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**Water quality — Determination of  
selected alkylphenols —**

Part 1:

**Method for non-filtered samples using  
liquid-liquid extraction and gas  
chromatography with mass selective  
detection**

*Qualité de l'eau — Dosage d'alkylphénols sélectionnés —*

*Partie 1: Méthode pour échantillons non filtrés par extraction en phase  
liquide-liquide et chromatographie en phase gazeuse avec détection  
sélective de masse*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18857-1 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

ISO 18857 consists of the following parts, under the general title *Water quality — Determination of selected alkylphenols*:

- *Part 1: Method for non-filtered samples using liquid-liquid extraction and gas chromatography with mass selective detection*
- *Part 2: Method for filtered samples using solid phase extraction and gas chromatography with mass selective detection*

# Water quality — Determination of selected alkylphenols —

## Part 1:

### Method for non-filtered samples using liquid-liquid extraction and gas chromatography with mass selective detection

**WARNING** — Persons using this International Standard should be familiar with normal laboratory practice. This International Standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

**IMPORTANT** — It is absolutely essential that tests conducted in accordance with this part of ISO 18857 be carried out by suitably qualified staff.

## 1 Scope

This part of ISO 18857 specifies a method for the determination of 4-nonylphenol (mixture of isomers) and 4-(1,1,3,3-tetramethylbutyl)phenol in non-filtered samples of drinking water, ground water and surface water. The method is applicable in a concentration range from 0,005 µg/l to 0,2 µg/l for 4-(1,1,3,3-tetramethylbutyl)phenol and from 0,02 µg/l to 0,2 µg/l for 4-nonylphenol (mixture of isomers). Depending on the matrix, the method is also applicable to waste water containing the analyzed compounds in the concentration range from 0,1 µg/l to 50 µg/l. Higher concentrations can be measured after appropriate dilution of the sample.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the reference document (including any amendments) applies.

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

ISO 5667-1, *Water quality — Sampling — Part 1: Guidance on the design of sampling programmes*

ISO 5667-2, *Water quality — Sampling — Part 2: Guidance on sampling techniques*

ISO 5667-3, *Water quality — Sampling — Part 3: Guidance on the preservation and handling of water samples*

## 3 Principle

The compounds 4-(1,1,3,3-tetramethylbutyl)phenol and 4-nonylphenol (mixture of isomers) are extracted from the acidified water sample with toluene. The extract is cleaned, if necessary, with silica and the alkylphenols are separated by gas chromatography using capillary columns. The alkylphenols are identified by mass spectrometry and quantified using an internal standard over the total procedure. The response factor using 4-(1,1,3,3-tetramethylbutyl)phenol and a technical mixture of isomers of 4-nonylphenol is determined daily.