



Method Summary

Determination of To-15 VOC's in Atmospheric, Subslab and Soilgas samples using Gas Chromatography with Mass Selective Detection

Scope and Range

This method describes a procedure for the detection, identification and quantitation of 69 volatile organic compounds (VOCs) in gases that have boiling points typically below 200°C. This method can also be used to detect, identify and semi-quantify organic compounds outside of the target list that have boiling points below 200°C and give an acceptable response on the detector used.

This method is applicable to atmospheric, sub-slab and soil-gas samples taken using passivated canisters or bottle-vacs. The range of the method is from LOD up to top of calibration (100ppbv).

<u>Compound</u>	<u>LOD (ppbv)</u>	<u>Accreditation</u>	<u>Holding Time (days)</u>
1,1,1-Trichloroethane	1.5	ISO17025	28
1,1,2,2-Tetrachloroethane	1.5	ISO17025	28
1,1,2-Trichloroethane	1.5	ISO17025	28
1,1-Dichloroethane	1.5	ISO17025	28
1,1-Dichloroethene	1.5	ISO17025	28
1,2,4-Trichlorobenzene	1.5	ISO17025	28
1,2,4-Trimethylbenzene	1.5	ISO17025	28
1,2-Dibromoethane	1.5	ISO17025	28
1,2-Dichlorobenzene	1.5	ISO17025	28
1,2-Dichloroethane	1.5	ISO17025	28
1,2-Dichloropropane	1.5	ISO17025	28
1,2-Dichlorotetrafluoroethane	1.5	ISO17025	28
1,3,5-Trimethylbenzene	1.5	ISO17025	28
1,3-Butadiene	1.5	ISO17025	28
1,3-Dichlorobenzene	1.5	None	28
1,4-Dichlorobenzene	1.5	ISO17025	28
1,4-Dioxane	1.5	None	28
2-Butanone (MEK)	1.5	ISO17025	28
2-Hexanone	1.5	ISO17025	28
2-Propanol	1.5	None	28
4-Methyl-2-pentanone	1.5	ISO17025	28
4-Ethyltoluene	1.5	None	28
Acetone	1.5	ISO17025	28
Acrolein	1.5	ISO17025	28
Benzene	1.3	ISO17025	28

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Benzyl Chloride	1.5	ISO17025	28
Bromodichloromethane	1.5	ISO17025	28
Bromoform	1.5	ISO17025	28
Bromomethane	1.5	ISO17025	28
Carbon Disulfide	1.5	ISO17025	28
Carbon Tetrachloride	1.5	ISO17025	28
Chlorobenzene	1.5	ISO17025	28
Chloroethane	1.5	ISO17025	28
Chloroform	1.5	ISO17025	28
Chloromethane	1.5	ISO17025	28
cis-1,2-Dichloroethene	1.5	ISO17025	28
cis-1,3-Dichloropropene	1.5	ISO17025	28
Cyclohexane	1.5	ISO17025	28
Dichlorodifluoromethane	1.5	ISO17025	28
Dibromochloromethane	1.5	None	28
Ethyl Acetate	1.5	None	28
Ethylbenzene	1.5	ISO17025	28
Hexachlorobutadiene	1.5	None	28
Heptane	1.5	None	28
Hexane	1.5	ISO17025	28
m/p-Xylene	3.0	ISO17025	28
Methyl Methacrylate	1.5	None	28
Methylene Chloride	1.5	ISO17025	28
MTBE	1.5	ISO17025	28
Naphthalene	1.5	None	28
o-Xylene	1.5	ISO17025	28
Propylene	1.5	None	28
Styrene	1.5	ISO17025	28
Tetrahydrofuran	1.5	None	28
Tetrachloroethene	1.5	ISO17025	28
Toluene	1.5	ISO17025	28
trans-1,2-Dichloroethene	1.5	ISO17025	28
trans-1,3-Dichloropropene	1.5	ISO17025	28
Trichloroethene	1.5	ISO17025	28
Trichlorofluoromethane	1.5	ISO17025	28



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Trichlorotrifluoroethane	1.5	ISO17025	28
Vinyl Acetate	1.5	ISO17025	28
Vinyl Chloride	1.5	ISO17025	28

References

Second Edition Compendium Method TO-14A – Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using Specially Prepared Canisters with Subsequent Analysis by Gas Chromatography.

TO-15A (2019) Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography-Mass Spectrometry (GC-MS).

Principle

Preparation and Extraction:

Samples are received in passivated canisters or bottle-vacs at close to atmospheric pressure, <5”Hg. Sample containers received with a vacuum >5”Hg are pressurised to ~19.7psia before analysis. A known volume of sample is focussed onto appropriate in-line traps and spiked with internal standards. Water is removed from the sample and the focussed sample is injected into the GC.

Analysis:

The analysis is conducted on an Agilent 7890 Gas Chromatograph (GC) system using an Agilent 5975C Mass Selective Detector (MSD). Analytes are separated on an appropriate analytical column before being detected by a mass selective detector.

Analyte responses are quantified against a 7-point calibration curve and corrected against internal standards.

In the case of non-target compounds being identified within the sample, the response factor of the nearest internal standard is used to calculate analyte concentration.

Interferences

Some solvents, such as dichloromethane and hexane, can be present in the atmosphere of the laboratory. To avoid contamination samples are stored and prepared in areas free from solvents.

m-Xylene and p-xylene co-elute and have similar ion spectra. These compounds are reported as a total as are acetone and propanal.

Branched alkanes are known to cause misidentification of target analytes. Where this is suspected identification is confirmed using a library match.

Contamination by carry over can occur whenever high-level and low-level samples are analysed sequentially. If high concentrations are suspected then the sample is screened using a smaller sample volume (nominally 10ml) and blanks analysed after the suspect sample.