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**INTERNATIONAL STANDARD**



**2268**

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

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**Surface active agents (non-ionic) – Determination of polyethylene glycols and non-ionic active matter (adducts) – Weibull method**

First edition – 1972-11-15

NOV 15 1972

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UDC 661.185.4 : 547.422

Ref. No. ISO 2268-1972 (E)

**Descriptors :** surfactants, chemical analysis, determination of content, by-products, polyoxyethylene, condensates.

Price based on 5 pages

ISO 2268-1972 (E)

## 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 2268 was drawn up by Technical Committee ISO/TC 91, *Surface active agents*.

It was approved in August 1971 by the Member Bodies of the following countries :

Austria	New Zealand	Sweden
Belgium	Poland	Switzerland
Egypt, Arab Rep. of	Portugal	Turkey
Germany	Romania	United Kingdom
Hungary	South Africa, Rep. of	U.S.A.
Japan	Spain	U.S.S.R.

The Member Body of the following country expressed disapproval of the document on technical grounds :

France

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Printed in Switzerland

# Surface active agents (non-ionic) – Determination of polyethylene glycols and non-ionic active matter (adducts) – Weibull method

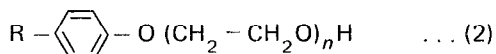
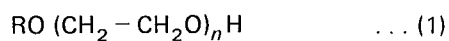
## 1 SCOPE

This International Standard specifies a method for the determination of polyethylene glycols and non-ionic active matter (adducts) in fatty alcohol and alkylphenol polyoxyethylate derivatives.

Generally the commercial products contain polyethylene glycols as a by-product. The Weibull method allows the determination of both the non-ionic active matter (adducts) and the polyethylene glycols impurity.

## 2 FIELD OF APPLICATION

Alkyl and alkylphenol polyoxyethylates correspond to the formulae (1) and (2) given below :



where  $n$  is a mean number of oxyethylene ( $\text{CH}_2 - \text{CH}_2\text{O}$ ) groups per molecule of hydrophobe and  $\text{R}$  is, in formula (1), a straight or branched chain alkyl group, usually comprising  $\text{C}_{10}$  to  $\text{C}_{18}$ , and, in formula (2), a branched chain alkyl group, usually nonyl or tertiary octyl.

The method is applicable to all commercial non-ionic surface active agents containing from 2 to 80 oxyethylene groups per molecule.

## 3 PRINCIPLE

The method relies on the facts that both non-ionic adducts and polyethylene glycols are soluble in sodium chloride solution, but one is soluble in ethyl acetate whereas the other is not.

Separation of the polyethylene glycols and the adducts is, therefore, possible by the following method :

Dissolution of the sample in ethyl acetate and extraction, at  $35 \pm 1^\circ\text{C}$ , of polyethylene glycols by sodium chloride solution and successive washes of the sodium chloride solution by ethyl acetate, and of the ethyl acetate by the sodium chloride solution.

Extraction of the polyethylene glycols isolated in the sodium chloride solution with chloroform, removal of the solvent and weighing of the residue.

Evaporation of the ethyl acetate solution which contains the adducts and weighing of the residue.

## 4 REAGENTS

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

The reagents used shall have the following properties.

**4.1 Ethyl acetate**,  $\rho_{20} = 0,90$  g/ml, distilling between  $75,5$  and  $77,5^\circ\text{C}$ .

**4.2 Sodium chloride solution**

Dissolve 300 g of sodium chloride in 1 000 ml of distilled water.

**4.3 Chloroform**,  $\rho_{20} = 1,48$  g/ml, distilling between  $59,5$  and  $61,2^\circ\text{C}$ .

**4.4 Acetone**, anhydrous,  $\rho_{20} = 0,79$  g/ml, distilling between  $55$  and  $57^\circ\text{C}$ .

**4.5 Light petroleum**, distilling between  $40$  and  $60^\circ\text{C}$ .

## 5 APPARATUS

Ordinary laboratory apparatus and :

### 5.1 Separating funnels

**5.1.1 three separating funnels**, capacity 250 ml, with ground glass stoppers, for method 1 (see Annex).

**5.1.2 three separating funnels**, capacity 250 ml, with ground glass stoppers and jackets, according to Figure, for method 2 (see Annex).

**5.2 One separating funnel**, capacity 500 ml, with ground glass stopper.

**5.3 Two flasks**, capacity 250 ml, wide-necked, with ground glass stoppers.

**5.4 Conical flask**, capacity 500 ml, wide-necked flat-bottomed.