are completely autonomous and automatics and are driven by an internal PC.

The price of such certification is a significative investment. It is necessary to manufacture two of each type of instrument and to organise preliminary tests, commissioning at the accredited laboratory. Six months are necessary to perform all the tests.

Even if it is a big investment, Instrument **certification** is very beneficial technically and commercially to continue to improve instrument quality in term of **metrology** and trueness. This certification allows validation of Chromatotec international experience and allows to improve current trueness from  $\pm 8\%$  to  $\pm 5\%$ .



**There are eleven criteria for lab tests. All of them have been successful met as certify the NPL letter here above**

1. Lack of fit
2. Repeatability at  $0,5 \mu\text{g}/\text{m}^3$
3. Repeatability at limit value
4. Influence of the interference of ozone
5. Influence of the interference from the sum of possible interfering organic compounds at span value
6. Influence of interference from relative humidity
7. Influence of surrounding temperature at span value
8. Influence of ambient pressure
9. Influence of voltage
10. Short term drift over 24 hours at span value
11. Carry over



Mobile Van in US EPA

## Water quality monitoring: the airmoPURGE

Chromatotec currently develops a new option for this market: the "purge" for identification and measurement of purgeable **volatile organic compounds (VOC)** in air and water. This solution is in compliance with **502.2 method** of the **US Environmental Protection Agency**.

The application fields are **VOC in environment** (raw source water, river water, seawater and rain water) and **VOC in potable water** (finished drinking water and bottled water).

### Chromatotec airmoPURGE.

This instrument extracts ("purge"), concentrates ("trap"), detects and quantifies VOCs after **speciation** thanks to the column. The airmoPURGE solution is installed in a 33U cabinet and analyses 21 compounds from  $\text{C}_6$  to  $\text{C}_{12}$ . The linear range is  $0.5$  to  $20 \mu\text{g}/\text{l}$  and the method detection limit for BTEX is  $0.05 \mu\text{g}/\text{l}$ . Data are stored on hard disk of the integrated computer thanks to the analyzer functioning software and the presentation of the results "Vistachrom". The oven and the permeation tube allow **auto-calibration** of the analyzer in continuous. Chromatotec complete solution includes airmoPURE (zero air generator), Nitroxichrom (nitrogen generator), Hydroxichrom (hydrogen generator), an airmoCAL with dilution option, an airmoVOC  $\text{C}_6\text{-C}_{12}$  and the purge system for finished drinking water (a sampling system is needed for non filtered water).



Purge & Trap cabinet

## MEDOR EX

Automated online analyzer, dedicated to continuous analysis and monitoring of sulfur compounds.

**Ex specification:** Class 1, Div.2, group C&D

**Sample:** 50-250 $\mu\text{l}$  loop injection

**Analytical Range:** 0-10 min. to 0-1000 max. (ppm or ppb)  
(Manufactured as to user specifications)

**Calibration:** Automatic, scheduled calibration by internal DMS permeation tube as standard

**Carrier Gas:** Dry air or  $\text{N}_2$

### Detection Limit:

* energyMEDORppm:	
$\text{H}_2\text{S}$ :	0.1 ppm (0.14 $\text{mg}/\text{m}^3$ )
DMS:	0.1 ppm (0.26 $\text{mg}/\text{m}^3$ )
* energyMEDORppb:	
$\text{H}_2\text{S}$ :	5.0 ppb (7.09 $\mu\text{g}/\text{m}^3$ )
DMS:	2.0 ppb (5.17 $\mu\text{g}/\text{m}^3$ )

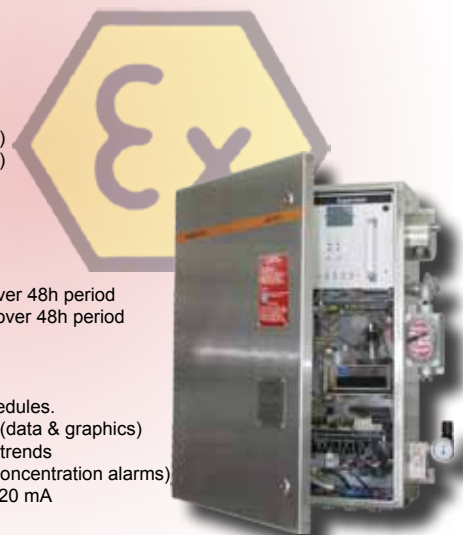
### Accuracy & Stability:

RSD < 3.0% on Concentration over 48h period  
RSD < 0.6% on Retention Time over 48h period

### Vistachrom Software:

Real-time visual display of chromatograms.  
User definable sampling and calibration schedules.  
Storage of > 10,000 results and calibrations (data & graphics)  
Full management of results: daily averages, trends  
Set up and control of alarm limits (high/low concentration alarms)  
Data transfer through MODBUS / MGS1 / 4-20 mA

**Certifications:** ASTM D7493-08  
ISO 6326/2  
DIN 51855/7



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