

Online Analytical Solutions Experts



# Chromatotec Sales Meeting

*France, Saint-Antoine, July 5 to 7*

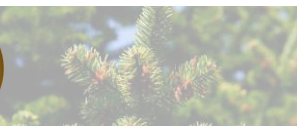
# micro-VOC

Workshop

Industrial  
applications



Ambient  
Air



Oil & Gas



Water /  
Liquid samples



Odor



Process



# Summary

- ▶ Main characteristics
- ▶ Principle
- ▶ Advantages
- ▶ Consumables
- ▶ Performances
- ▶ Launching and using
  - ▶ Set-up
  - ▶ Analysis
  - ▶ Results
  - ▶ Calibration
  - ▶ Tests/maintenance
  - ▶ Useful spare parts



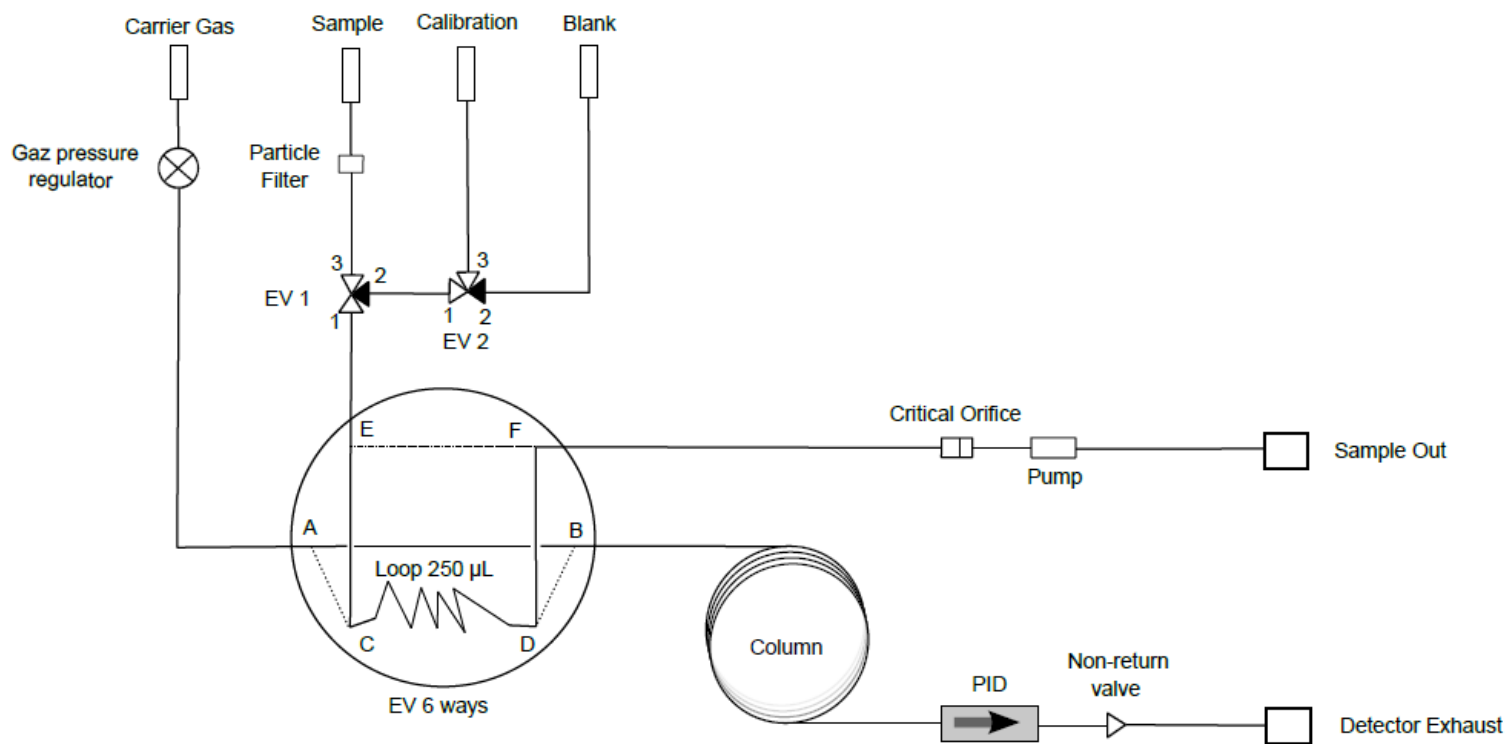
# I. Main characteristics

Dimension	32 cm × 28 cm × 15 cm
Weight	6,0kg
Limit of detection	1ppb<lod<5pbb (BTEX)
Linearity range	0 - 1000 ppb
Trapping type	Sampling loop
Carrier gas	N <sub>2</sub>
Detection type	Mini PID lamp
Run time	10 minutes

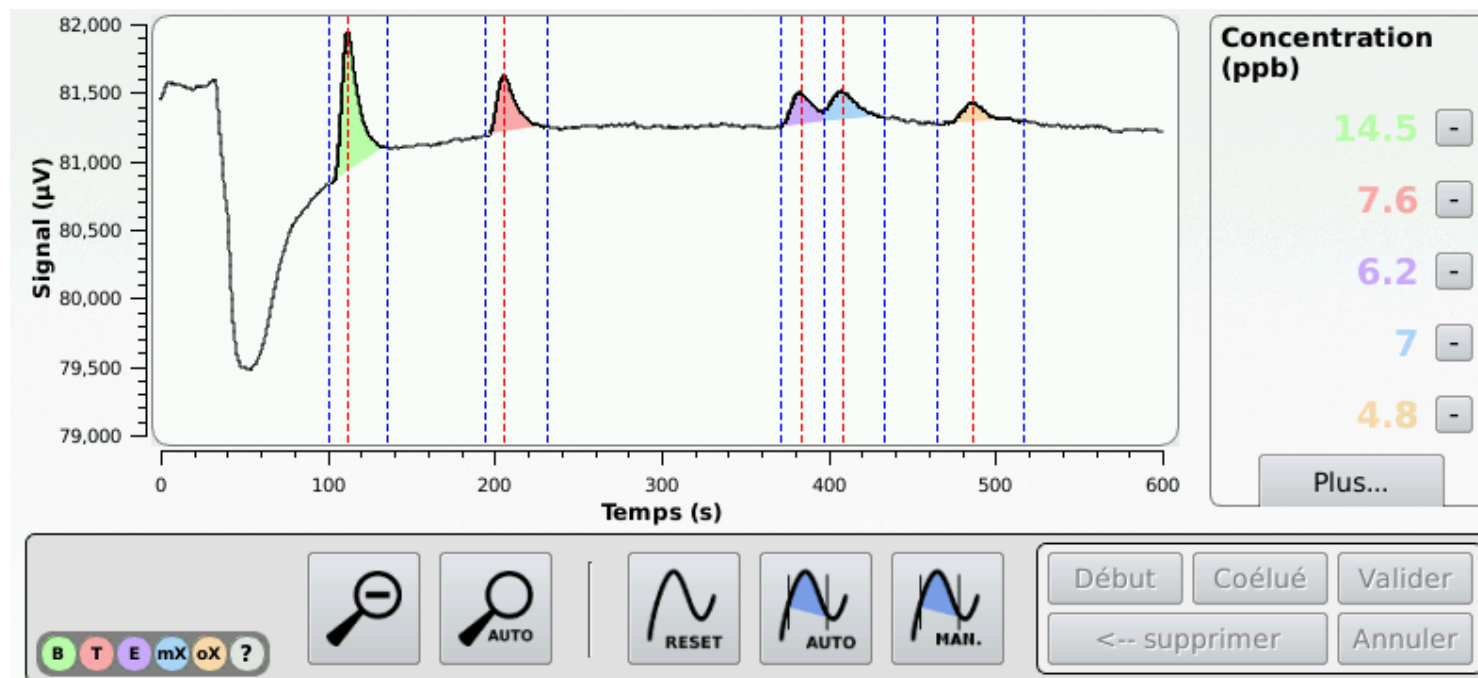
# II. Principle Scheme

## Micro BTEX $\mu$ Btex

EV 6 ways	Pneumatic drawing
OFF	_____
ON	-----



## II. Typical Chromatogram



### Test parameters :

- **Column temperature:** 58°C
- **Sampling:** 300 sec
- **Analyse:** 600 sec
- **Pump speed:** 55%cm
- **Carrier gas pressure:** 4,00 bar

The **intensity of the signal** is **proportional to the concentration** of BTEX

# III. Advantages

## Advantages

### **-User friendly**

Compact size and light weight  
Deployment in less than 5 minutes  
Powered by either plug-in or battery  
Minimal carrier gas consumption  
Rapid calibration with gaseous BTEX mixture or only toluene  
Compatibility with canisters and FLEC® System

### **-Rapid & accurate measurements**

Short analysis time: 10 minutes  
Detection limit lower than 1 ppb for benzene

### **-Analysis programming, monitoring & data logging**

Color touch screen with standard/expert user modes  
Method programming capability  
Results in near real-time  
Data logging for quality control

### **-Issued from French academic research**

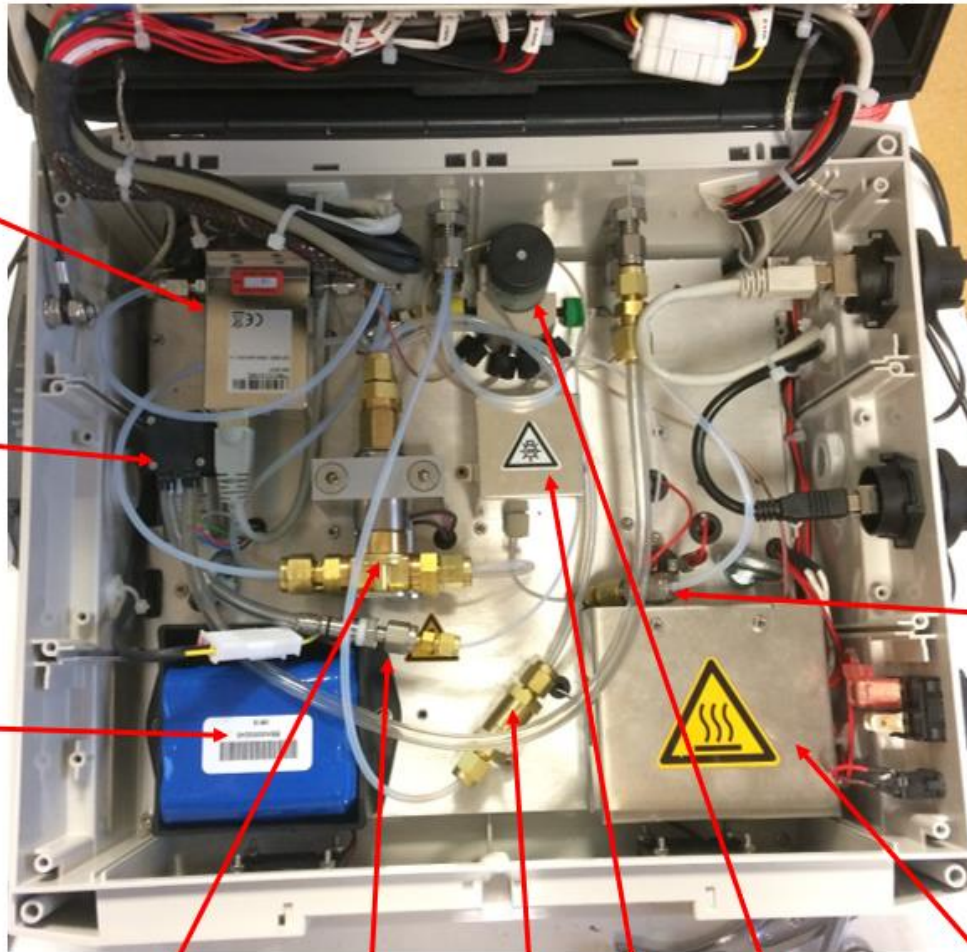
Innovation from CNRS & Strasbourg University  
Patented microfluidic device  
Supported by EU and innovation programs



## IV. Main components

Legend:

- 1: Mass flow controller
- 2: Sampling pump
- 3: Battery
- 4: 3 way solenoid valve (x2)
- 5: Critical orifice
- 6: Particle filter
- 7: PID lamp
- 8: 6 way valve
- 9: Chromatographic column
- 10: Double check valve





# V. Performance

**Detection range :** 0-1000 ppb

**Detection limit :**

- ▶ Benzene & Toluene: ~ 1 ppb
- ▶ Ethylbenzene & m+p-Xylenes: ~ 2 ppb (with default settings)
- ▶ o-Xylene: ~ 4 ppb

**Response time :** 10 min

**Temporal resolution :** 0,1 seconds

**Conditions :**

Gas T°: 5 - 40 °C;

Gas Relative humidity : 20 - 80%

Atmospheric pressure

Altitude max : 2000m

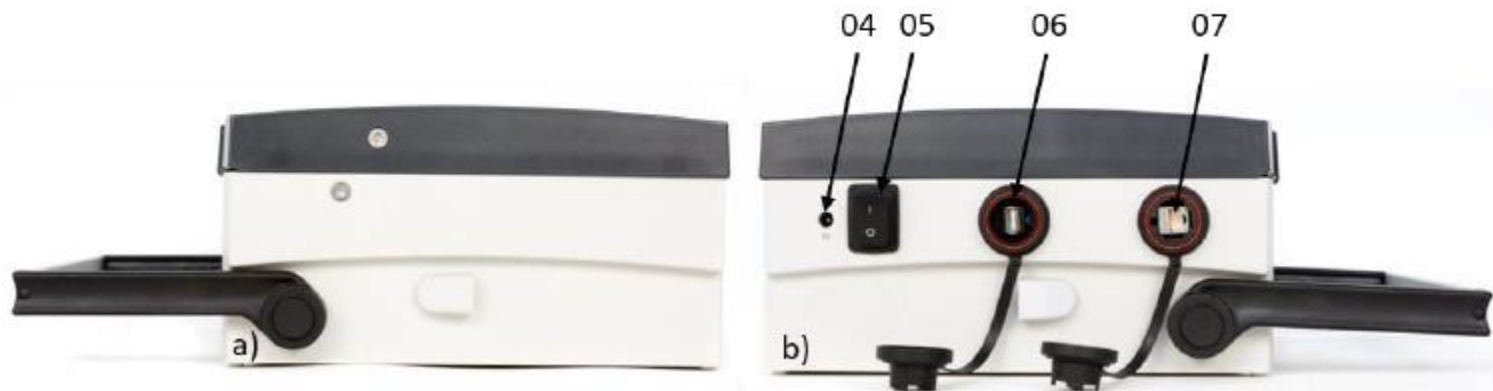
**Calibration:** Gaseous BTEX mixture or Gaseous Toluene

## VI. Launching and using the device a) Set-up



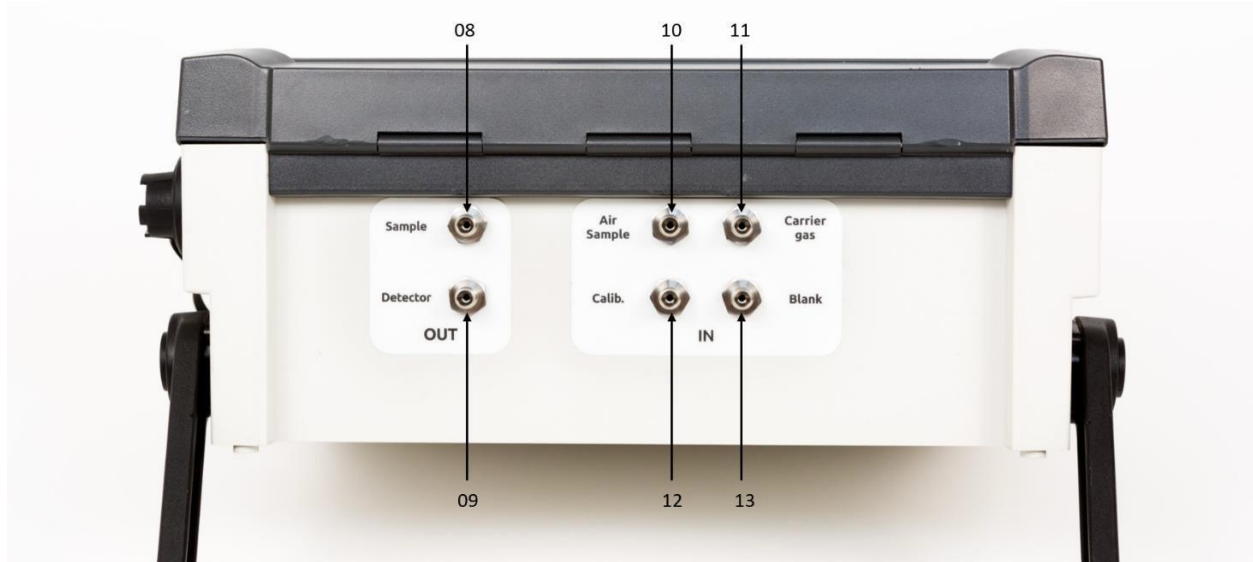
Designation	Component	Description
01	LED state: Default	Red LED OFF: no default Red LED ON: Technical default
02	LED state: Power	Green LED OFF: Device OFF Green LED ON: Device running Green LED flashing: Standby mode
03	Touchpad	Report to userguide §6

## VI. a) Set-up



Designation	Component	Description
04	Power supply	Report to userguide §6
05	ON/OFF switch	
06	USB port	Report to userguide §7,7
07	Ehternet port	

## VI. a) Set-up

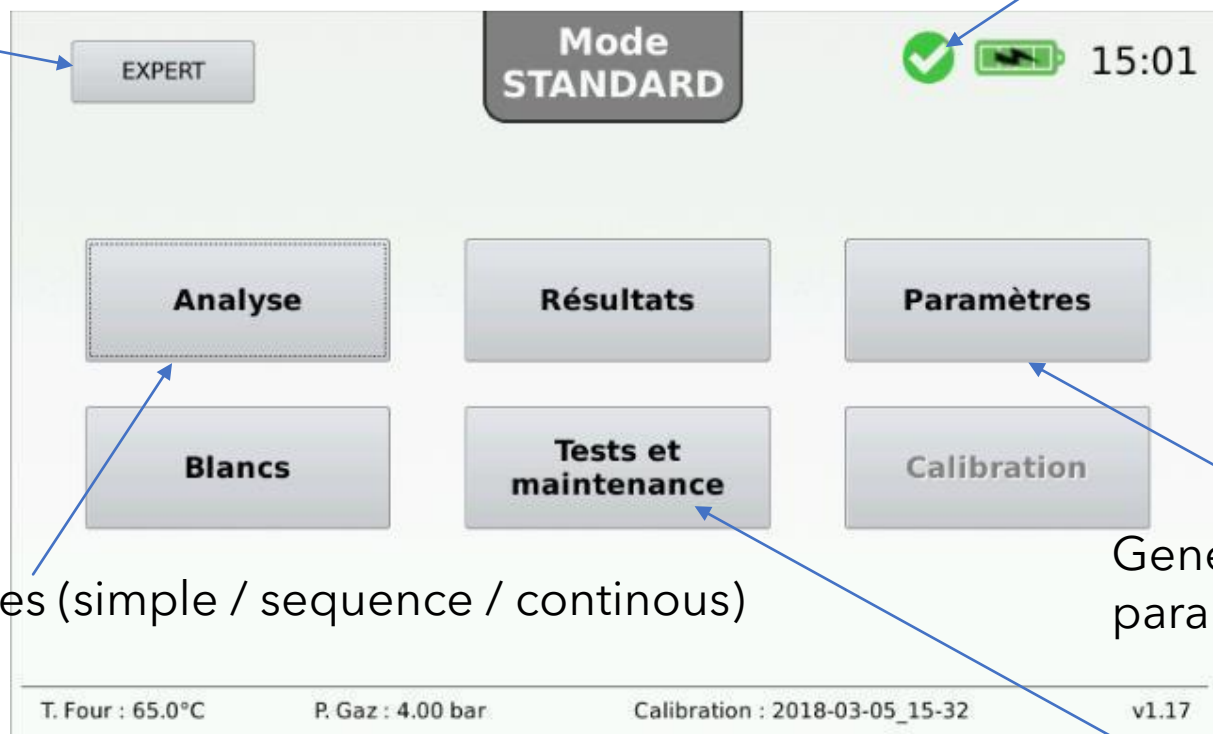


Designation	Component	Description
08	Sample gas outlet	Report to userguide \$5
09	Detector gas outlet	
10	Air sample inlet	
11	Carrier gas inlet	
12	Calibration gas inlet	
13	Blank gas inlet	

## VI. b) Analysis

User mode  
and expert  
mode

Stabilisation



Analysis acces (simple / sequence / continous)

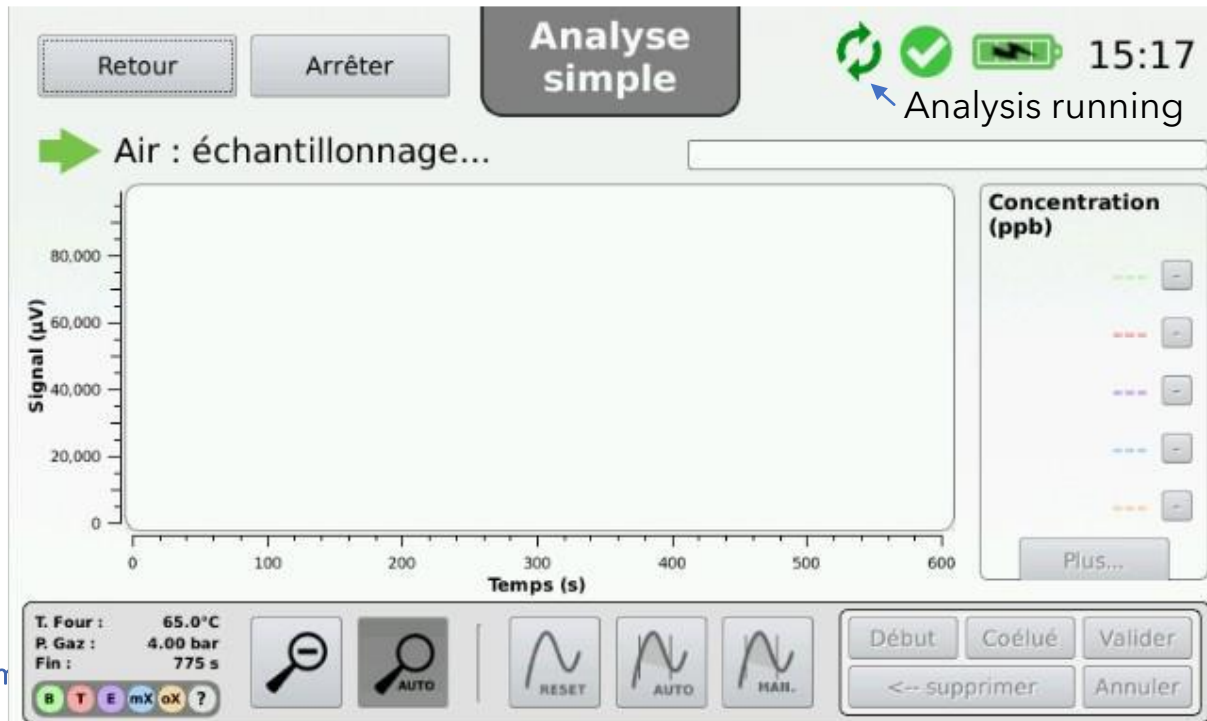
General & analytical  
parameters

Maintenance gateway

## VI. b) Analysis

Before a run, check that the analyser is calibrated (minimum every months)

- ▶ 5/10 minutes required before first analysis (oven stabilisation ...)
- ▶ Each chromatogram is date & time-stamped
- ▶ Continuous access to sequence & analysis monitoring
- ▶ Main steps: stabilisation / sampling / analysis / results



## VI. b) Analysis

Retour

✓ 15:16

Simple Continue Séquence

Début : ☒ Maintenant

8 Mar 2018 15:17:29

☐ Délai entre analyses : 1 min

Nombre d'analyses : 2

☐ Insérer des blancs

Fréquence : 1 acq

☐ Commencer par un blanc

Nom de la série :

Commentaires :

Fin de l'analyse le 08/03/18 à 15:39:33

Retour

✓ 16:04

Simple Continue Séquence

Début : ☒ Maintenant

22 Feb 2017 16:05:00

Nom du fichier :



Commentaires :

Lancer



## VI. b) Analysis

Retour

 15:24

SimpleContinueSéquence

	Type	Date	Heure
1	Acquisition	2018-03-08	15:24:18
2	Blanc	2018-03-08	15:45:00

☐ Acquisition  
☒ Blanc

8 Mar 201815:45:00

AjouterSupprimerSupprimer tout

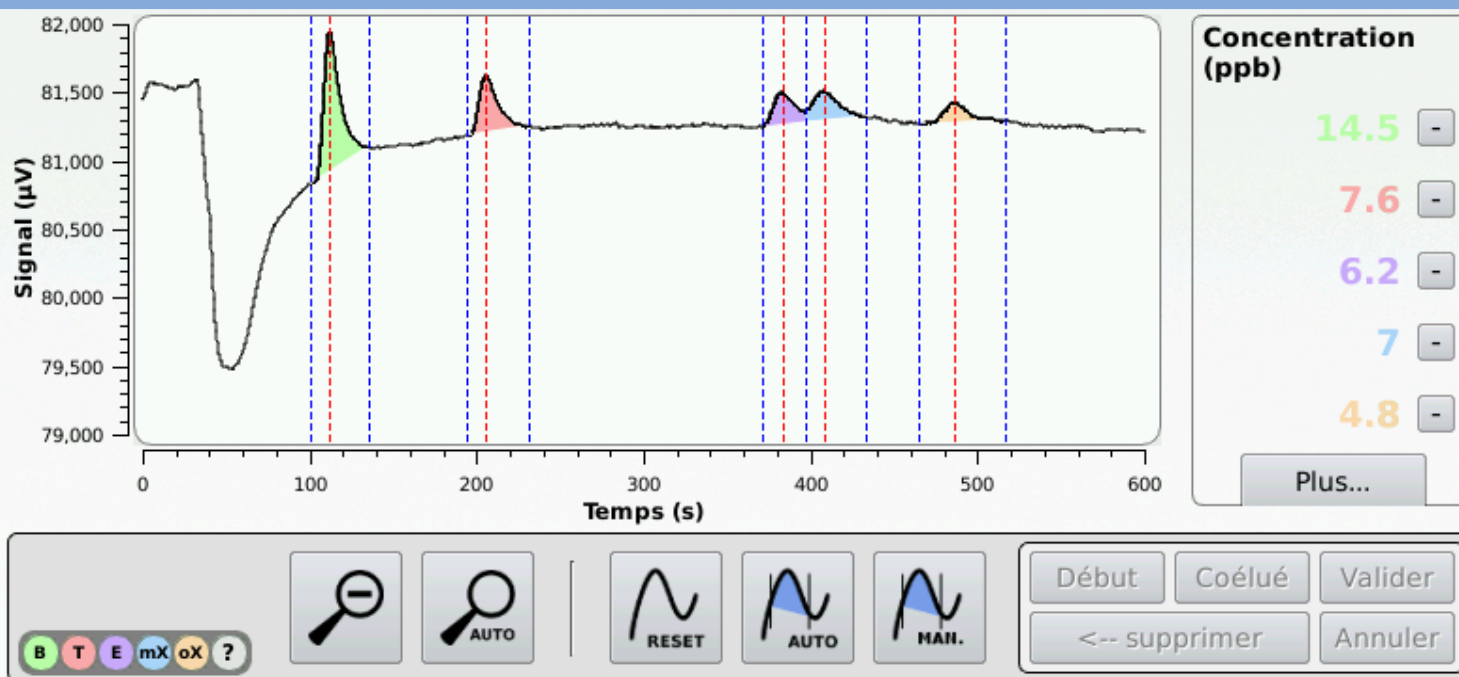
Nom de la séquence :

Commentaires :

EnregistrerCharger

Lancer

# VI. c) Results



- ▶ BTEX Profile (~5/10ppb)
- ▶ Direct visualisation
- ▶ Exportation as excel file (via USB key)

Retour Visualiser **Résultats détaillés** 17:4

Nom du fichier : 22-03-02\_17-42.csv

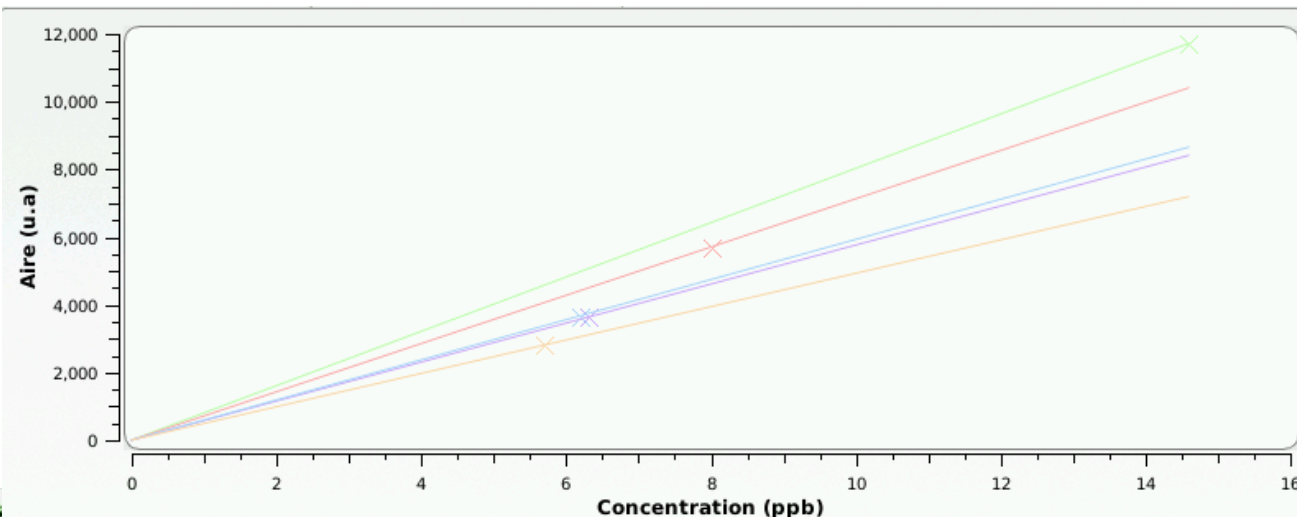
Date de calibration : 2022-03-02\_16-34

T. rétention (s)	Composé	Concentration (ppb)	Aire	Intensité
111.7	benzene	14.5	11658	1033.6
205.3	toluene	7.6	5428.7	423.4
382.9	ethylbenzene	6.2	3569.9	238.4
407.8	mpxylene	7	4110.3	221.8
485.75	oxylene	4.8	2354.9	148.2

## VI. d) Calibration

1. Connect calibration gas mixture to calibration port
2. Program and launch

Multipoints available!



Type d'échantillon : Mélange étalon de BTEX

Référence benzène : 30.0 ppb

Référence toluène : 30.0 ppb

Référence ethylbenzène : 30.0 ppb

Référence (m+p)-xylènes : 30.0 ppb

Référence o-xylène : 30.0 ppb

Retour Suivant

B T E mX oX ?  
22-03-02\_16-16\_synthesis.csv



Informations



Visualisation

Retour

# VI. e) Tests/Maintenance

[Retour](#)

**Tests et maintenance**

 15:51

Tests

Maintenance

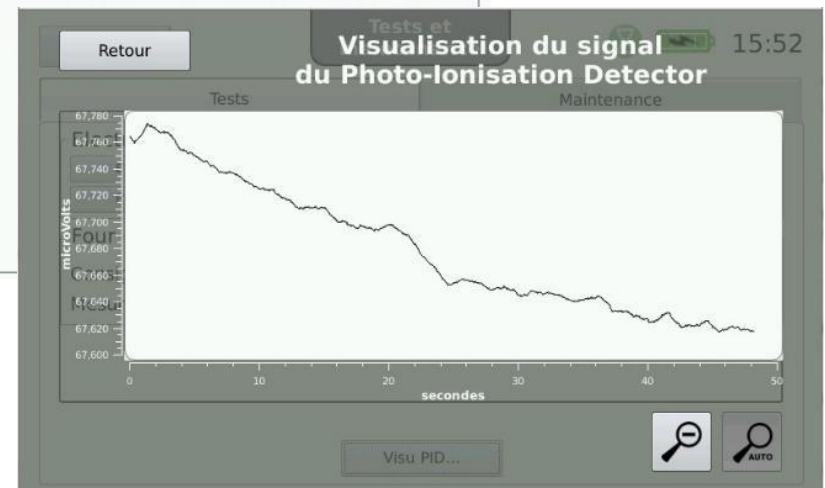
**Electrovannes**  
EV3-1 : OFF  
EV3-2 : OFF  
EV6-1 : OFF

**Four**  
Consigne : 58 °C  
Mesure : 57.1°C

**Pompe**  
Consigne : 60 %  
Absence de rotation OFF

**RDP**  
Consigne : 4.00 bar  
Mesure : 4.00 bar ON

[Visu PID...](#)



## VI. e) Tests/Maintenance



Tests	Maintenance
<b>Colonne</b>	<b>Lampe PID</b>
Conditionnement <input type="button" value="OFF"/>	Utilisation : 1895 h <input type="button" value="RAZ"/>
Température 200 <input type="button" value="▲"/> <input type="button" value="▼"/> °C	Nettoyage : 1895 h <input type="button" value="RAZ"/>
Durée 60 <input type="button" value="▲"/> <input type="button" value="▼"/> min	<b>FAP</b>
Utilisation : 1895 h <input type="button" value="RAZ"/>	Utilisation : 58 h <input type="button" value="RAZ"/>
<b>Défauts</b>	
LDB-I LDB-H CAL FOUR PMP PID EV3 EV6 RDP	


- ▶ Main consumable clocks
- ▶ Column conditioning tool
- ▶ General defaults (LDB-I...)



# VI. f) Method

- **General settings**

Retour   17:22

Général	Analyse	Détection	Intég. auto
Langue du système : <input checked="" type="radio"/> FR <input type="radio"/> EN			
Unité de température : <input checked="" type="radio"/> °C <input type="radio"/> °F			
Unité de concentration : <input checked="" type="radio"/> ppb <input type="radio"/> µg/m3			
Pression gaz vecteur veille : 2.00 bar			
Extinction de l'écran : 10 min			
Mise en veille : 30 min			
Luminosité : 			

- **Analytical conditions**

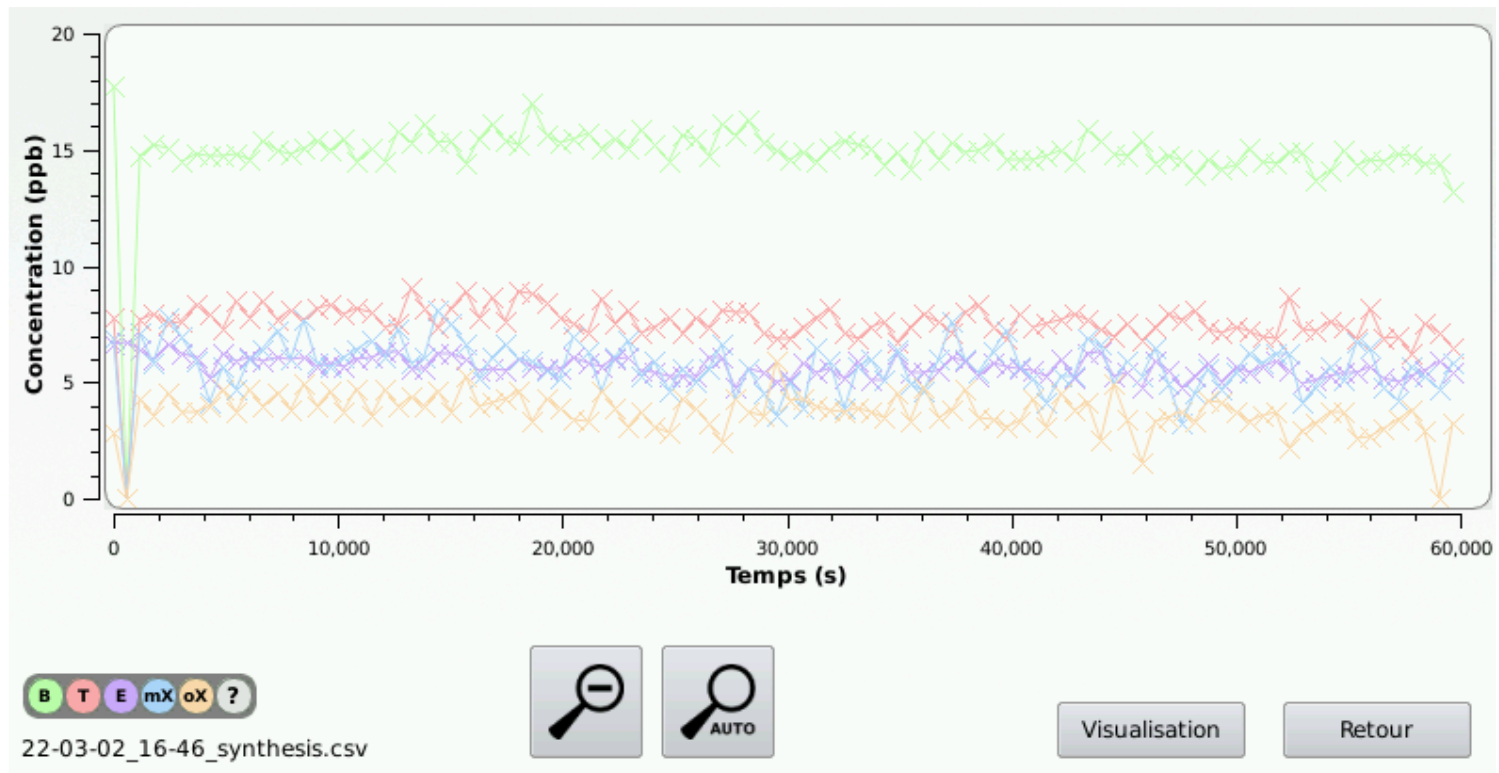
Général	Analyse	Détection	Intég. auto
Températures			
Colonne 58 °C			
Durées			
Prélèvement 300 sec		Injection 20 sec	
Analyse 600 sec			
Autres			
Vitesse pompe 55 %		Pression gaz vecteur 4.00 bar	

## VI. g) Substances table

Général	Analyse	Détection	Intég. auto
Temps de rétention			
Benzène :	<input type="text" value="109"/>	<input type="button" value="▲"/> <input type="button" value="▼"/>	sec
Toluène :	<input type="text" value="202"/>	<input type="button" value="▲"/> <input type="button" value="▼"/>	sec
Ethylbenzène :	<input type="text" value="377"/>	<input type="button" value="▲"/> <input type="button" value="▼"/>	sec
(M+P)-xylènes :	<input type="text" value="404"/>	<input type="button" value="▲"/> <input type="button" value="▼"/>	sec
O-xylène :	<input type="text" value="479"/>	<input type="button" value="▲"/> <input type="button" value="▼"/>	sec
Tolérance :	<input type="text" value="10"/>	<input type="button" value="▲"/> <input type="button" value="▼"/>	sec



# VI. h) Synthesis



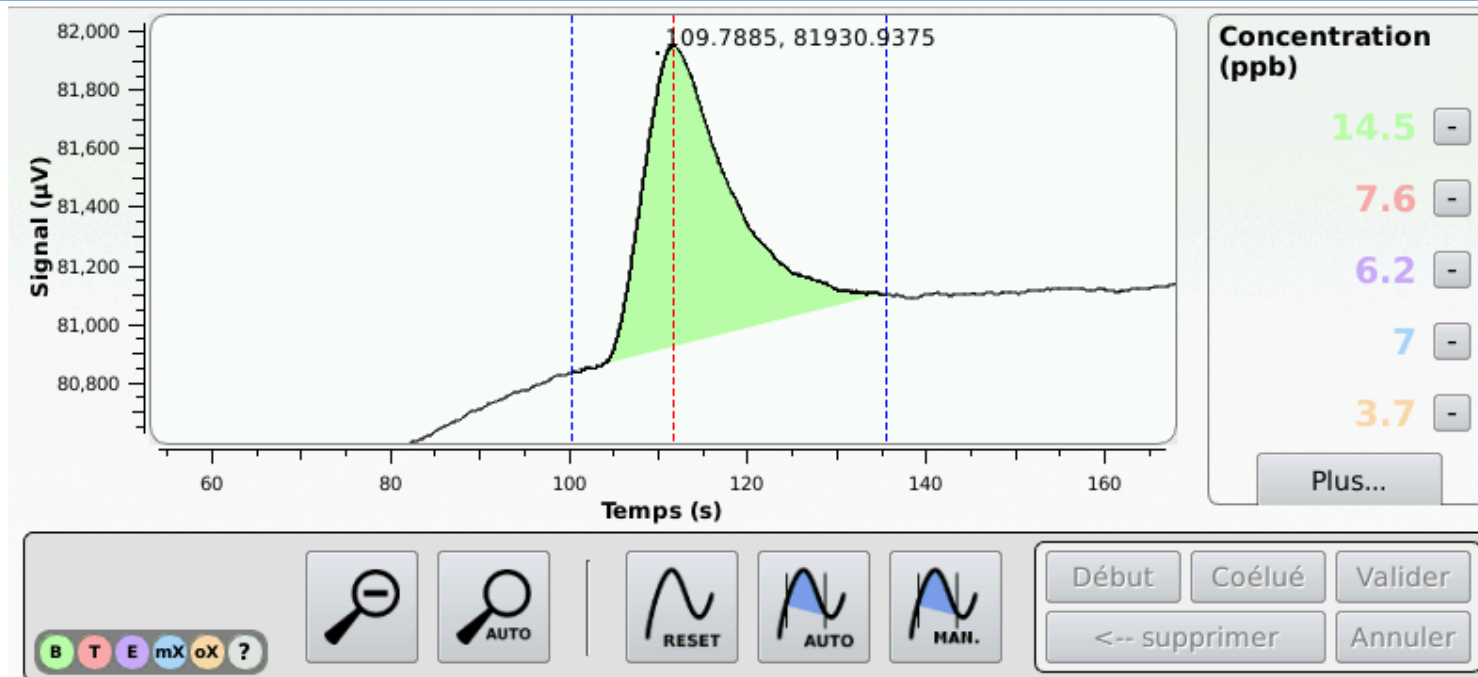
CSV



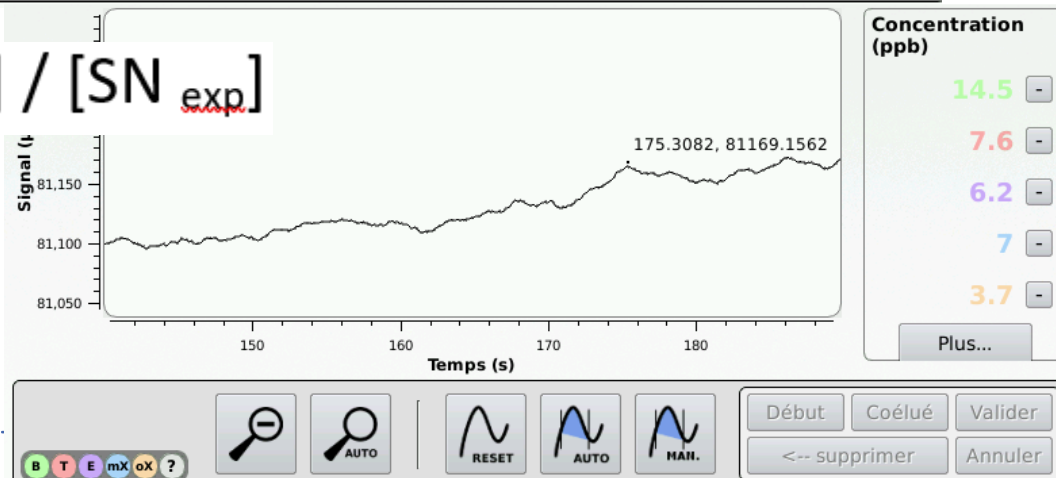
23/03/2022						
Date de calibration	2021-11-08_10-38					
Coefficient de calibration benzene	4052,27					
Offset de calibration benzene	NULL					
Coefficient de calibration toluene	1934,32					
Offset de calibration toluene	NULL					
Coefficient de calibration ethylbenzene	1884,54					
Offset de calibration ethylbenzene	NULL					
Coefficient de calibration (m+p)-xylene	2648,25					
Offset de calibration (m+p)-xylene	NULL					
Coefficient de calibration oxylene	1125,56					
Offset de calibration oxylene	NULL					
		21-11-10_20-45_				
		Aire (ua)	Concentration (ppb)	Temps de retention (s)	Intensite du pic (ua)	
	benzene	2007,9	0,5	118,95	205	
	toluene	3641,7	1,9	222,45	303,5	
		21-11-12_12-19_				
	benzene	2214,1	0,5	122,9	264,5	
	toluene	11292,8	5,8	225,35	1398,3	

Chromatotec Sales Meeting, France, 5-7 July 2022

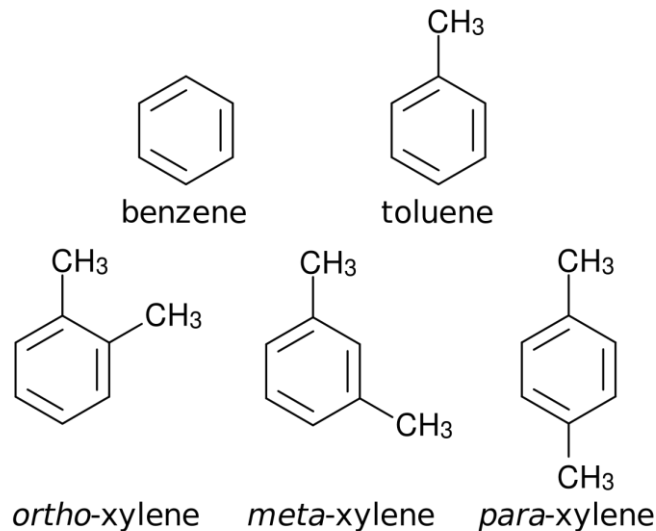
# VI. h) Limit Of Detection



$$\text{LoD (ppb)} = [C_{\text{exp}} \times \text{SN}_3] / [\text{SN}_{\text{exp}}]$$

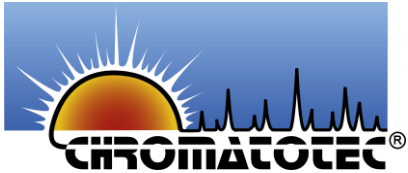


Benzene  
Toluene  
Ethylbenzene  
Xylenes  
Phenol  
Acrolein  
1.3 Butadiene



## Applications

Public building occupational exposure verification  
Industrial hygiene measurement  
Chamber test studies  
Material emissions quantification  
Building management  
Concentration level continuous monitoring



## Online Analytical Solutions Experts



**Thanks for your attention**