Online Analytical Solutions Experts

Chromatotec Sales Meeting

France, Saint-Antoine, July 5 to 7

Online Analytical Solutions Experts

micro-VOC

Workshop

Chromatotec Sales Meeting, France, 5-7 July 2022

Summary

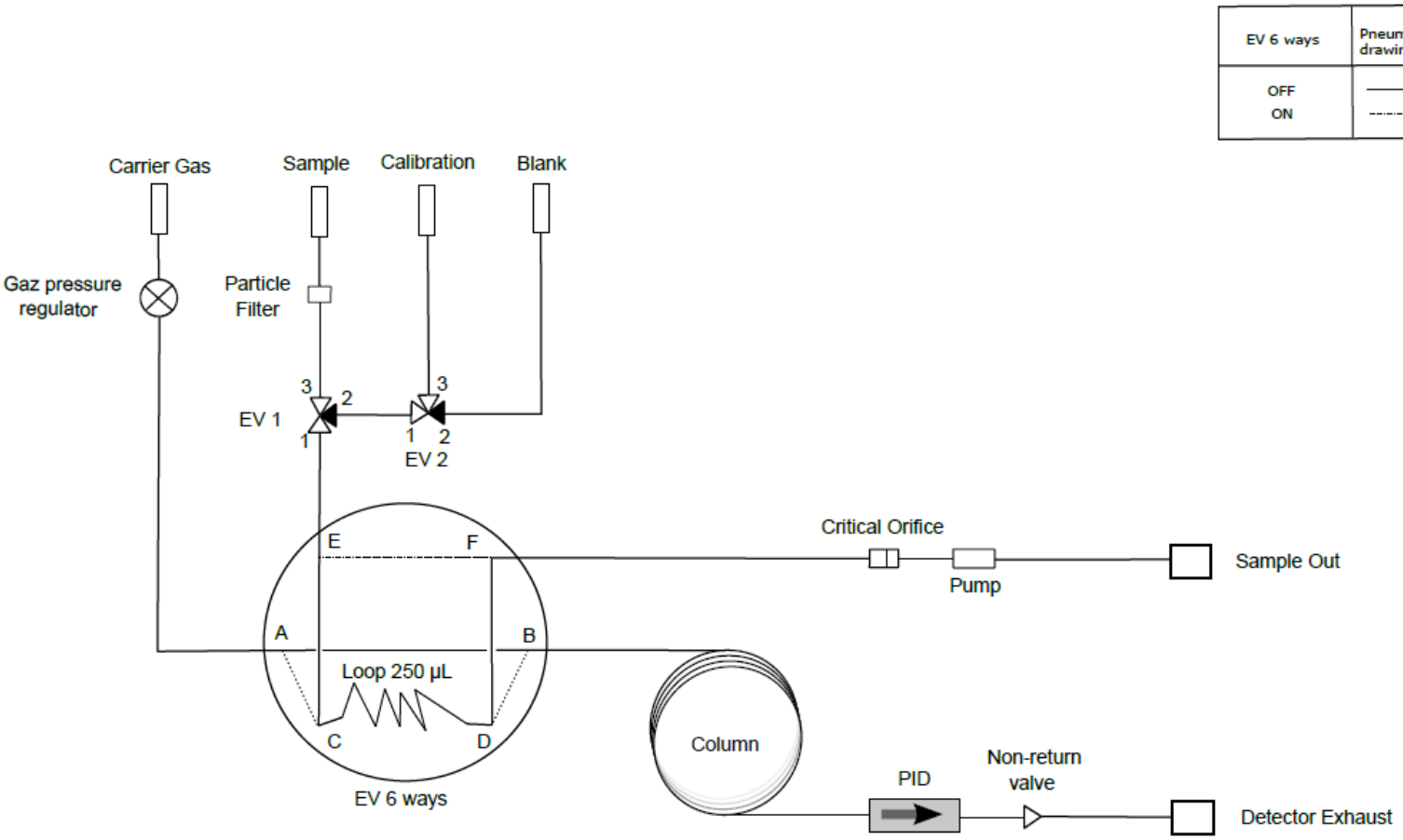
- Main characteristics
- Principle
- Advantages
- Consumables
- Performances
- Launching and using
  - Set-up
  - Analysis
  - Results
  - Calibration
  - Tests/maintenance
  - Useful spare parts

I. Main characteristics

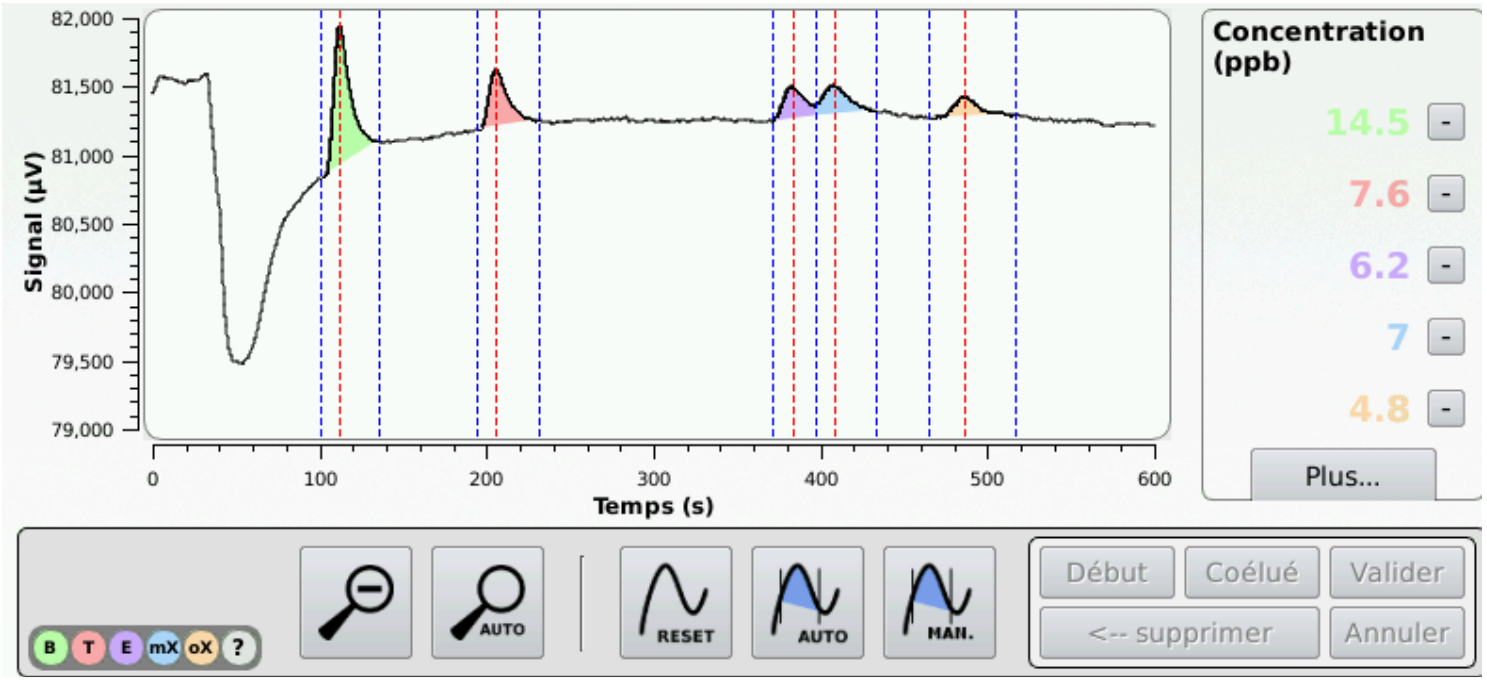
Dimension	32 cm × 28 cm × 15 cm
Weight	6,0kg
Limit of detection	1ppb<lod<5pbb (BTEX)
Linearity range	0 – 1000 ppb
Trapping type	Sampling loop
Carrier gas	N_2
Detection type	Mini PID lamp
Run time	10 minutes

II. Principle Scheme

Micro BTEX µBtex



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

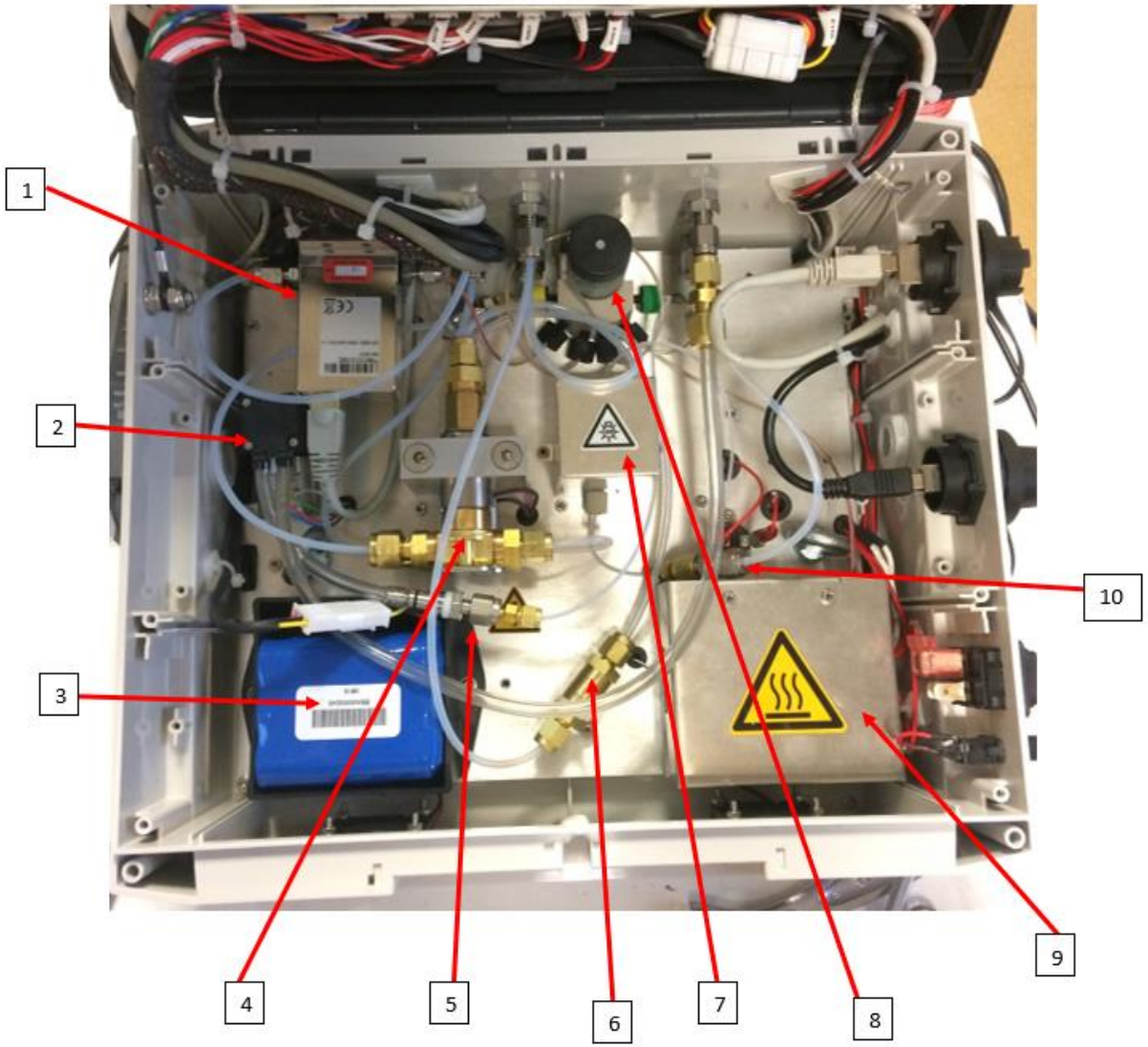
-User friendly
Compact size and light weight
Deployment in less than 5 minutes
Powered by either plug-in or battery
Minimal carrier gas consumption
Rapid calibration with gaseous BTEX mixture or only toluene
Compatibility with canisters and FLEC® System

-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

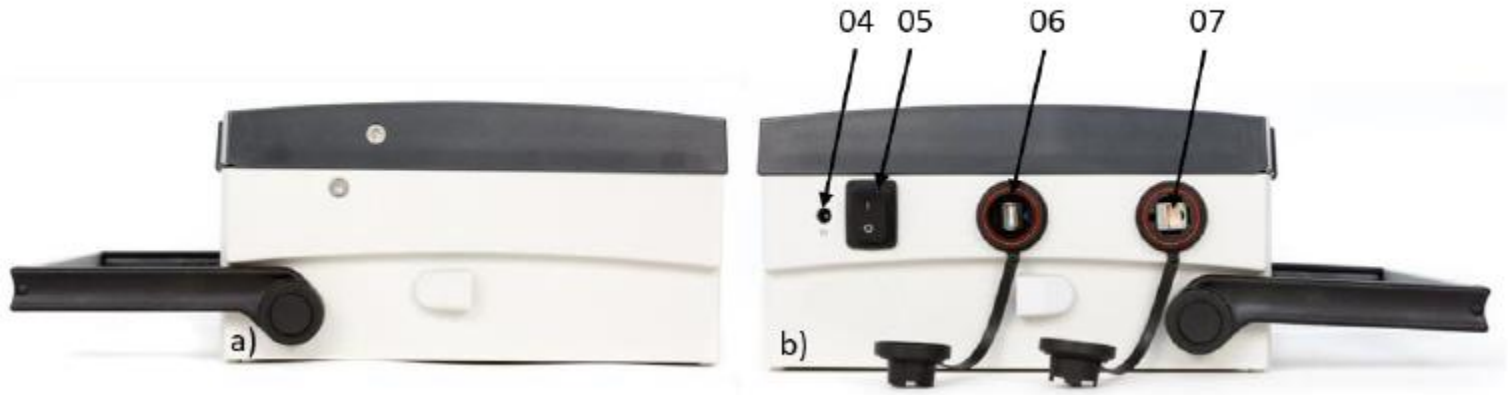
Altitude max : 2000m

Calibration: Gaseous BTEX mixture or Gaseous Toluene

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

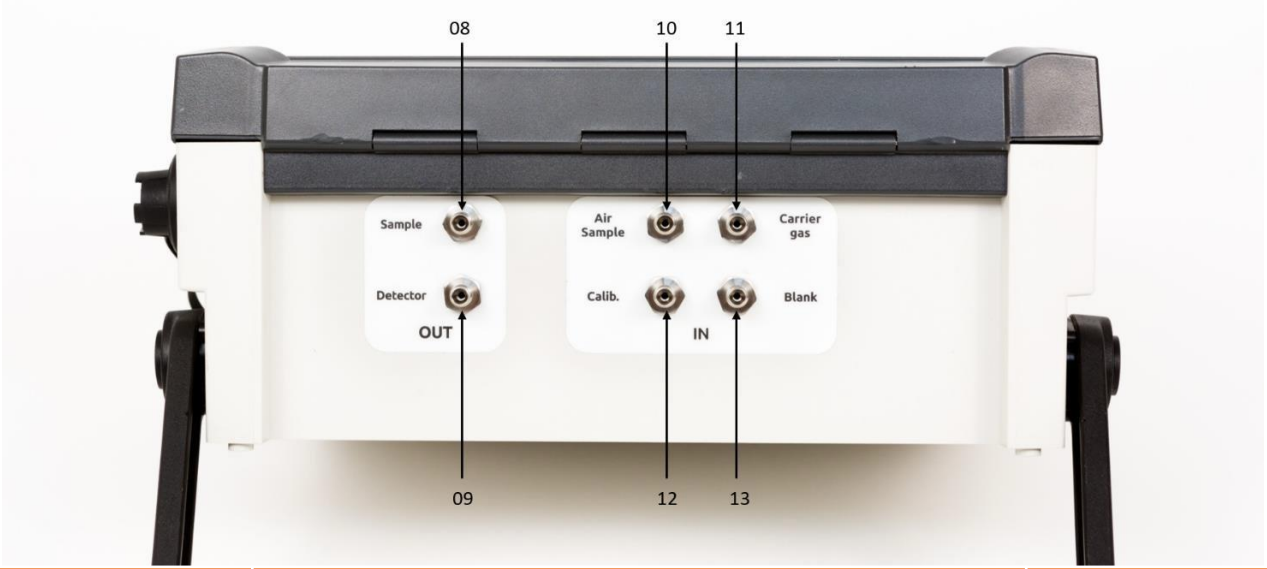
Designation	Component	Description
01	LED state: Default	Red LED OFF: no defaut Red LED ON: Technical defaut
02	LED state: Power	Green LED OFF: Device OFF Green LED ON: Device running Green LED flashing: Standby mode
03	Touchpad	Report to userguide §6

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

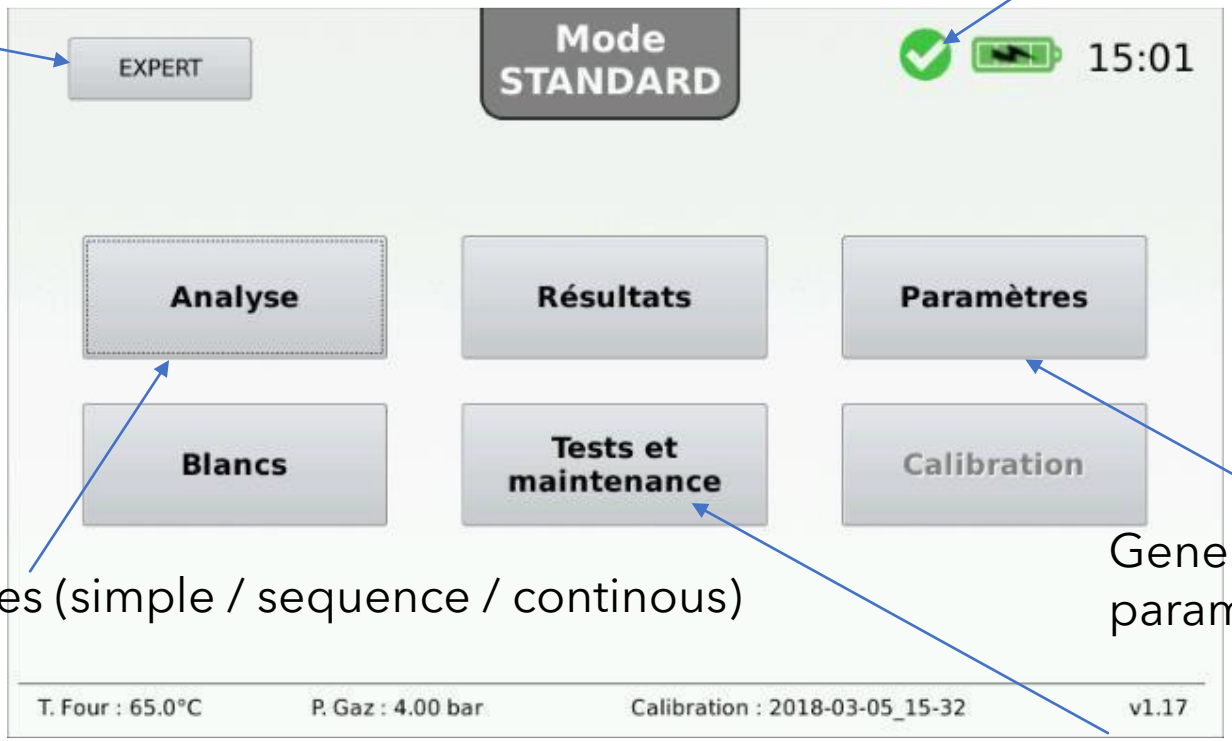


Designation	Component	Description
08	Sample gas outlet	Report to userguide §5
09	Detector gas outlet	
10	Air sample inlet	
11	Carrier gas inlet	
12	Calibration gas inlet	
13	Blank gas inlet	

VI. b) Analysis

User mode and expert mode

Stabilisation



Analysis acces (simple / sequence / continous)

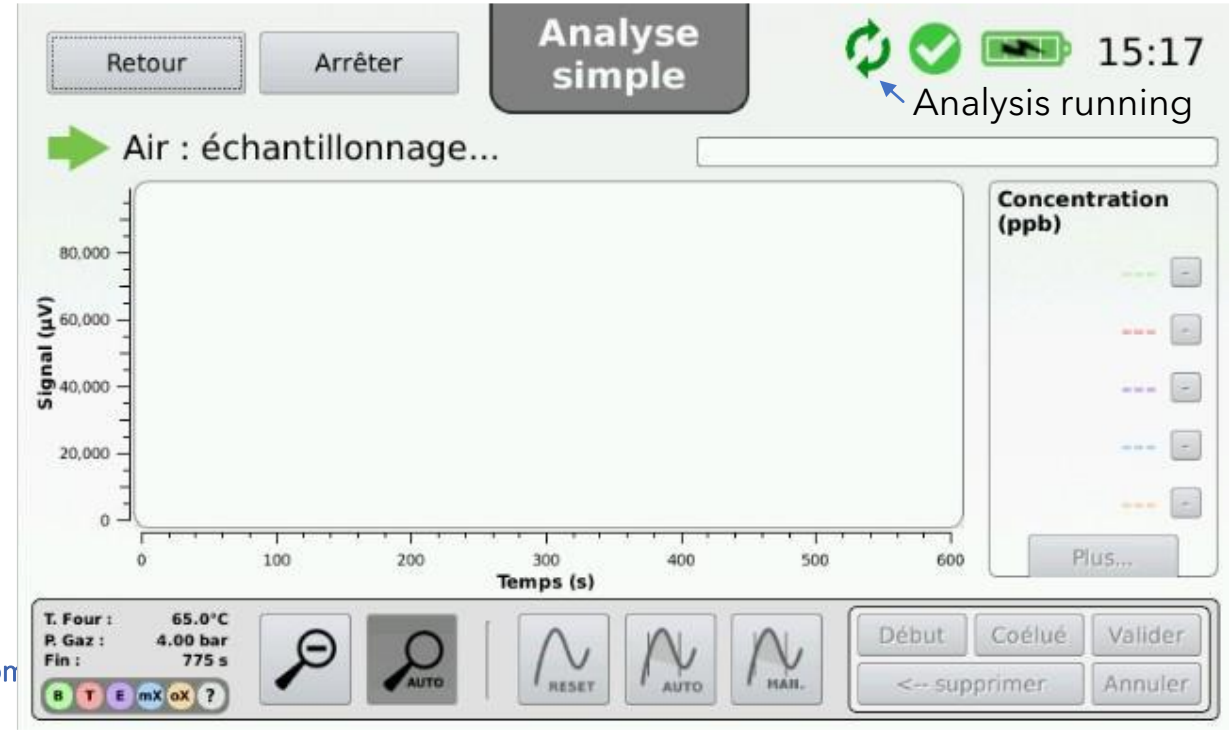
General & analytical parameters

Maintenance gateway

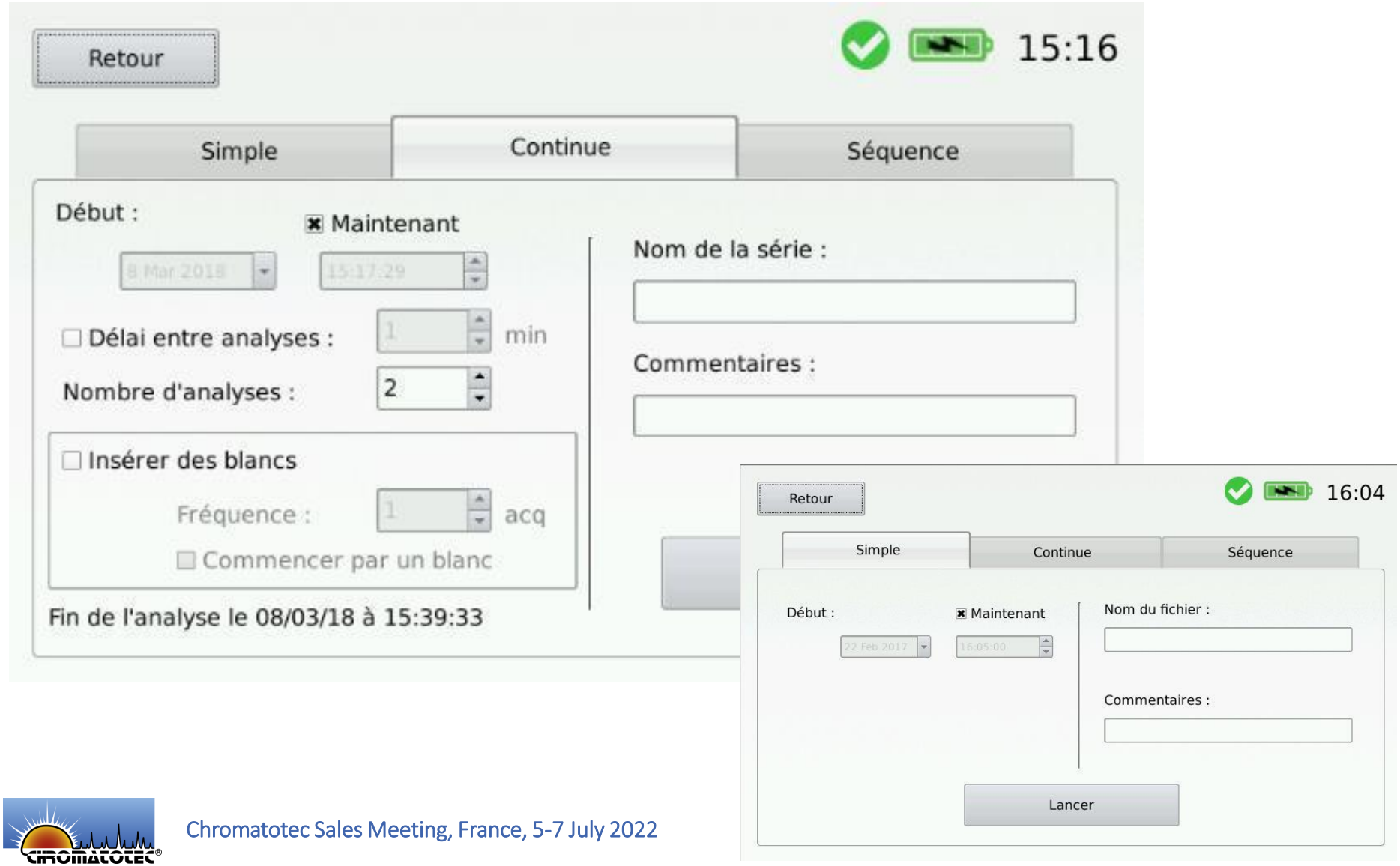
VI. b) Analysis

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

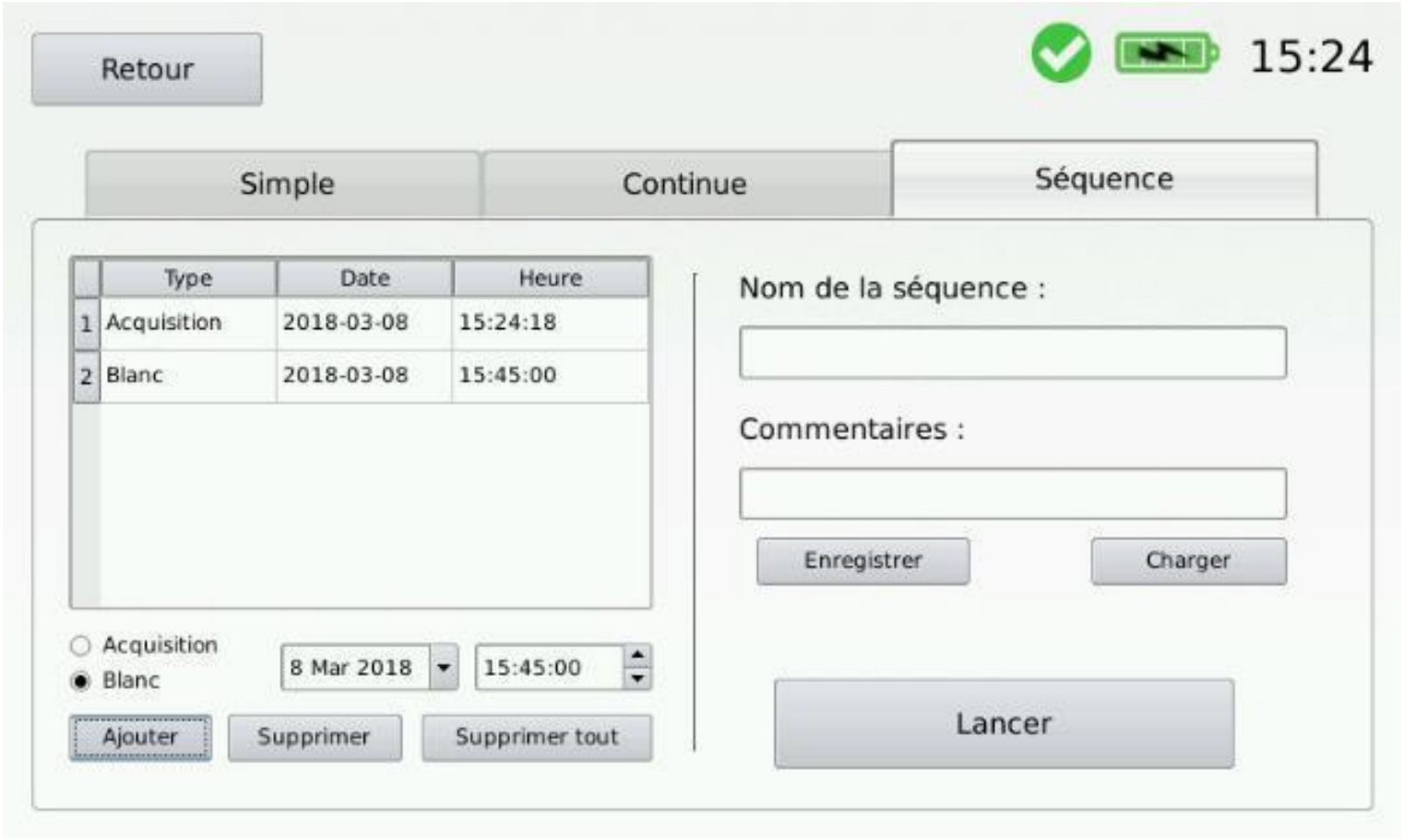
- 5/10 minutes required before first analysis (oven stabilisation …)
- Each chromatogram is date & time-stamped
- Continous access to sequence & analysis monitoring
- Main steps: stalibisation / sampling / analysis / results



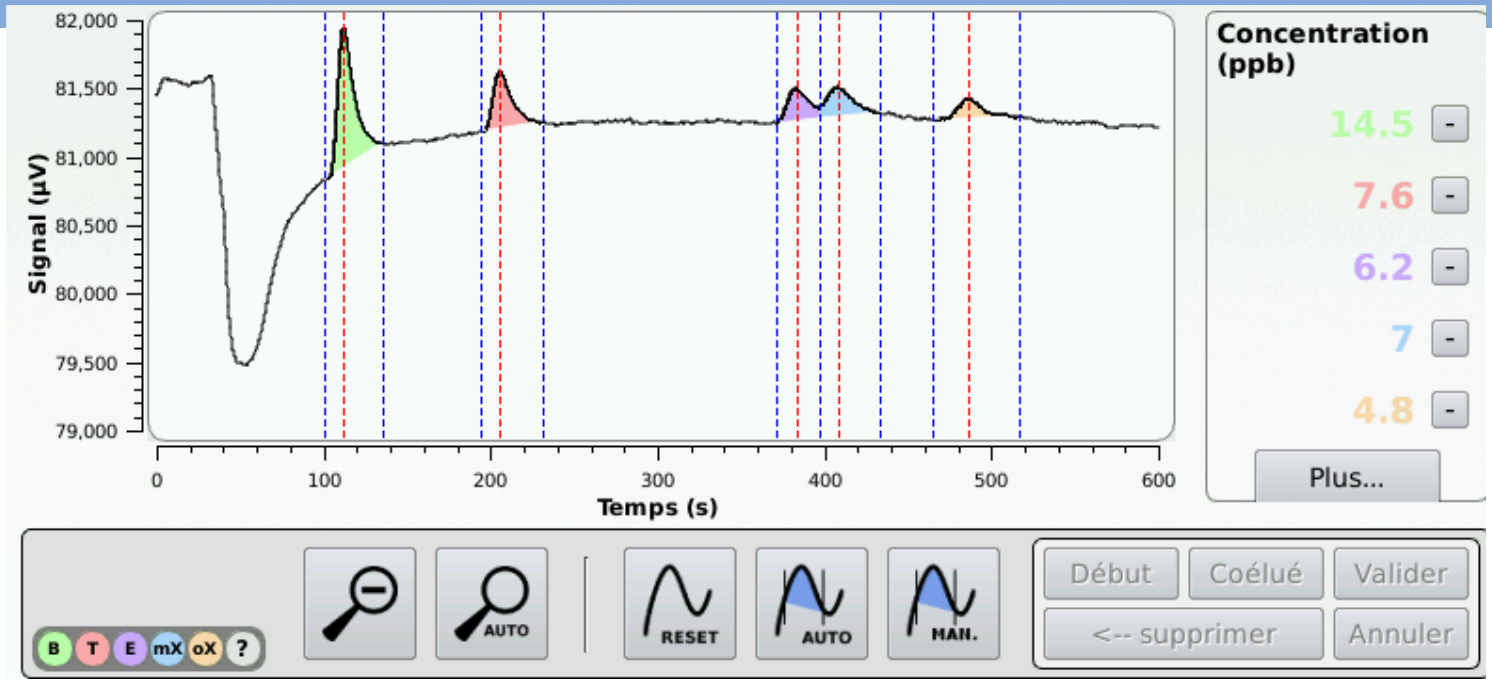
VI. b) Analysis



VI. b) Analysis



VI. c) Results



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

Retour

Résultats détaillés

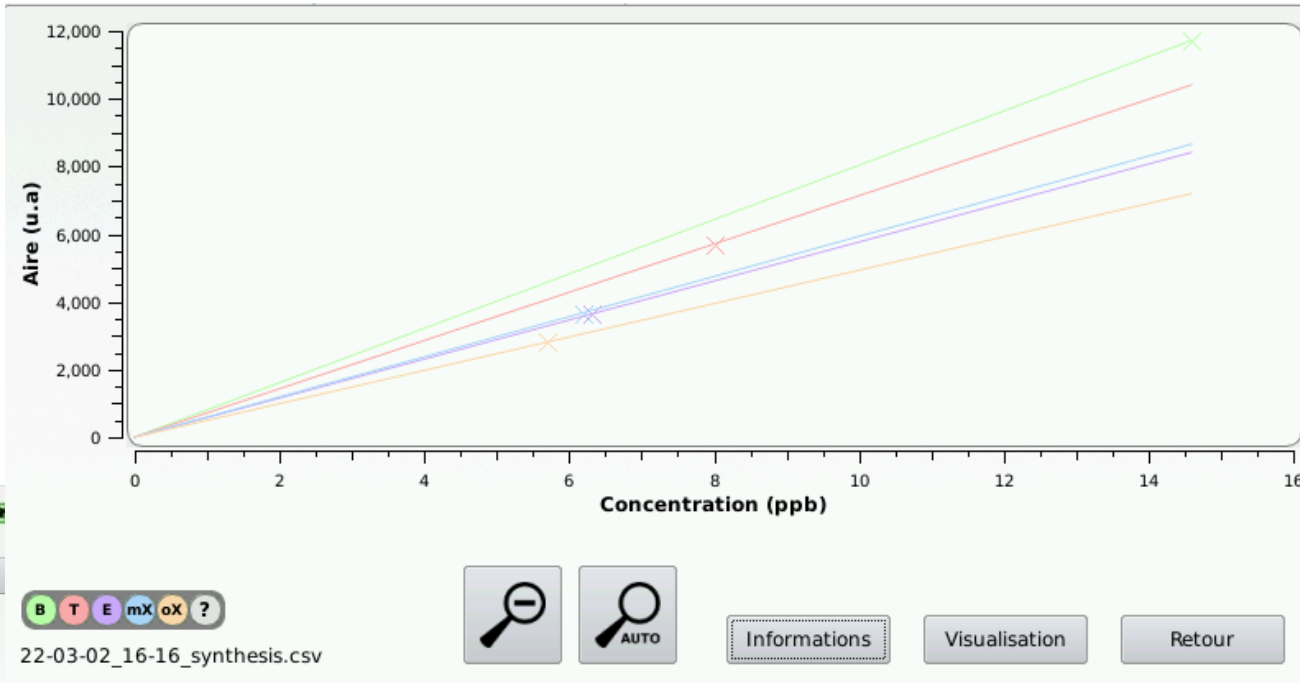
Nom du fichier : 22-03-02_17-42.csv
Date de calibration : 2022-03-02_16-34

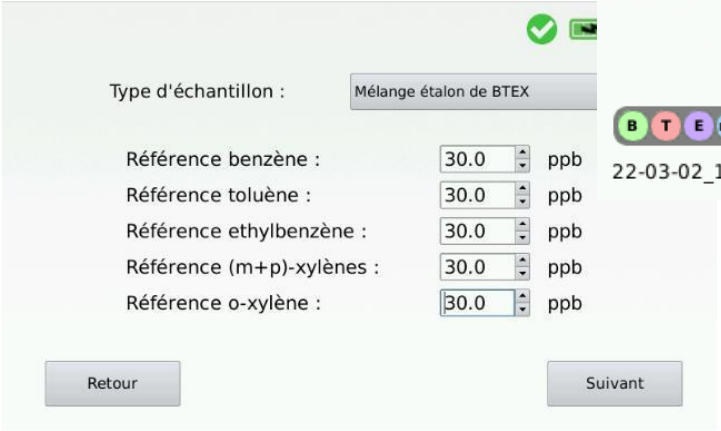
T. rétention (s)	Composé	Concentration (ppb)	Aire	Intensité
111.7	benzene	14.5	11658	1033.6
205.3	toluene	7.6	5428.7	423.4
382.9	ethylbenzene	6.2	3569.9	238.4
407.8	mpxylene	7	4110.3	221.8
485.75	oxylene	4.8	2354.9	148.2

VI. d) Calibration

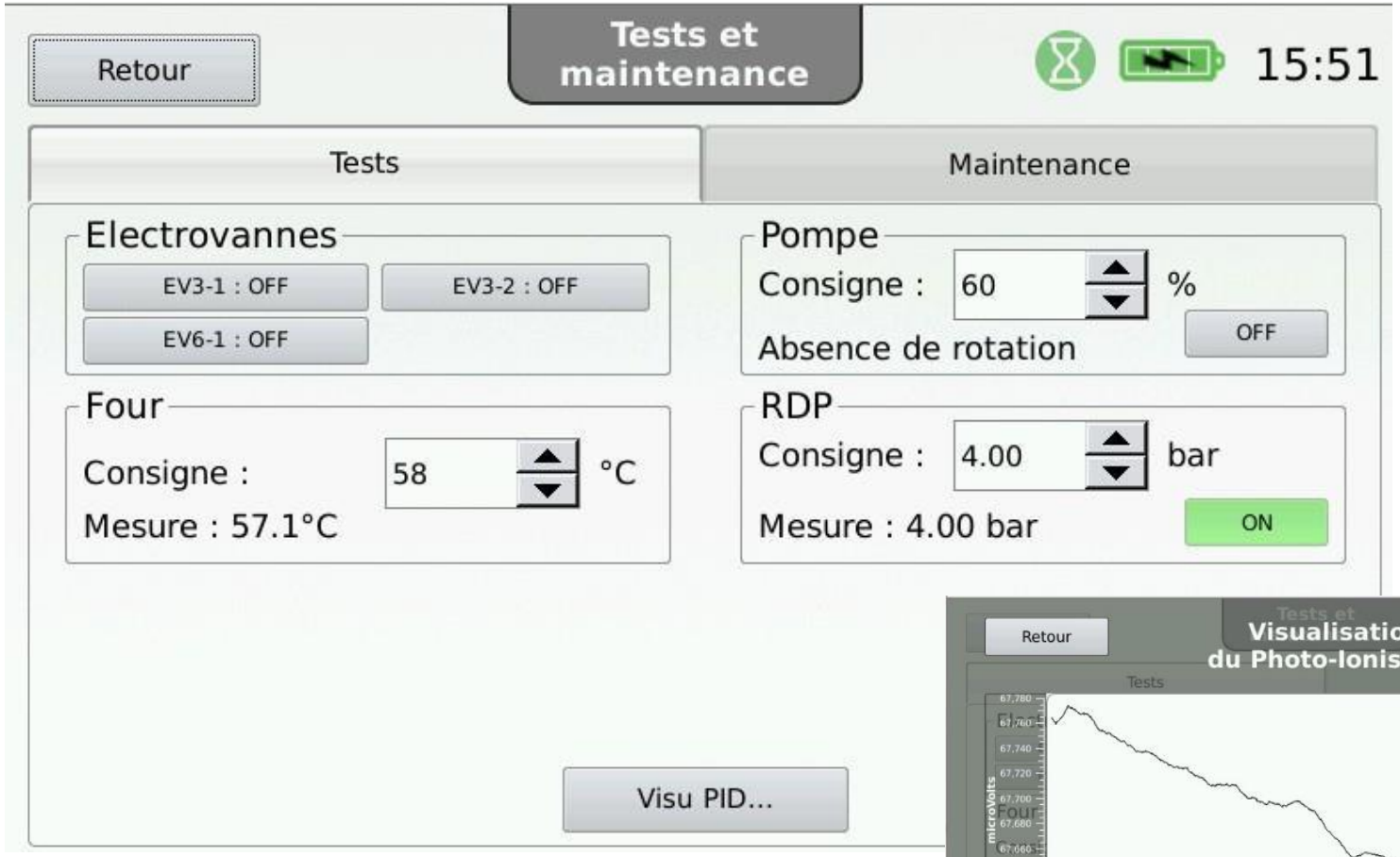
1. Connect calibration gas mixture to calibration port
2. 2. Program and launch

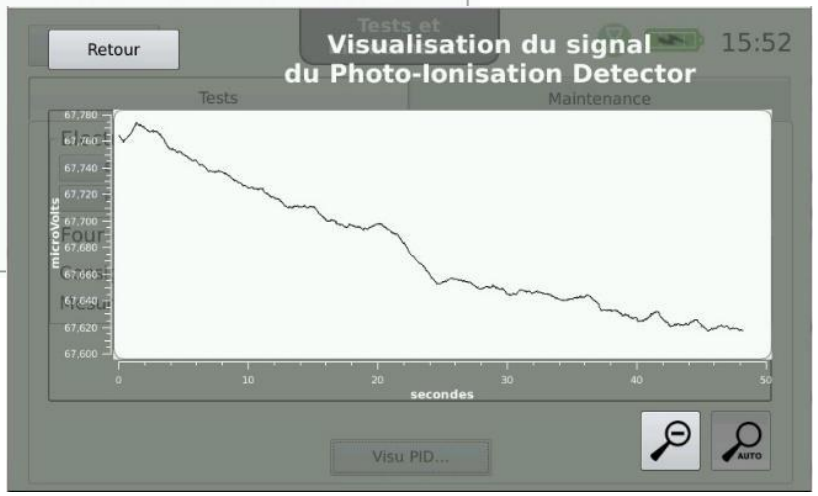
[Multipoints available!]



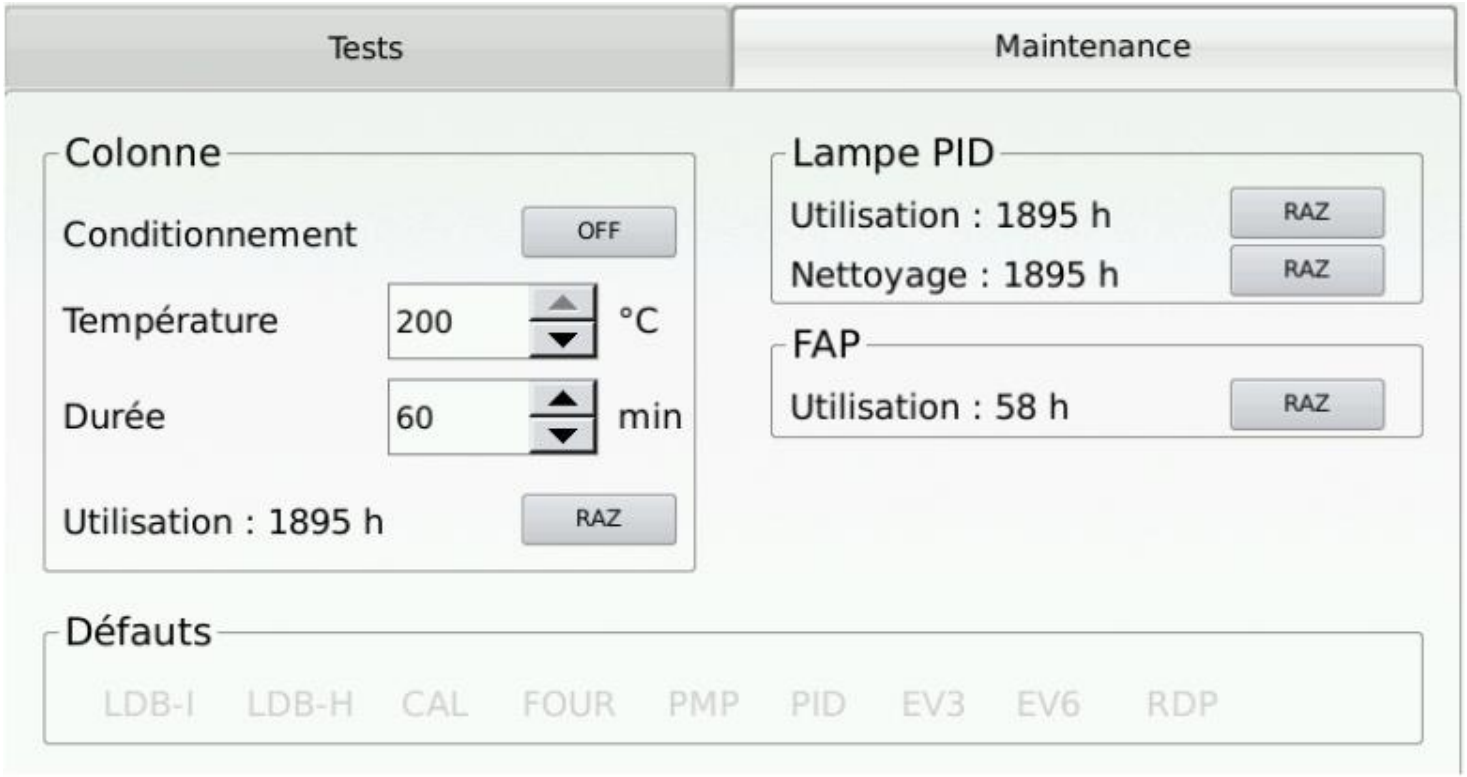


VI. e) Tests/Maintenance





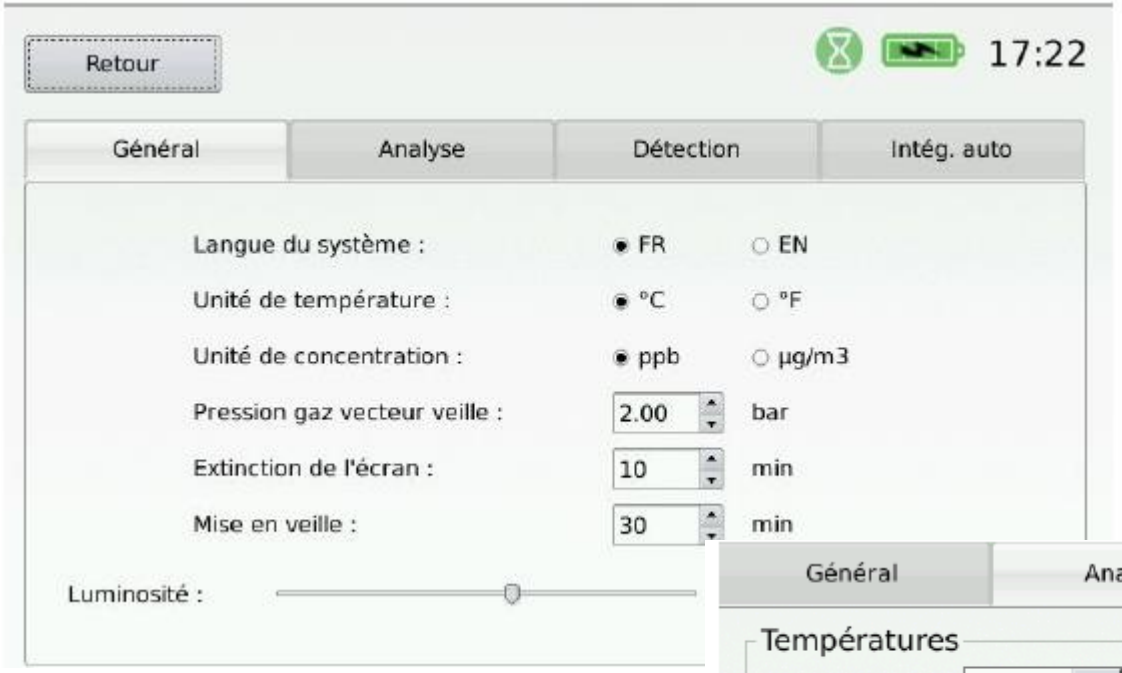
VI. e) Tests/Maintenance



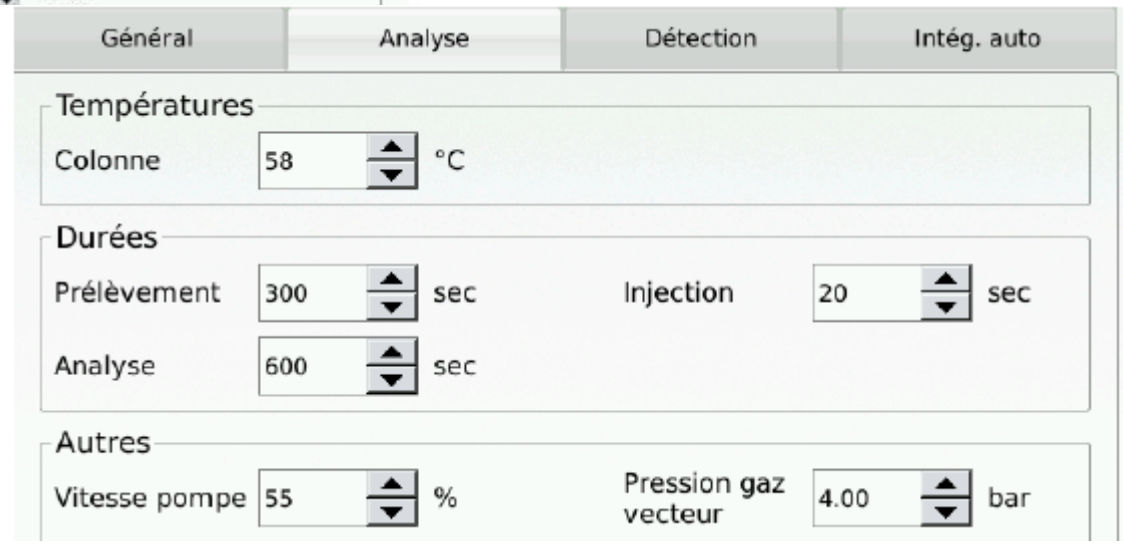
- Main consumable clocks
- Column conditioning tool
- General defaults (LDB-I…)

VI. f) Method

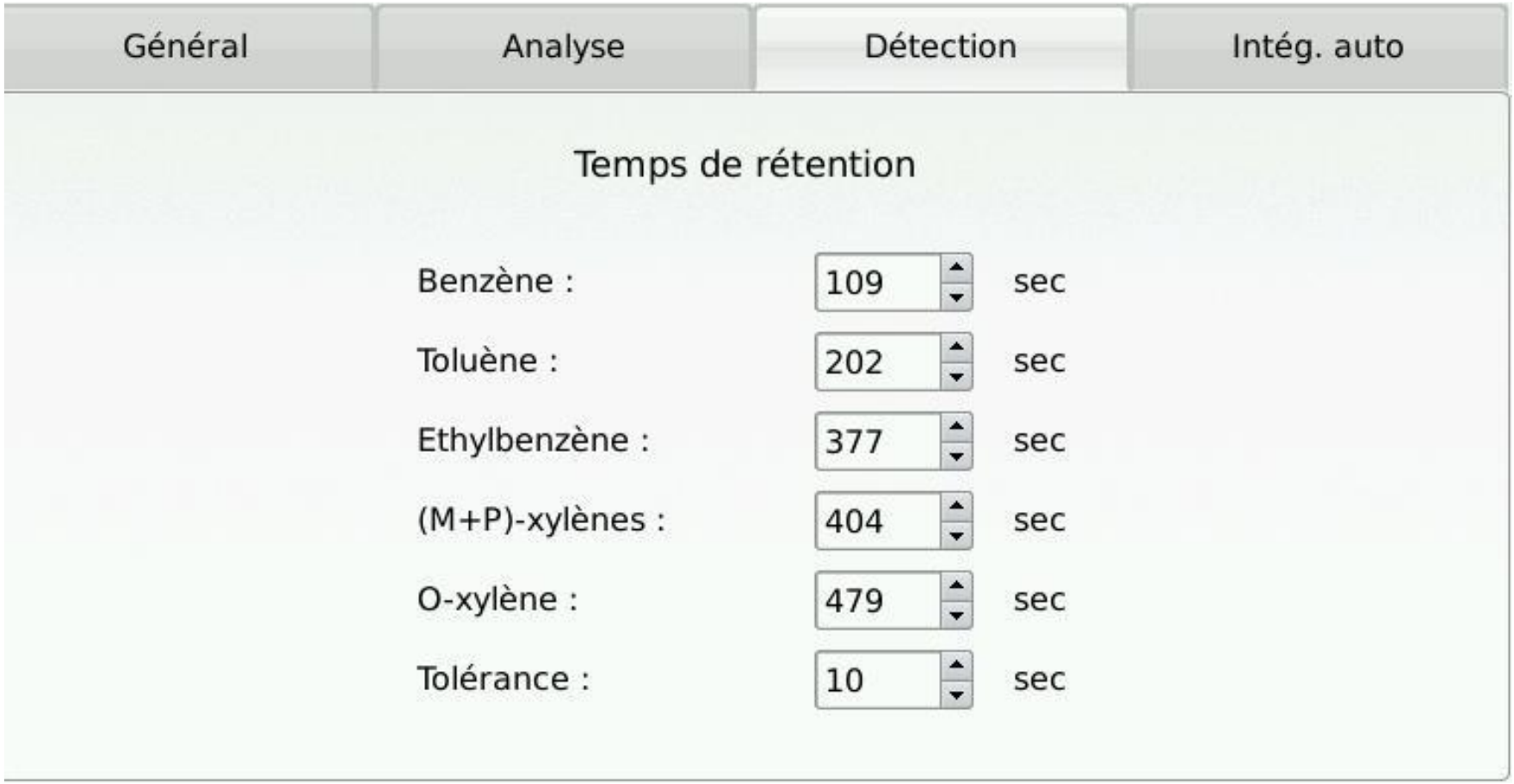
- **General settings**



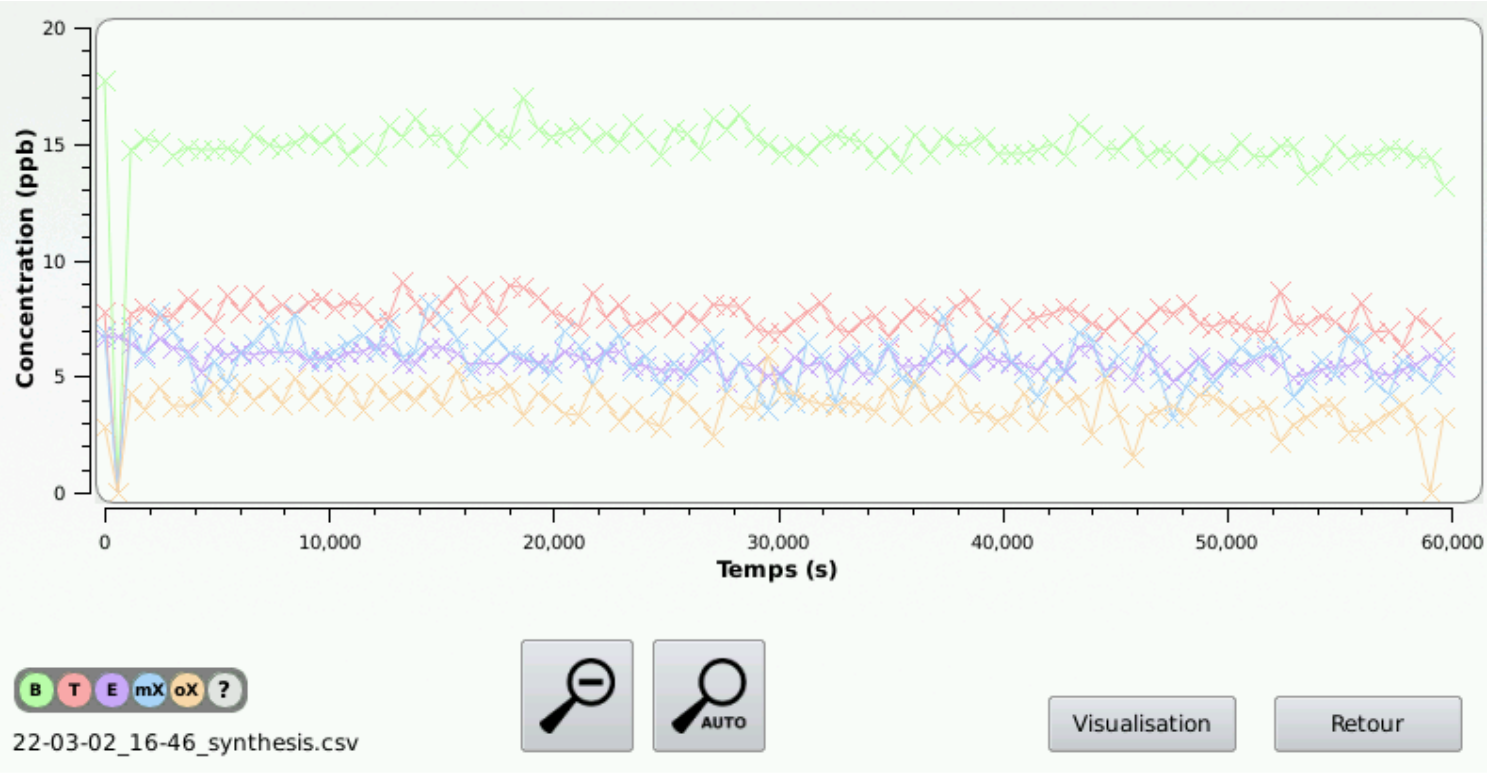
- **Analytical contidions**



VI. g) Substances table



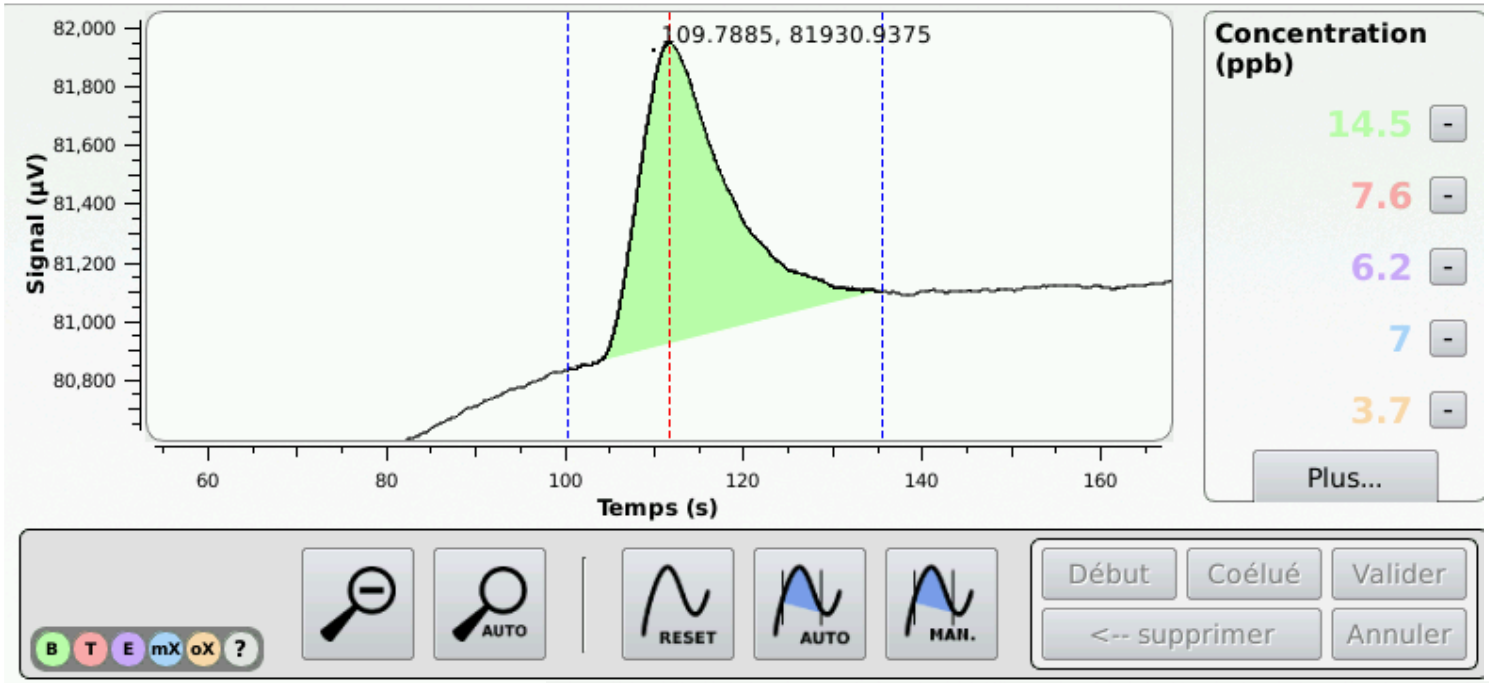
VI. h) Synthesis



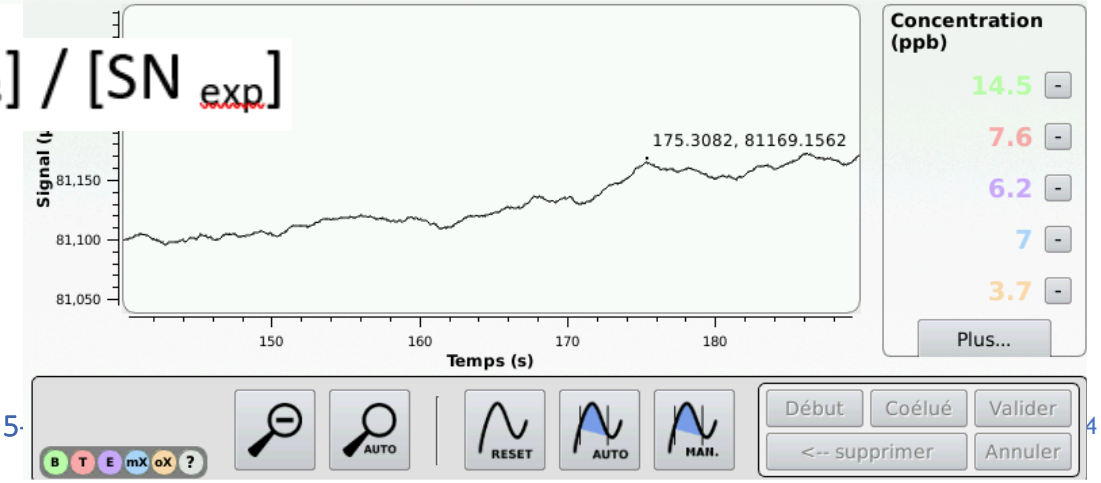
CSV

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

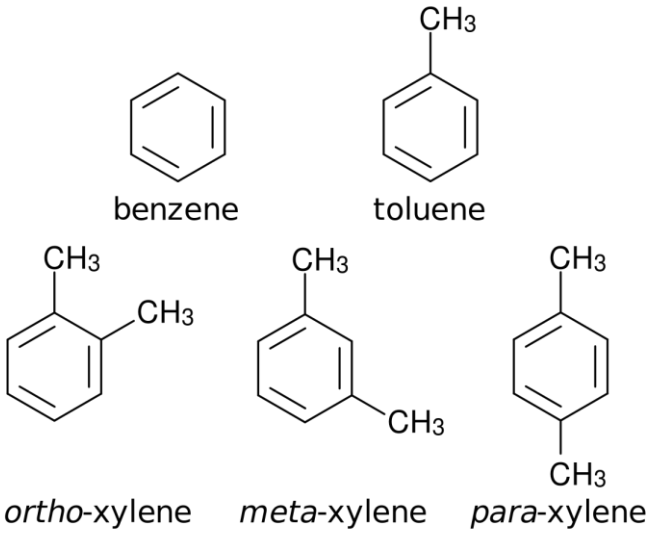
VI. h) Limit Of Detection



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



- 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

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Thanks for your attention