Method Summary

Determination of Volatile Organic Compounds in Soils by Methanolic Extraction and Headspace/GC-MS

Scope and Range

This method is used for the detection, identification and quantitation of 63 Volatile Organic Compounds (VOCs) that have boiling points typically below 200°C.

Soil-cores are preserved in methanol on-site or extracted into methanol in the VOC laboratory.

The analysis is conducted on a Gas Chromatograph system using a Mass Selective Detector (GC-MS).

The concentration range is from the reporting limits shown in the table below up to a maximum of 2500µg/kg.

Holding times for VOC compounds in both refrigerated soil-cores and methanol preserved soils is 14 days (7 days for Vinyl Chloride and Styrene).

Analysis by this method is outside the scope of UKAS accreditation.

Compound	Reporting Limit (µg/kg)	Compound	Reporting Limit (µg/kg)
Dichlorodifluoromethane	50	Dibromochloromethane	10
Chloromethane	50	1,2-Dibromoethane	10
Vinyl Chloride	10	Chlorobenzene	10
Bromomethane	25	1,1,1,2-tetrachloroethane	25
Chloroethane	10	Ethylbenzene	10
Trichlorofluoromethane	10	p/m-Xylene	20
1,1-Dichloroethene	10	o-Xylene	10
Carbon Disulphide	25	Styrene	10
Dichloromethane	50	Bromoform	25
Tert-butyl methyl ether	10	Isopropylbenzene	10
Trans-1,2-Dichloroethene	10	1,1,2,2-Tetrachloroethane	25
1,1-Dichloroethane	10	1,2,3-Trichloropropane	25
Cis-1,2-Dichloroethene	10	Bromobenzene	10
2,2-Dichloropropane	25	Propylbenzene	10
Bromochloromethane	25	2-Chlorotoluene	25
Chloroform	10	4-Chlorotoluene	10
1,1,1-Trichloroethane	10	1,3,5-Trimethylbenzene	25
1,1-Dichloropropene	10	Tert-Butylbenzene	25

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Carbontetrachloride	10	1,2,4-Trimethylbenzene	10
1,2-Dichloroethane	25	Sec-Butylbenzene	10
Benzene	10	4-Isopropyltoluene	10
Tert-amyl methyl ether	50	1,3-Dichlorobenzene	10
Trichloroethene	10	1,4-Dichlorobenzene	10
1,2-Dichloropropane	10	n-Butylbenzene	10
Dibromomethane	25	1,2-Dichlorobenzene	25
Bromodichloromethane	25	1,2-Dibromo-3-Chloropropane	10
Cis-1,3-Dichloropropene	25	1,3,5-Trichlorobenzene	10
Toluene	10	Hexachlorobutadiene	10
Trans-1,3-Dichloropropene	25	1,2,4-Trichlorobenzene	10
1,1,2-Trichloroethane	25	Naphthalene	25
1,3-Dichloropropane	25	1,2,3-Trichlorobenzene	25
Tetrachloroethene	10		

References

BS10176:2000 "Taking Soil Samples for Determination of Volatile Organic Compounds (VOCs)"

USEPA Method No. 5035A "Closed-system purge-and-trap and extraction for volatile organics in soil and waste samples"

Principle

An aliquot of the methanol-extracted sample is transferred to a headspace vial with water and heated/agitated to drive volatile analytes into the headspace of the vial. A portion of the headspace is transferred to a gas chromatograph where the compounds are separated and detected by GC-MS.

Interferences

Compounds with retention times and ion spectra similar to the target compounds could interfere with the analysis.

Interferences in the atmosphere readily dissolve in methanol and as such opened containers of methanol should not be stored for long periods of time.