

INTERNATIONAL STANDARD

**ISO
6439**

Second edition
1990-05-15

Water quality — Determination of phenol index — 4-Aminoantipyrine spectrometric methods after distillation

*Qualité de l'eau — Détermination de l'indice phénol — Méthode spectrométrique à
l'antino-4 antipyrine après distillation*



Reference number
ISO 6439 : 1990 (E)

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 6439 was prepared by Technical Committee ISO/TC 147, *Water quality*.

This second edition cancels and replaces the first edition (ISO 6439 : 1984), of which it constitutes a minor revision.

Annex A forms an integral part of this International Standard.

© ISO 1990

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Introduction

The term "phenol index" as used in this International Standard only includes phenols which react with 4-aminoantipyrine under the conditions specified to give coloured compounds.

In a water containing phenol itself, there will usually be associated with it other phenolic compounds whose sensitivity to the reagents used in the following methods may not necessarily be the same.

The percentage composition of the various phenolic compounds (3.1) present in a given test sample is unpredictable. It is obvious, therefore, that a standard containing a mixture of phenolic compounds cannot be made applicable to all test samples. For this reason, phenol (C_6H_5OH) has been selected as a standard, and any colour produced by the reaction of other phenolic compounds is measured as phenol and reported as the phenol index (3.2).

It is not possible to use the procedures specified in this International Standard to differentiate between different kinds of phenols. Some phenolic compounds with substituents such as alkyl, aryl and nitro in the *para* position do not produce colour with 4-aminoantipyrine. Phenolic compounds containing *para* substituents such as a carboxyl, halogen, hydroxyl, methoxyl or sulfonic acid, do produce colour with 4-aminoantipyrine. Hence the phenol index includes only those phenolic compounds which can be determined under specified conditions.

This document is a preview generated by EVS

This page intentionally left blank

Water quality — Determination of phenol index — 4-Aminoantipyrine spectrometric methods after distillation

1 Scope

This International Standard specifies methods for determining the phenol index (3.2) in drinking waters, surface waters and waste waters.

After a preliminary distillation, the test samples are analysed according to specific application as follows:

method A (direct colorimetric method): this method is capable of measuring the phenol index in test samples that contain more than 0,10 mg/l in the aqueous phase (without chloroform extraction), using phenol as a standard.

method B (chloroform extraction method): this method is capable of measuring the phenol index without dilution from about 0,002 mg/l to about 0,10 mg/l when the coloured end-product is extracted and concentrated in chloroform phase, using phenol as a standard.

NOTES

1 The limits of detection achievable with both methods are insufficient for checking compliance with the limits given in the Directive 80/778/EEC for drinking water.

2) According to the results of a German interlaboratory trial using a method almost identical to method B, the lower limit of detection is 0,01 mg/l.

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 : 1982, *Water quality — Sampling — Part 2: Guidance on sampling techniques.*

ISO 5667-3 : 1985, *Water quality — Sampling — Part 3: Guidance on the preservation and handling of samples.*

3 Definitions

For the purpose of this International Standard, the following definitions apply:

3.1 phenolic compounds: Hydroxy derivatives of benzene and its analogues.

3.2 phenol index: A number giving a concentration, expressed in milligrams of phenol per litre, of different phenolic compounds based on the degree of colour they produce with 4-aminoantipyrine according to the procedure given.

4 Method A — Direct colorimetric method

4.1 Principle

Separation of phenolic compounds from impurities and preservative agents by distillation. The rate of volatilization of the phenolic compounds is gradual, so that the volume of the distillate must equal that of the test sample being distilled.

Reaction of the steam-distillable phenolic compounds with 4-aminoantipyrine at a pH of $10,0 \pm 0,2$ in the presence of potassium hexacyanoferrate(III) to form a coloured antipyrine dye.

Measurement of the absorbance of the dye at 510 nm. The phenol index is expressed as milligrams of phenol (C_6H_5OH) per litre.

The minimum detectable quantity is equivalent to 0,01 mg of phenol when a 50 mm cell is used in the spectrometric measurement and 100 ml of distillate are used in the determination.

4.2 Reagents

During the analysis, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

4.2.1 4-aminoantipyrine, 20 g/l solution.

Dissolve 2,0 g of 4-aminoantipyrine ($C_{11}H_{13}N_3O$) in water and dilute to 100 ml.

Prepare this reagent just before use.

If red particles remain, the solution cannot be used again.