
International Standard



7875/2

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Water quality — Determination of surfactants — Part 2: Determination of non-ionic surfactants using Dragendorff reagent

Qualité de l'eau — Dosage des agents de surface — Partie 2: Dosage des agents de surface non ioniques à l'aide du réactif de Dragendorff

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7875/2 was prepared by Technical Committee ISO/TC 147, *Water quality*.

Water quality — Determination of surfactants — Part 2: Determination of non-ionic surfactants using Dragendorff reagent

0 Introduction

Anionic and non-ionic surface active substances, generally called surfactants, are used in synthetic products for general cleaning purposes.

ISO 7875 consists of the following parts:

Part 1: Determination of anionic surfactants by the methylene blue spectrometric method.

Part 2: Determination of non-ionic surfactants using Dragendorff reagent.

1 Scope

This part of ISO 7875 specifies a method for the determination of non-ionic surfactants in aqueous media using Dragendorff reagent.

2 Field of application

This part of ISO 7875 applies to the determination of low concentrations of bismuth active substances (BiAS), i.e. non-ionic surfactants of the alkylphenol-alkylene oxide and alcohol-alkylene oxide adduct types, as long as they can be stripped and precipitated with Dragendorff reagent (for example ethoxylates with about 5 to 30 ethylene oxide groups per molecule). The method is suitable for influents and effluents of sewage treatment plants and waste water. When investigating surface waters it may be necessary to handle large sample volumes (up to 5 000 ml).

The detection limit is 0,05 mg/l for a 1 litre sample and the optimum range of application is 250 to 800 µg.

3 References

ISO 5667, *Water quality — Sampling —*

Part 2: Guidance on sampling techniques.

*Part 3: Guidance on the preservation and handling of samples.*¹⁾

4 Principle

Air stripping of surfactants from the sample and collection in ethyl acetate. Removal of ethyl acetate and precipitation of the non-ionic surfactants with Dragendorff reagent ($\text{KBiI}_4 + \text{BaCl}_2 + \text{acetic acid}$).

Isolation and dissolution of the precipitate, and potentiometric determination of the concentration of bismuth equivalent to the concentration of non-ionic surfactant with sodium pyrrolidin-1-yl dithiocarboxylate solution.

Alternative methods for the determination of the bismuth ion are, among others, atomic absorption and UV spectrometry (see the annex).

5 Reagents

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

5.1 Sodium chloride (NaCl).

5.2 Sodium hydrogencarbonate (NaHCO_3).

5.3 Ethyl acetate ($\text{C}_4\text{H}_8\text{O}_2$), freshly distilled.

CAUTION — Ethyl acetate is flammable and toxic.

5.4 Methanol (CH_3OH), freshly distilled, stored in a glass bottle.

5.5 Glacial acetic acid (CH_3COOH), $\rho = 1,05 \text{ g/ml}$.

Lower concentrations are not suitable.

5.6 Hydrochloric acid.

Add 1 ml HCl ($\rho = 1,12 \text{ g/ml}$) to 100 ml water.

1) At present at the stage of draft.