

*Online Analytical Solutions Experts*

# microVOC

BTEX or other VOCs applications



# Summary

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



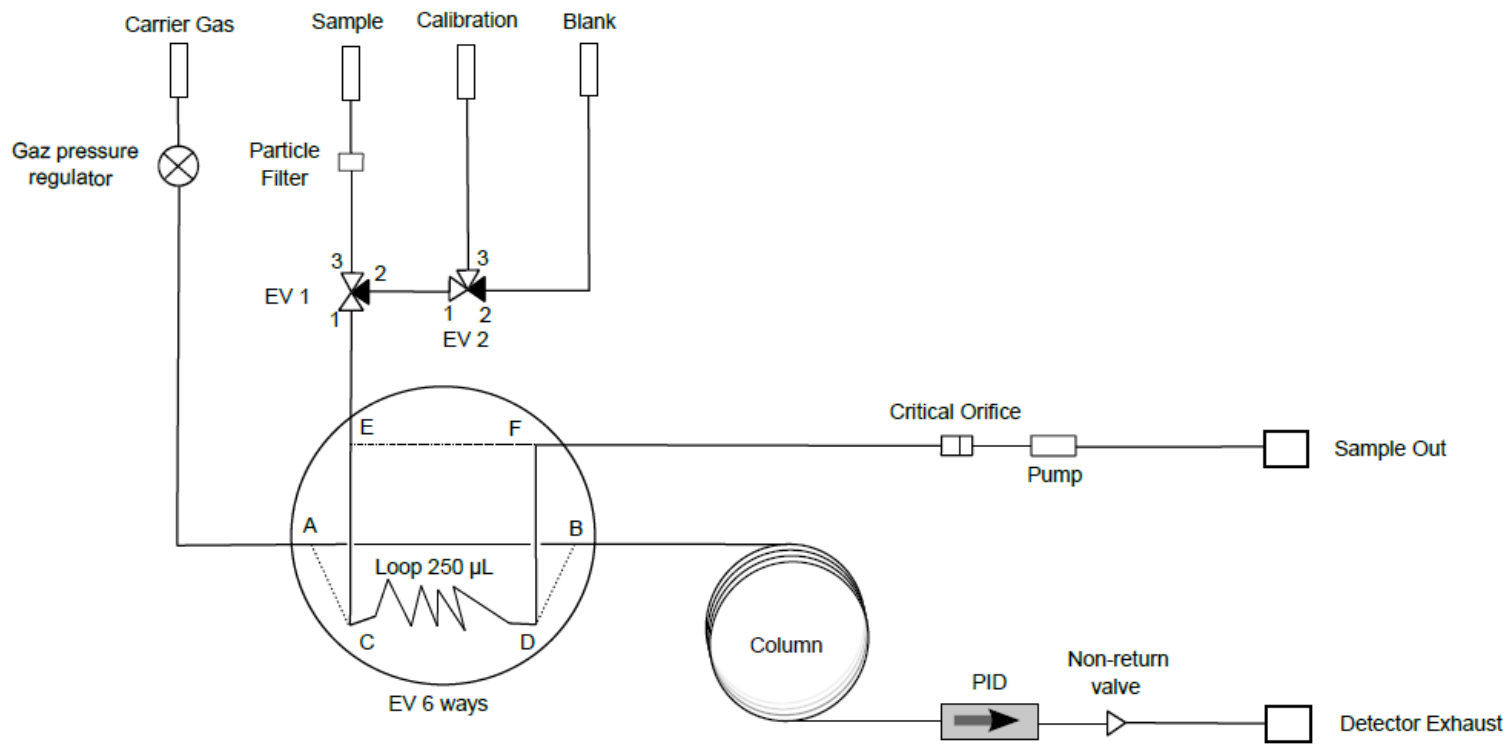
# I. Main characteristics

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

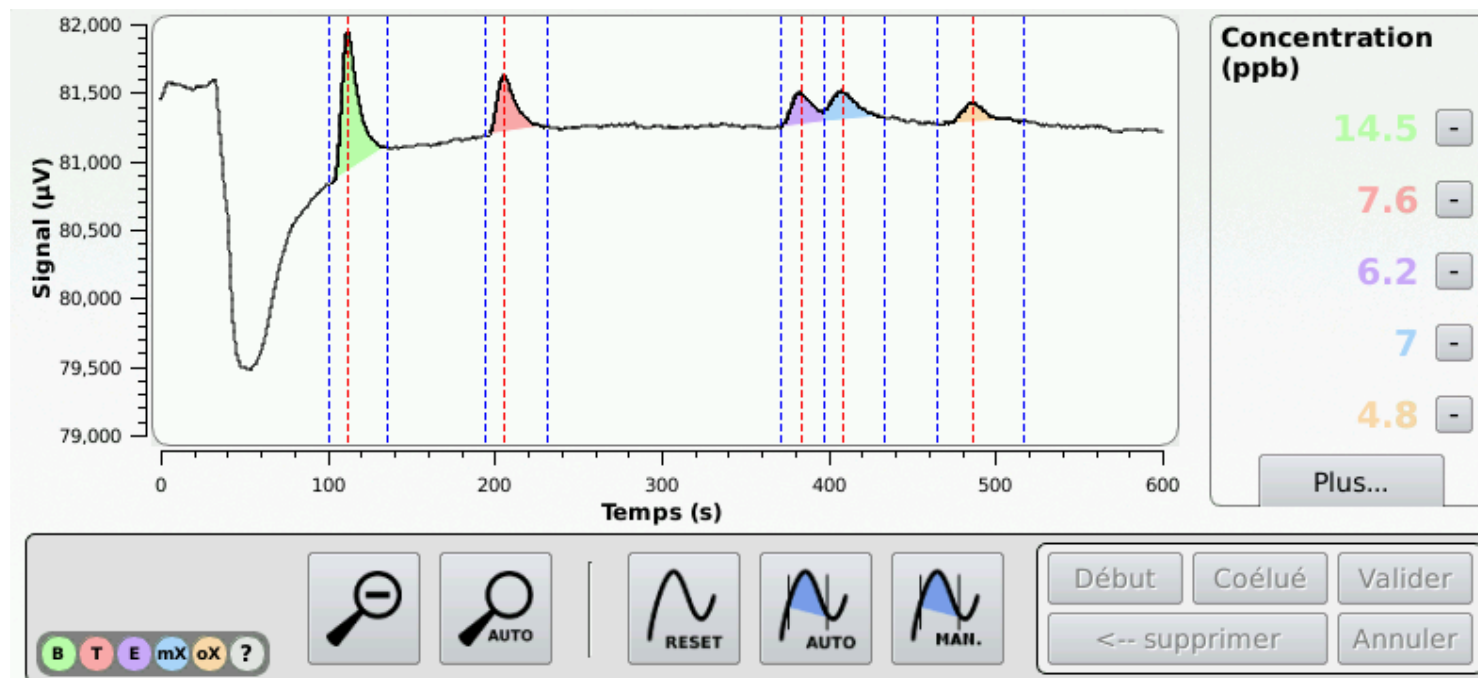
# II. Principle Scheme

Micro BTEX  $\mu$ Btex

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



## II. Typical BTEX 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  
21 days of gas in BTEX version allowing to do some field campaign  
Rapid calibration with gaseous BTEX mixture or only benzene  
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

Data storage in SD card 32 GO for more than 13 months of continuous data

**Issued from French academic research in 2018**

Innovation from CNRS & Strasbourg University

Produced and developed by CHROMATOTEC since 2021

**Intuitive and easy to use software**

Remote access function

# IV. Main components

Legend:

1: Pressure controller

2: Sampling pump

3: Battery

4: 3 way solenoid valve (x2)

5: Critical orifice

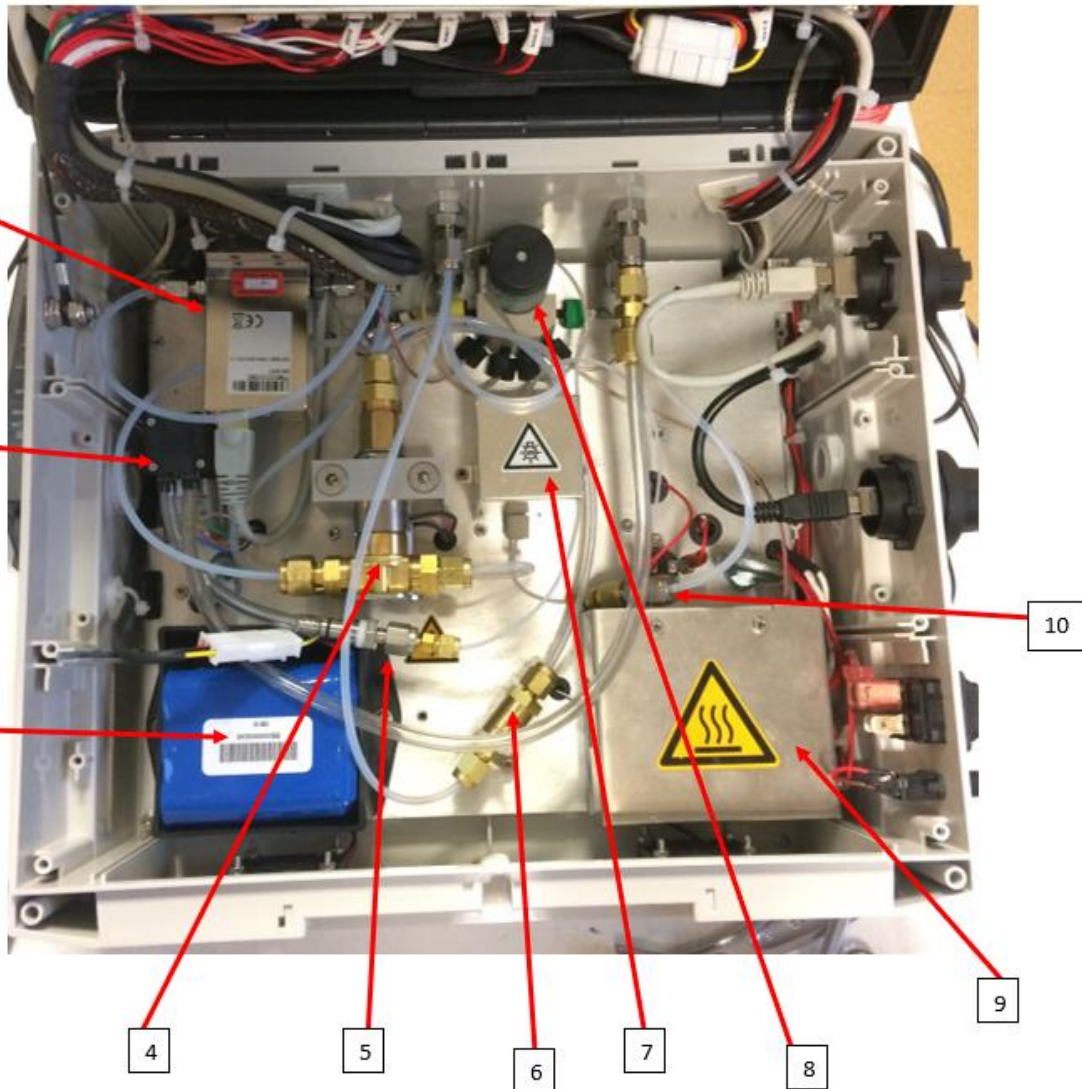
6: Particle filter

7: PID lamp

8: 6 way valve

9: Chromatographic column

10: Double check valve



# V. Performance

**Detection range :** 0-1000 ppb (0-10 ppm or higher in option)

**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

**Sample conditions :**

Gas T° : 5 - 40° C;

Gas Relative humidity : 20 - 90% (higher in option)

Atmospheric pressure

Altitude max : 2000m

**Calibration:** Gaseous BTEX mixture or Benzene only

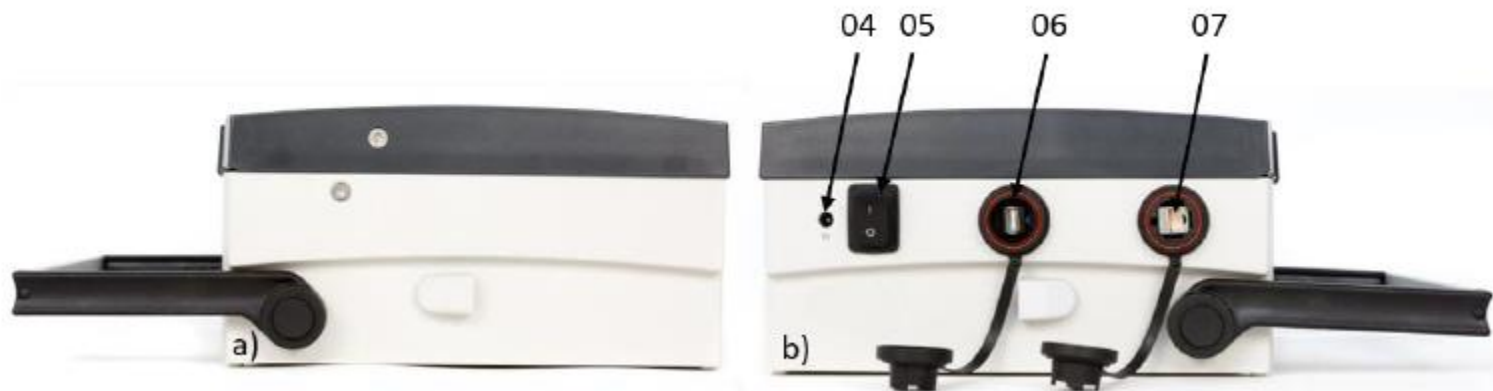


# VI. Launching and using the device a) Set-up



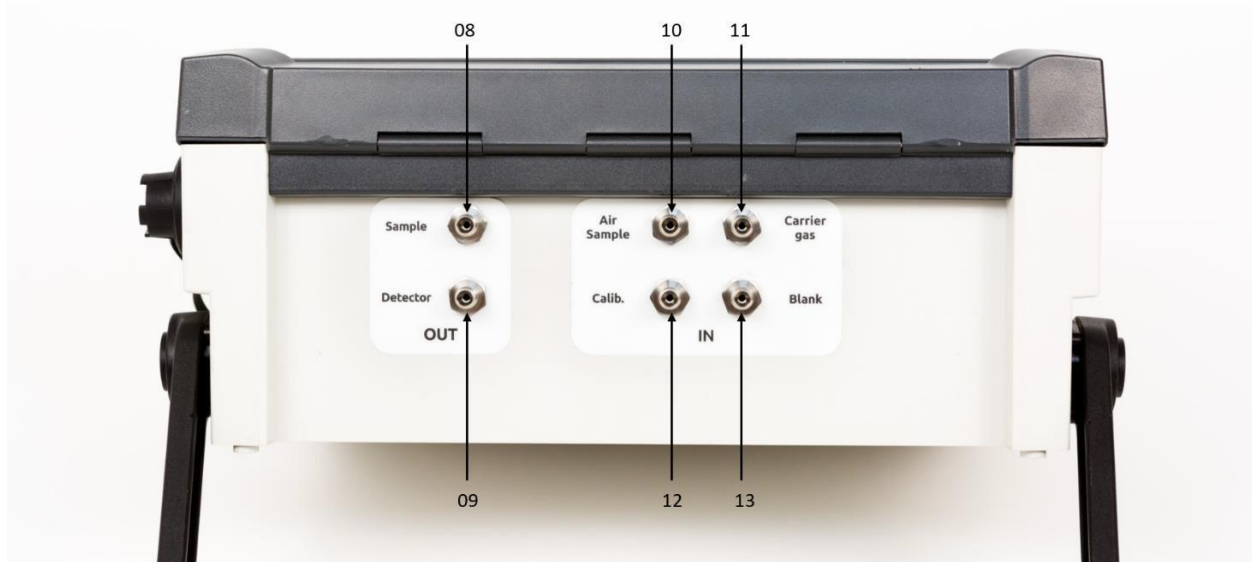
Designation	Component	Description
01	LED state: Default	Red LED OFF: no default Red LED ON: Technical default
02	LED state: Power	Green LED OFF: Device OFF Green LED ON: Device running Green LED flashing: Standby mode
03	Touchpad	Report to userguide §6

## 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

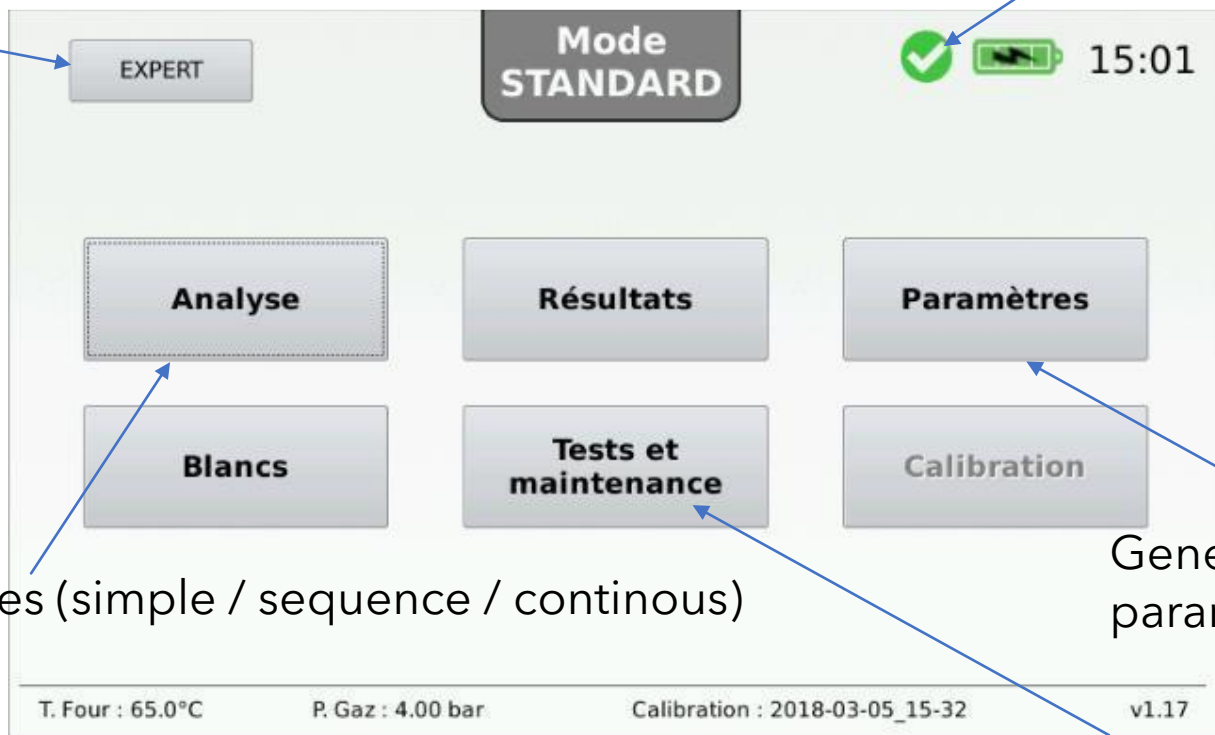


Designation	Component	Description
08	Sample gas outlet	Report to userguide \$5
09	Detector gas outlet	
10	Air sample inlet	
11	Carrier gas inlet	
12	Calibration gas inlet	
13	Blank gas inlet	

# VI. b) Analysis

User mode and expert mode

Stabilisation



Analysis acces (simple / sequence / continous)

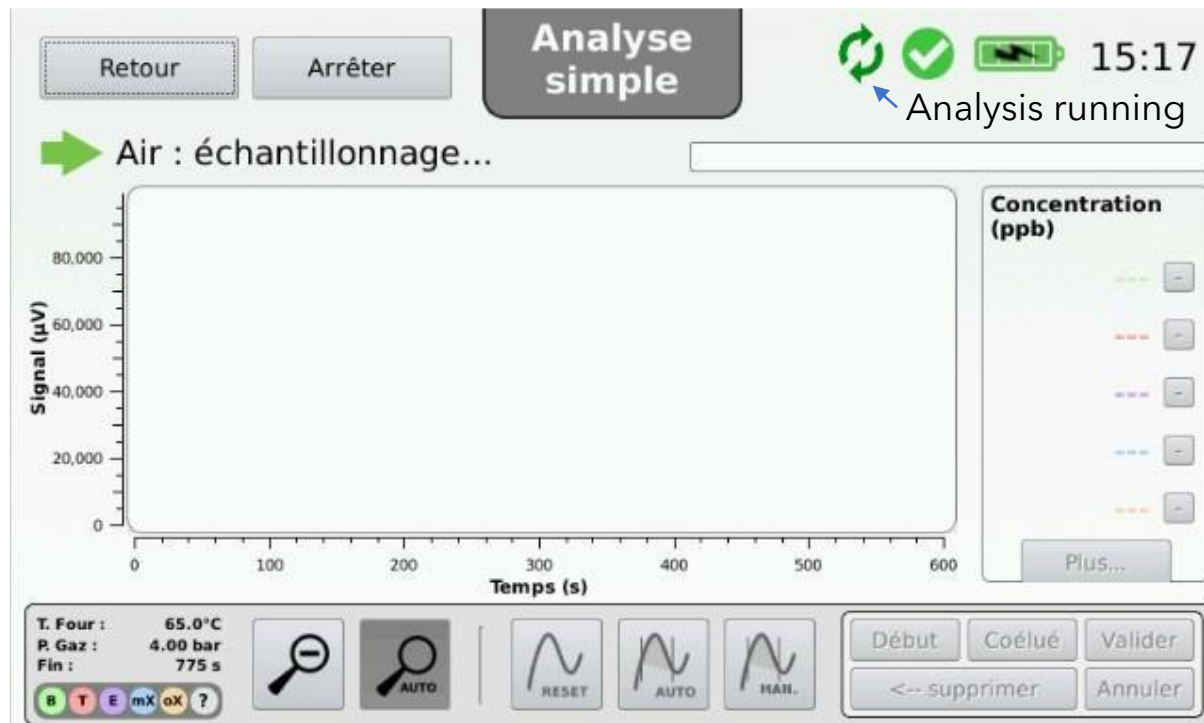
General & analytical parameters

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

Simple Continue **Séquence**

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

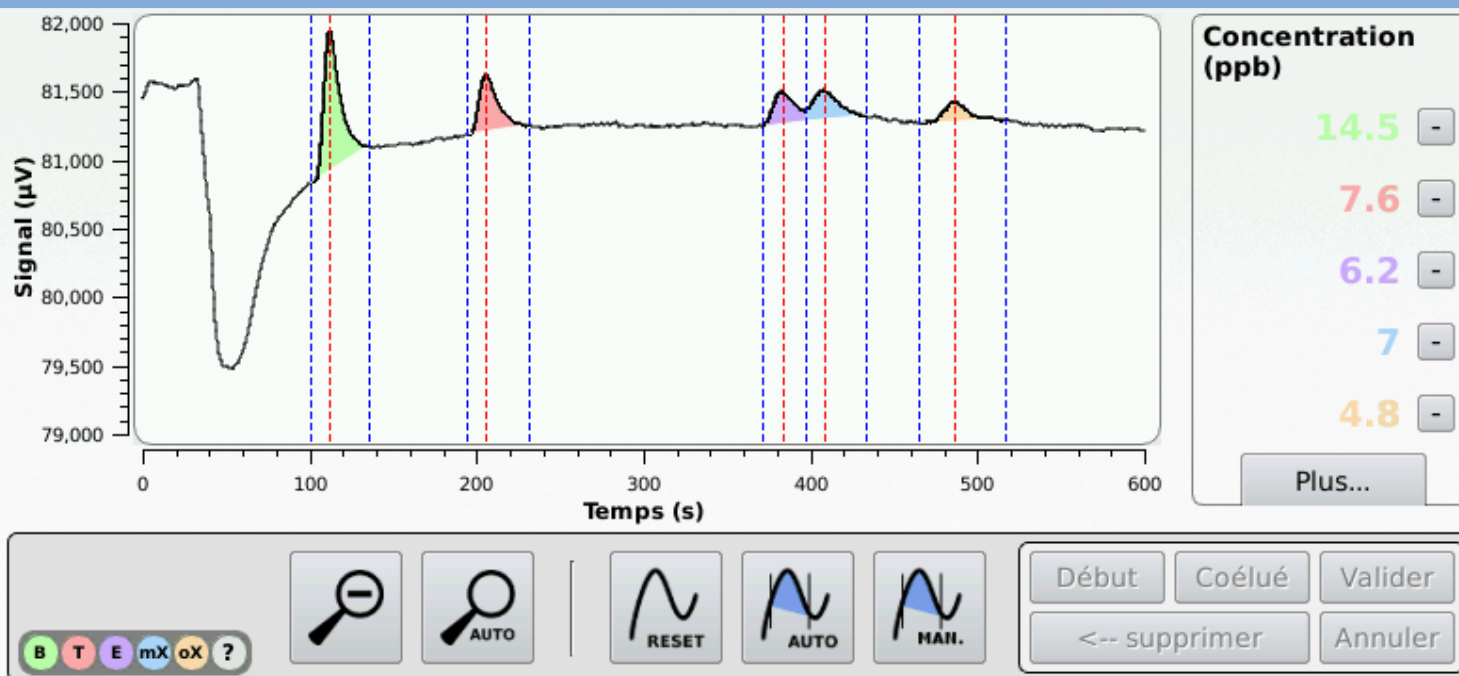
Nom de la séquence :

Commentaires :

Acquisition  Blanc

8 Mar 2018 15:45:00

# VI. c) Results



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

Retour Visual **Résultats détaillés** 17:4

Nom du fichier : 22-03-02\_17-42.csv  
Date de calibration : 2022-03-02\_16-34

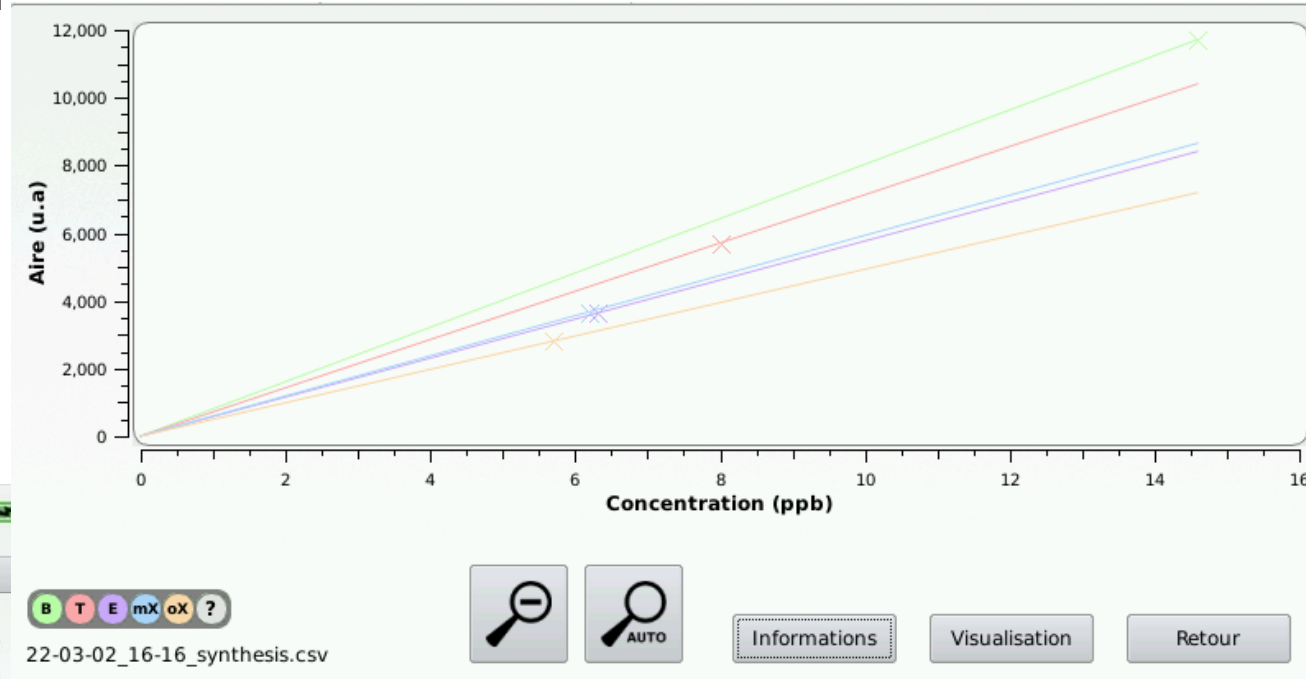
T. rétention (s) / Δ	Composé	Concentration (ppb)	Aire	Intensité
111.7	benzene	14.5	11658	1033.6
205.3	toluene	7.6	5428.7	423.4
382.9	ethylbenzene	6.2	3569.9	238.4
407.8	mpxylene	7	4110.3	221.8
485.75	oxylene	4.8	2354.9	148.2



# VI. d) Calibration

1. Connect calibration gas mixture to calibration port
2. 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

# 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 %

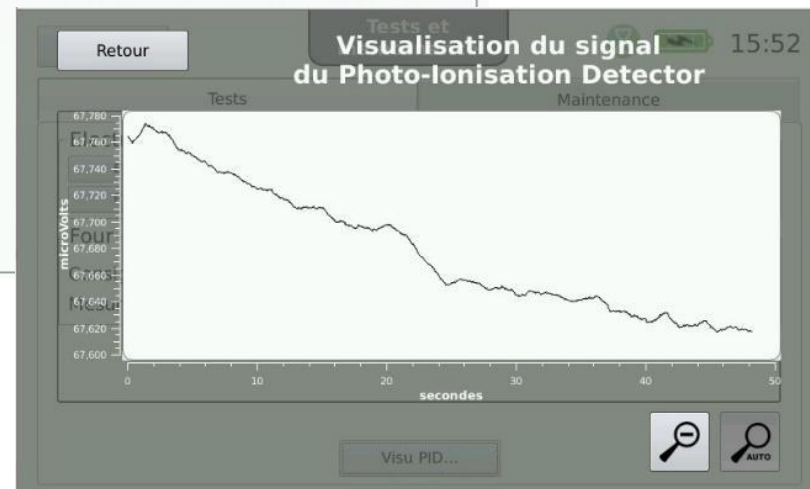
Absence de rotation OFF

**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/m <sup>3</sup>			
Pression gaz vecteur veille : 2.00 bar			
Extinction de l'écran : 10 min			
Mise en veille : 30 min			
Luminosité : 			

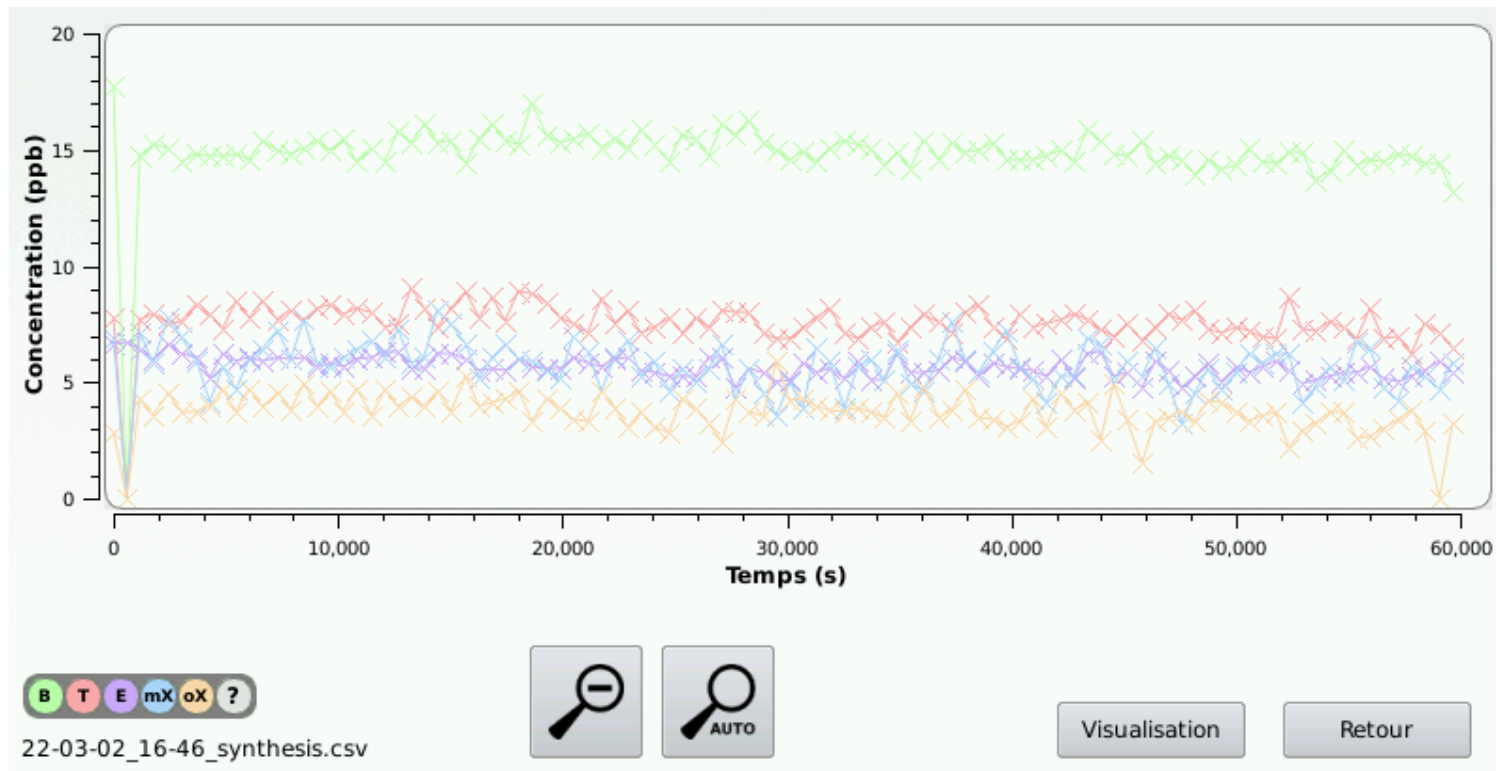
- **Analytical conditions**

Général	Analyse	Détection	Intég. auto
<b>Températures</b>			
Colonne 58 °C			
<b>Durées</b>			
Prélèvement 300 sec		Injection 20 sec	
Analyse 600 sec			
<b>Autres</b>			
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

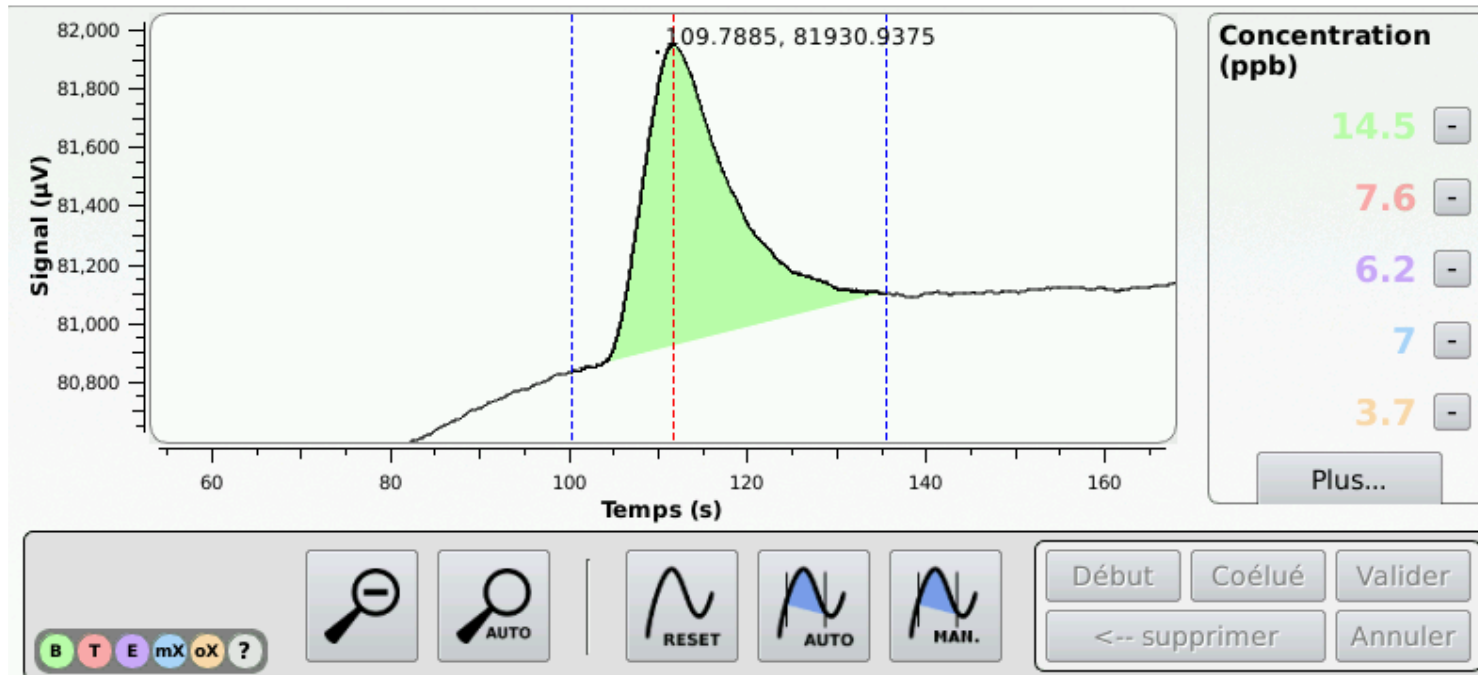


CSV

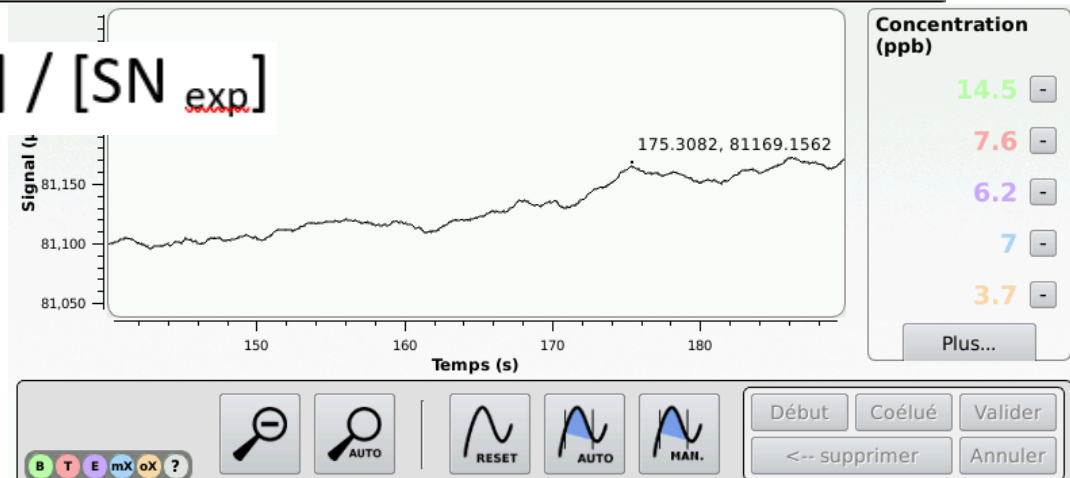


23/03/2022					
Date de calibration	2021-11-08_10-38				
Coefficient de calibration benzene	4052,27				
Offset de calibration benzene	NULL				
Coefficient de calibration toluene	1934,32				
Offset de calibration toluene	NULL				
Coefficient de calibration ethylbenzene	1884,54				
Offset de calibration 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	0,5	118,95	205
		toluene	1,9	222,45	303,5
		21-11-12_12-19_			
		benzene	0,5	122,9	264,5
		toluene	5,8	225,35	1398,3

# VI. h) Limit Of Detection



$$\text{LoD (ppb)} = [C_{\text{exp}} \times SN_3] / [SN_{\text{exp}}]$$



Benzene

Toluene

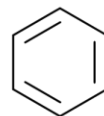
Ethylbenzene

Xylenes

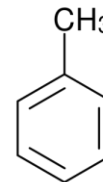
Phenol

Acrolein

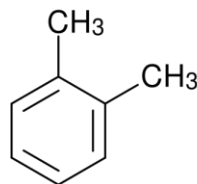
1.3 Butadiene



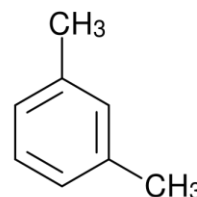
benzene



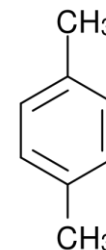
toluene



*ortho*-xylene



*meta*-xylene

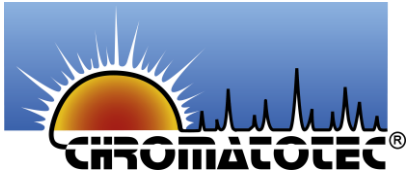


*para*-xylene

## Applications

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





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**Thanks for your attention**