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# INTERNATIONAL STANDARD



# 2871

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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**Surface active agents – Detergents – Determination of cationic-active matter – Direct two-phase titration procedure**

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## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

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.

International Standard ISO 2871 was drawn up by Technical Committee ISO/TC 91, *Surface active agents*, and circulated to the Member Bodies in August 1972.

It has been approved by the Member Bodies of the following countries :

Austria	Ireland	Spain
Belgium	Japan	Switzerland
Egypt, Arab Rep. of	Mexico	Thailand
France	New Zealand	Turkey
Germany	Poland	United Kingdom
Hungary	Romania	U.S.A.
India	South Africa, Rep. of	U.S.S.R.

This International Standard has also been approved by the International Union of Pure and Applied Chemistry (IUPAC).

No Member Body expressed disapproval of the document.

# Surface active agents – Detergents – Determination of cationic-active matter – Direct two-phase titration procedure

## 1 SCOPE

This International Standard specifies a method for the determination of cationic-active matter in detergents.

## 2 FIELD OF APPLICATION

This method is applicable to the analysis of cationic-active materials such as long-chain quaternary ammonium compounds (benzyl-dimethyl-stearyl-ammonium chloride, benzyl-dimethyl-dodecyl-ammonium chloride etc.), salts of laurylamine, salts of imidazoline etc.

This method is applicable to solids or to aqueous solutions of the active material. The molar mass of the cationic-active matter must be known or previously determined if its content is expressed as a percentage by mass.

NOTE – Low molar mass sulphonates of toluene and xylene present as hydrotropes do not interfere when present in concentrations up to 15 % (m/m) on active material. At higher levels, their influence shall be evaluated in each particular case.

Non-ionic surface active agents, soap, urea and ethylenediaminetetra-acetic acid salts do not interfere.

Typical inorganic components of detergent formulations such as sodium chloride, sulphate, borate, tripolyphosphate, perborate, silicate, etc., do not interfere, but bleaching agents other than perborate shall be destroyed before the analysis, and the sample must be completely soluble in water.

## 3 REFERENCE

ISO 2271, *Surface active agents – Detergents – Determination of anionic-active matter (direct two-phase titration procedure)*.

## 4 PRINCIPLE

Titration of an aliquot portion of a standard solution of sodium lauryl sulphate with a solution of the test sample, according to the direct two-phase titration procedure described in ISO 2271.

## 5 REAGENTS

The water used shall be distilled water or water of at least equivalent purity.

The reagents given below as a reminder correspond to the reagents used in ISO 2271.

**5.1 Chloroform**,  $\rho_{20}$  1,48 g/ml, distilling between 59,5 and 61,5 °C.

**5.2 Sulphuric acid**, 5 N solution.

**5.3 Sulphuric acid**, 1,0 N solution.

**5.4 Sodium hydroxide**, 1,0 N standard volumetric solution.

**5.5 Sodium lauryl sulphate**, 0,004 M standard volumetric solution.

**5.6 Benzethonium chloride**, 0,004 M, standard volumetric solution.

**5.7 Phenolphalein**.

**5.8 Mixed indicator solution**.

## 6 APPARATUS

Ordinary laboratory apparatus, and

**6.1 Bottles**, 200 ml, fitted with ground, or measuring cylinders, 100 ml, glass stoppers.

**6.2 Burette**, 25 ml complying with class A of ISO/R 385.

**6.3 One-mark volumetric flask**, 1 000 ml capacity, with ground glass stopper, complying with ISO/R 1042.

## 7 PROCEDURE

### 7.1 Test portion

Weigh, to the nearest 1 mg, about 5 g of the test sample.

### 7.2 Determination

Dissolve the weighed sample in 100 ml of water. Transfer to a 1 000 ml one-mark volumetric flask (6.3) and dilute to the mark with water. This is test solution A.

By means of a pipette, transfer 10 ml of the standard volumetric sodium lauryl sulphate standard solution (5.5) into the measuring cylinder (6.1). Add 10 ml of water, 15 ml of the chloroform (5.1) and 10 ml of the mixed acid indicator solution (5.8).

Fill the burette (6.2) with solution A.

Titrate the sodium lauryl sulphate solution with solution A; stopper and shake well after each addition.

As the end-point approaches, emulsions formed during shaking tend to break easily. Continue the titration, drop by drop, with shaking after each addition, until the end-point is reached. This is at the moment when the pink colour is completely discharged from the chloroform layer, which is then a faint greyish blue. With excess of solution A the chloroform layer turns blue. Note the volume of solution A required for the titration.

NOTE — It is recommended that the volume of solution A required for the test be at least 10 ml. If this not the case, adjust the mass of the test portion accordingly.

**8 EXPRESSION OF RESULTS**

**8.1 Calculation**

The content, as a percentage by mass, of cationic-active matter is equal to

$$\frac{M \times T \times 10 \times 1\,000 \times 100}{1\,000 \times V \times m} = \frac{M \times T \times 1\,000}{V \times m}$$

The amount of cationic-active matter in milli-equivalents per gram, is equal to

$$\frac{T \times 10\,000}{V \times m}$$

where

*M* is the molar mass of the cationic-active matter;

*T* is the molarity of the sodium lauryl sulphate solution;

*m* is the mass, in grams, of the test portion;

*V* is the volume, in millilitres, of solution A used for the titration.

**8.2 Repeatability**

The difference found between the results of two determinations carried out on the same sample simultaneously or in rapid succession by the same analyst using the same apparatus should not exceed 1,5 % of the mean value.

**8.3 Reproducibility**

The difference between the results obtained on the same sample in two different laboratories should not exceed 3 % of the average value.

**9 TEST REPORT**

The test report shall include the following particulars :

- a) the reference of the method used;
- b) the results and the method of expression used;
- c) any unusual features noted during the determination;
- d) any operation not included in this International Standard, or regarded as optional.