



AROMATICS AND VOLATILE ORGANIC CHLORINATED HYDROCARBONS

Summary

This product information sheet describes the analysis of aromatics and volatile organic chlorinated hydrocarbons determined by the laboratory of Eurofins Analytico.

The volatile compounds measured are partially aromatic and partially organic chlorinated hydrocarbons.

Aromatic compounds are:

- Benzene
- Toluene
- Ethyl benzene
- Xylenes
- Naphthalene

Volatile organic chlorinated hydrocarbons are:

- Dichloromethane
- Trichloromethane
- Tetrachloromethane
- Trichloroethene
- Tetrachloroethene
- 1,1-Dichloroethane
- 1,2-Dichloroethane
- 1,1-Trichloroethane
- 1,1,2-Trichloroethane
- cis1,2-Dichloroethene and trans 1,2-Dichloroethene

Gas chromatography is being used as separation technique and the detection method is mass spectrometry. The obtained results are expressed in $\mu\text{g/L}$ for water samples and in mg/kg dm for soil samples.

Introduction/ background

The abbreviation BTEXN summarizes the following compounds: Benzene, Toluene, Ethyl benzene, Xylenes (ortho and meta/para) and Naphthalene. Except for Naphthalene all these compounds are monocyclic aromatic hydrocarbons. These compounds are volatile, flammable, colorless liquids which are obtained from TPH. Naphthalene is white solid at room temperature. These compounds are mostly used as solvents and as raw material for the industry. These compounds are found in soil and groundwater at (former) petrol stations, gas plants, paint factories and printing ink factories.

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The volatile organic chlorinated hydrocarbons mentioned above are chlorinated compounds with a chain length up to 3 carbon atoms. These compounds are being used as solvents, degreaser or as cleaning solvents. The last few years studies have been conducted in finding alternatives which are less harmful for the environment. These compounds can also be produced by the use of chlorine as an oxidative reagent in (waste) water.

General information

The above mentioned volatile organic compounds have a boiling point lower than 300°C and a low vapour pressure. Water samples are preserved by storing them at low temperatures and sodiumhydrogensulphate is added to avoid evaporation and biological breakdown. It is essential that the bottle does not have any headspace. In table 1 you can find the specific compound and the corresponding reporting limit for soil and water samples. The method used is headspace injection and the separation is done by the use of gas chromatography. Detection of the compounds is done by the use of mass spectrometry.

Table 1: Specification BTEXN and VOC:

compound	reporting limit in water (µg/L)	reporting limit in soil (mg/kg dm)
benzene	0.2	0.05
toluene	0.2	0.05
ethyl benzene	0.2	0.05
xylene	0.2	0.05
naphthalene	0.2	0.01
dichloromethane	0.2	0.005
trichloromethane	0.2	0.005
tetrachloromethane	0.5	0.1
trichloroethene	0.1	0.005
tetrachloroethene	0.1	0.005
1,1-dichloroethane	0.1	0.005
1,2-dichloroethane	0.1	0.005
1,1,1-trichloroethane	0.1	0.005
1,1,2-trichloroethane	0.1	0.005
cis1,2-dichloroethene	0.1	0.005
trans 1,2-dichloroethene	0.1	0.005

Normalisation

The operational procedures are handled in accordance with ISO standards. The aromatics are determined according to the ISO 11423-1/CMA 3/E and the volatile organic chlorinated hydrocarbons according to the NEN-EN-ISO 10301 and CMA/3E.

Technical description

Before the samples can be analysed pre-treatment is required. Soil samples require an extraction of methanol. A specific amount of methanol (for soil samples) or water (for water samples) is added. At the same time an internal standard is added to a vial containing a standard amount of salt, the vial is air-tight closed with a cap. The salt enhances a better separation of the volatile compounds. The vial is heated in a headspace-sampler and from the gas layer a reproducible injection is done. The injected material is separated on a column into specific compounds. The detection of these different compounds is done by a mass spectrometer.

The results are reported in µg/l for water samples and in mg/kg dm for soil samples.

When one of the compounds is detected with a high concentration this might influence the reporting limit of the other compounds in terms of a higher detection limit.

If there are any questions concerning this information you can contact your personal project coordinator.