
**Water quality — Determination of highly
volatile halogenated hydrocarbons —
Gas-chromatographic methods**

*Qualité de l'eau — Dosage des hydrocarbures halogénés hautement volatils —
Méthodes par chromatographie en phase gazeuse*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10301 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

Annexes A to G of this International Standard are for information only.

Introduction

Highly volatile halogenated hydrocarbons are used in industrial, commercial and domestic fields, and can enter a water body via waste water and may consequently contaminate drinking water. Furthermore, they can originate from the use of chlorine as an oxidizing agent in water and waste-water treatment. They also can be introduced by inappropriate handling. In addition, they can be formed by decomposition of higher molecular mass organohalogen derivatives.

In uncontaminated ground water and rain water, the concentrations of halogenated hydrocarbons are generally below 0,1 µg/l. In surface water they may be higher, depending on the origin and quality of the water. In untreated waste water the concentrations may reach saturation of the aqueous phase. In general, the solubility of these compounds in organic solvents and in fatty material exceeds their solubility in water.

Water quality — Determination of highly volatile halogenated hydrocarbons — Gas-chromatographic methods

Section 1 : General

1.1 Scope

This International Standard specifies two methods for the determination of highly volatile halogenated hydrocarbons using gas chromatography.

Section 2 specifies a method for the determination by liquid/liquid extraction of highly volatile halogenated hydrocarbons in drinking water, ground water, swimming pool water, most rivers and lakes and many sewage and industrial effluents. Typical values of "quantification limits" are given in table 1.

Table 1 — Typical values of "quantification limits" for some highly volatile halogenated hydrocarbons using liquid/liquid extraction

Compound	Quantification limits µg/l
Dichloromethane	50
Chloroform	0,05 - 0,3
Carbon tetrachloride	0,01 - 0,1
1,1-Dichloroethane	1,0 - 5
1,2-Dichloroethane	5 - 10
1,1,1-Trichloroethane	0,02 - 0,1
1,1,2,2-Tetrachloroethane	0,05 - 0,1
Hexachloroethane	0,01 - 0,05
<i>cis</i> -1,2-Dichloroethylene	5 - 50
<i>trans</i> -1,2-Dichloroethylene	1 - 10
Trichloroethylene	0,05 - 0,1
Tetrachloroethylene	0,1
Hexachlorobutadiene	0,01
Tribromomethane	0,1
1,1,2-Trichlorotrifluoroethane	0,1

Section 3 specifies a method for the determination of highly volatile halogenated hydrocarbons in drinking water, surface waters and ground water by a static head-space method. Typical values of "quantification limits" are given in table 2.

In practise, the head-space method is applicable for industrial effluents as a screening method, but in some cases it is necessary to confirm the result by the liquid-liquid extraction method.

NOTE : When applying this International Standard, the guide on analytical quality control for water analysis (see ISO/TR 13530) should be followed, especially for the calibration steps.

Table 2 — Typical values of "quantification limits" for some highly volatile halogenated hydrocarbons using static head-space method

Compound	Quantification limits µg/l
Dichloromethane	50
Chloroform	0,3
Carbon tetrachloride	0,1
1,1-Dichloroethane	100
1,2-Dichloroethane	100
1,1,1-Trichloroethane	0,1
1,1,2-Trichloroethane	20
1,1-Dichloroethylene	10
<i>cis</i> -1,2-Dichloroethylene	50
<i>trans</i> -1,2-Dichloroethylene	25
Trichloroethylene	0,2
Tetrachloroethylene	0,2
1,2-Dichloropropane	50
1,3-Dichloropropane	200
<i>cis+trans</i> -1,3-Dichloropropylene	10
Dibromomethane	0,3
Tribromomethane (Bromoform)	5
1,2-Dibromoethane	2
Bromochloromethane	1
Bromodichloromethane	0,2
Dibromochloromethane	0,3
1,1,3-Trifluoroethane	1

1.2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5667-1:1980,	Water quality - Sampling - Part 1 : Guidance on the design of sampling programmes
ISO 5667-2:1991,	Water quality - Sampling - Part 2 : Guidance on sampling techniques
ISO/TR 13530:— ¹⁾	Water quality - Guide to analytical quality control for water analysis

¹⁾ In preparation.