
International Standard



4327

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Non-ionic surface active agents — Polyalkoxylated derivatives — Determination of hydroxyl value — Phthalic anhydride method

Agents de surface non ioniques — Dérivés polyoxyalkylénés — Détermination de l'indice d'hydroxyle — Méthode à l'anhydride phtalique

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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 4327 was developed by Technical Committee ISO/TC 91, *Surface active agents*, and was circulated to the member bodies in June 1976.

It has been approved by the member bodies of the following countries :

Australia	Ireland	Romania
Austria	Japan	South Africa, Rep. of
Belgium	Korea, Rep. of	Switzerland
Brazil	Mexico	Turkey
France	Netherlands	United Kingdom
Germany, F.R.	New Zealand	
India	Poland	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Chile
Spain

Non-ionic surface active agents — Polyalkoxylated derivatives — Determination of hydroxyl value — Phthalic anhydride method

0 INTRODUCTION

The classical method for the determination of the hydroxyl value described in this International Standard requires, because of the toxic effects of pyridine and phthalic anhydride, that all handling and the titration be conducted under a well ventilated fume hood. However, annex C provides a procedure using a special apparatus which reduces the danger due to pyridine and phthalic anhydride.

1 SCOPE

This International Standard specifies a method for the determination of the hydroxyl value of polyalkoxylated condensates by esterification of the hydroxyl groups with phthalic anhydride.

2 FIELD OF APPLICATION

This method is applicable to the determination of the hydroxyl groups of polyalkoxylated condensates of aliphatic and alicyclic compounds (in particular, of ethylene oxide, propylene oxide or mixed adducts of primary and secondary fatty alcohols, alkylphenols and fatty acids, and can be used for the determination of hydroxyl values from 10 to 1 000.

However, certain substances present in these materials may react with the phthalic anhydride or with the standard volumetric sodium hydroxide solution used and consequently falsify the results.

The possible interferences are detailed below :

- Primary and secondary amines and amides, tertiary alcohols, thiols and epoxides undergo side reactions which affect the accuracy of the method.
- Long-chain fatty acids and esters may interfere by forming anhydrides which are more stable than phthalic anhydride and are not completely decomposed at the end of the method.

— Other free acids interfere by reacting with the standard volumetric sodium hydroxide solution; bases, including some tertiary amines, interfere by reacting with the phthalic acid produced. In these cases a correction may be made for the acidity or alkalinity (see ISO 4314).

Although epoxides interfere, the method may still be used if the epoxides can be eliminated, without altering the hydroxyl value, by cold vacuum distillation.

The presence of water in the sample is revealed by reaction with the phthalic anhydride, but the method may nevertheless be used without risk if the precautions described in the procedure are followed.

3 REFERENCES

ISO 607, *Surface active agents and detergents — Methods of sample division*.¹⁾

ISO 1392, *Determination of crystallizing point — General method*.

ISO 2211, *Liquid chemical products — Measurement of colour in Hazen units (platinum-cobalt scale)*.

ISO 4314, *Surface active agents — Determination of free alkalinity or free acidity — Titrimetric method*.

ISO 4317, *Surface active agents — Determination of water content — Karl Fischer method*.

4 DEFINITION

hydroxyl value $I(\text{OH})$: The number of milligrams of potassium hydroxide needed to neutralize the acidity which appears during the esterification, by phthalic anhydride, of the hydroxyl groups in 1 g of the material, or the number of milligrams of potassium hydroxide corresponding to the hydroxyl groups in 1 g of the material.

NOTE — The number of moles of potassium hydroxide corresponding to the hydroxyl value is equal to the number of hydroxyl groups present in 1 kg of the material.

1) In preparation. (Revision of ISO/R 607.)