

## CHROMATOTEC PURGE & TRAP SPECIFICATIONS

### Applications:

- 1- Finished drinking water, drinking water in any treatment stage

#### **Method based on EPA 502.2 Method.**

- a. Range 0.5-200 µg/L in Amplification 2
  - b. Range 0.5-20 µg/L in Amplification 3
- 2- Surface water – Range 0.5-20 µg/L

### C6-C12 analysis: C6 (Benzene) to C12 (n-Dodecane)

The airmoVOC uses a valve with a sample trap and a **metallic capillary column**.

### Cycle time: 30 min for VOC in water or air

### Gas supply:

- H<sub>2</sub> (FID and carrier gas): 30 mL/min (inlet 2 bars; 1/16" swagelock)
- Air (FID): 180 mL/min (inlet 2 bars; 1/8" swagelock)
- N<sub>2</sub> (FID): 40 mL/min (inlet 3 bars; 1/8" swagelock)

### Critical orifice: 60 µm for a sampling flow around 30 mL/min for a range 0.5-20 µg/L

### Purge: For on-line analytical instrument

- **Based on 502.2 Method**
- **5 mL of water sample in standard** & 25 mL sparger in option
- Purge with inert gas: ultra pure N<sub>2</sub> (Ultra High Purity – UHP) – 40 mL/min
- Sample time: 11 minutes
- **Dead volume < 15 mL (Gas volume between water and trap)**
- Bubbles with a diameter < 3 mm at the origin of the frit
- Automatic rinse (two times in standard)
- ZERO N<sub>2</sub> analysis
- ZERO WATER analysis (Blank)

### 1) Detector: FID: airmoVOC C6C12: application 21 compounds in standard

**51 compounds detected by the analyzer:** for application with column CE30 = 45 peaks detected.

No.	Compounds	No.	Compounds
1	<b>Benzene</b> in standard	27	trans-1,3-Dichloropropene
2	<b>Bromobenzene</b>	28	cis-1,3-Dichloropropene
3	<b>Chlorobromomethane</b>	29	<b>Ethylbenzene</b> in standard
4	<b>Bromodichloromethane</b>	30	Hexachloro-1,3-butadiene in standard
5	<b>Tribromomethane = Bromoform</b>	31	Isopropylbenzene in standard
6	n-Butylbenzene	32	p-Isopropyltoluene
7	sec-Butylbenzene	33	Naphtalene
8	tert-Butylbenzene	34	n-Propylbenzene
9	<b>Carbon tetrachloride</b>	35	Styrene in standard
10	Chlorobenzene in standard	36	1,1,2,2-Tetrachloroethane

No.	Compounds	No.	Compounds
11	Chloroform	37	1,1,1,2-Tetrachloroethane
12	2-Chlorotoluene	38	Tetrachloroethylene in standard
13	4-Chlorotoluene	39	Toluene in standard
14	Dibromochloromethane	40	1,2-Dibromo-3-chloropropane
15	1,2-Dibromoethane	41	1,2,3-Trichlorobenzene in standard
16	Dibromomethane	42	1,2,4-Trichlorobenzene in standard
17	1,2-Dichlorobenzene in standard	43	1,1,1-Trichloroethane
18	1,3-Dichlorobenzene in standard	44	1,1,2-Trichloroethane
19	1,4-Dichlorobenzene in standard	45	Trichloroethylene in standard
20	1,1-Dichloroethane	46	1,2,3-Trichloropropane
21	1,2-Dichloroethane in standard	47	1,2,4-Trimethylbenzene in standard
22	cis-1,2-Dichloroethene	48	1,3,5-Trimethylbenzene in standard
23	1,2-Dichloropropane in standard	49	o-Xylene in standard
24	1,3-Dichloropropane	50	m-Xylene in standard
25	2,2-Dichloropropane	51	p-Xylene in standard
26	1,1-Dichloropropene		

SUM of 50 + 51 = m+p-Xylene

SUM of 36 + 49 = 1,1,2,2-Tetrachloroethane + o-Xylene

SUM of 34 + 13 = n-Propylbenzene + 4-Chlorotoluene

SUM of 8 + 42 = tert-Butylbenzene + 1,2,4-Trichlorobenzene

SUM of 11 + 25 = Chloroform + 2,2-Dichloropropane

SUM of 4 + 45 = Bromodichloromethane + Trichloroethylene

These bromo compounds, Dibromochloromethane / Dibromomethane / Bromodichloromethane / Chlorobromomethane / Bromobenzene / 1,2-Dibromoethane, are difficult to quantify: we need more time for quantification.

We have a lot of experience with compounds from TO14 and PAMS in black:  
Application 21 compounds in standard

**We are expert for BTEX**

## 2) List: 21 compounds identified and 18 compounds quantified (4 to 21)

No.	Compounds	No.	Compounds
1	Chloroform	12	o-Xylene
2	Carbon tetrachloride	13	Styrene
3	Tribromomethane = Bromoform	14	Isopropylbenzene
4	1,2-Dichloroethane	15	1,2-Dichlorobenzene
5	Benzene	16	1,4-Dichlorobenzene
6	Xylene (m+p)	17	1,2,4-Trimethylbenzene
7	Trichloroethylene	18	1,3,5-Trimethylbenzene
8	Tetrachloroethylene	19	1,2,3-Trichlorobenzene
9	Toluene	20	1,2,4-Trichlorobenzene
10	Chlorobenzene	21	Hexachloro-1,3-butadiene
11	Ethylbenzene		

Bromoform is difficult to quantify: we need more time, experiments and experience for quantification and we are not sure to achieve the quantification of bromoform.

Performance	SPECIFICATIONS	
	specifications	Chromatotec's actual value
<b>Detection limit</b>	All detected compounds LDL < 0.05 µg/L	MDL < 0.05 µg/L for BTEX MDL < 0.1 µg/L for compounds 4 to 21 MDL < 1.0 µg/L for compounds 1, 2, 3
<b>Linearity range</b>	All detected compounds R <sup>2</sup> > 0.99, linear range 0-20 µg/L	Linearity range: <b>0.5-20µg/L</b> <b>R<sup>2</sup> &gt; 0.99</b> for compounds 4 to 21 More test for compounds 1, 2, 3
<b>Repeatability</b>	RSD < 10%	RSD < 10% for compounds 4 to 21 More test for compounds 1, 2, 3
<b>Precision / Specificity</b>	Precision < 3%	< <b>6%</b> for compounds 4 to 21 More test for compounds 1, 2, 3
<b>Zero drift</b>	< ± 5%	< <b>± 3%</b>
<b>Full range drift</b>	< ± 10%	< <b>± 10%</b>
<b>Reliability test</b>	Run 720h continuously without unnormal situation	OK
<b>Comparison test</b>	Compare with Purge & Trap GC-MS method (Purge & Trap GC-FID Method / Purge & Trap GC-ECD Method), on the installment spot. Inaccuracy < 10 %	Later with an order After demo unit delivery The fee refers to the comments 8.
<b>Other specification</b>	The same as on-line VOC ambient air analyzer	airmoVOC C6-C12 (BTEX): <b>TUV approval on 1996 for BTEX in ambient air</b> Range: 0.5 to 45 µg/m <sup>3</sup> for Benzene LDL: 0.05 µg/m <sup>3</sup> Repeatability on retention time < <b>0.3% over 48h</b>

**Results:** Data storage on computer

**1) Important Comments:** P 52-502-21 is a special application .

2) Each analyzer can be configured for a specific range.

3) Each analyzer can analyse in sequence air and water: P52-502-21.

4) Purge is an option for airmoVOC which is TUV certified in 1996.

5) You supplies water sample whose suspended particles < 100 µm. Under these circumstances, for the maintenance of the Purge & Trap, you will buy a second sparger, identical to the first sparger. Then change when cleaning the first sparger so the analyzer will not be stopped more than one or two hours per month, according to the competence of the operator.

6) Then for the maintenance, there are some things to check once or twice a month: the level of water in the Hydroxchrom tank, which need not to stop the analyser when completing the level of distilled water, and the level of oil in the airmoPURE, checking at the same time as changing the sparger and completing the level if it is needed. And there is the monitoring of the analyser to make: to check pressure, temperature...

7) Chromatotec system uses a secondary circuit and the pump takes sample in a primary circuit which contains a filtration system. Change filters of the two circuits if it is needed (primary and secondary circuit). For the secondary circuit (Chromatotec circuit), change the filters once per month.

**8) Comparison test:** Comparison test in China. Chromatotec guarantees results for comparison test with an **inaccuracy < 10 % for compounds 4 to 21**. You can do the comparison test alone, in Beijing or other places. If you finds that the inaccuracy is more than 10%, you will invite Chromatotec technician to do comparison test again. In the case the final result is less than 10%, you will pay for journey fee. But if the result is still > 10%, you will not pay any fee for the test.

9) We have already success on compounds 4 to 21, in the near future we will add 1 & 2 and later 3.