INTERNATIONAL STANDARD 3240

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Sodium sulphate for industrial use — Determination of acidity or alkalinity

Sulfate de sodium à usage industriel — Détermination de l'acidité ou de l'alcalinité

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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 3240 was drawn up by Technical Committee ISO/TC 47, *Chemistry,* and circulated to the Member Bodies in November 1973.

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

Australia	Germany	Poland
Austria	Hungary	Romania
Belgium	India	South Africa, Rep. of
Bulgaria	Ireland	Spain
Chile	Israel	Switzerland
Czechoslovakia	Italy	Thailand
Egypt, Arab Rep. of	Korea, Rep. of	Turkey
Finland	Netherlands	United Kingdom
France	New Zealand	U.S.S.R.

No Member Body expressed disapproval of the document.

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INTERNATIONAL STANDARD ISO 3240-1975 (E)

Sodium sulphate for industrial use — Determination of acidity or alkalinity

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for the determination of a possible excess of acidity or alkalinity in sodium sulphate for industrial use, after dissolution in water.

2 REFERENCES

ISO 3234, *Sodium sulphate for industrial use — Determination of loss in mass at 110 °C.*

ISO . . ., *Chemical products — Sampling.* [1)]

3 PRINCIPLE

Dissolution in water of a test portion. Addition of a known excess of standard volumetric sulphuric acid solution, in the presence of methyl red. Elimination of carbon dioxide by boiling. Titration of the excess of acid with standard volumetric sodium hydroxide solution. Calculation of the acidity or alkalinity, expressed as sulphuric acid (H_2SO_4) or sodium carbonate (Na_2CO_3), depending on whether the quantity of acid found is higher or lower than the known quantity introduced.

4 REAGENTS

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

4.1 Sulphuric acid, 0,1 N standard volumetric solution.

4.2 Sodium hydroxide, 0,1 N standard volumetric solution, free from carbonates.

4.3 Methyl red, 1 g/l solution in 95 % (*V/V*) ethanol.

5 APPARATUS

Ordinary laboratory apparatus.

6 SAMPLING

For the sampling instructions, including the number of increments to be taken from a batch of given size, use the method specified in ISO . . .

7 PROCEDURE

7.1 Test portion

Weigh, to the nearest 0,01 g, about 10 g of the test sample.

7.2 Blank test

After the determination, carry out a blank test using the same quantities of the standard volumetric sulphuric acid solution (4.1) and of the methyl red solution (4.3) as for the determination.

7.3 Determination

Dissolve the test portion (7.1) in 200 ml of water containing 5 drops of the methyl red solution (4.3), in a 500 ml conical flask.

If the solution is yellow, introduce, from a burette, the standard volumetric sulphuric acid solution (4.1) until the appearance of a red colour and then, in all cases, that is to say even if the solution is red to begin with, add an excess of 10 ml of the sulphuric acid solution (4.1), and boil for 5 min. If the colour becomes yellow during the boiling, add a further known volume of the sulphuric acid solution (4.1) such that the final excess is about 10 ml. Cool the solution to about 60 °C and titrate the excess acid with the standard volumetric sodium hydroxide solution (4.2) until the colour changes from red to yellow.

1) In preparation.

8 EXPRESSION OF RESULTS

In the formulae given in 8.1 and 8.2,

V_0 is the total volume, in millilitres, of the standard volumetric sulphuric acid solution (4.1) added during the determination (and equally during the blank test);

V_1 is the volume, in millilitres, of the standard volumetric sodium hydroxide solution (4.2) used for the determination;

V_2 is the volume, in millilitres, of the standard volumetric sodium hydroxide solution (4.2) used for the blank test;

m is the mass, in grams, of the test portion (7.1).

8.1 Acid samples

In this case V_1 is greater than V_2.

The acidity of the product "as received", expressed as a percentage by mass as sulphuric acid (H_2SO_4), is given by the formula

$$(V_1 - V_2) \times 0{,}1 \times \frac{V_0}{V_2} \times 0{,}049 \times \frac{100}{m} = \frac{0{,}49\ V_0\ (V_1 - V_2)}{V_2 \times m}$$

8.2 Alkaline samples

In this case V_2 is greater than V_1.

The alkalinity of the product "as received", expressed as a percentage by mass as sodium carbonate (Na_2CO_3), is given by the formula

$$(V_2 - V_1) \times 0{,}1 \times \frac{V_0}{V_2} \times 0{,}053 \times \frac{100}{m} = \frac{0{,}53\ V_0\ (V_2 - V_1)}{V_2 \times m}$$

NOTE – If it is desired to express the result on the basis of the material dried at 110 °C, multiply the result obtained for the product "as received" by the factor

$$\frac{100}{100 - P}$$

where P is the loss in mass at 110 °C, determined according to the method specified in ISO 3234.

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 in those International Standards to which reference is made, or regarded as optional.

ANNEX

This document forms part of a series of International Standards on methods of test for sodium sulphate for industrial use.

The complete list of the International Standards published is as follows :

ISO 3234 — Determination of loss in mass at 110 °C.

ISO 3235 — Determination of acid-insoluble matter.

ISO 3236 — Determination of chlorides content — Mercurimetric method.

ISO 3237 — Determination of sulphates content — Calculation method and barium sulphate gravimetric method.

ISO 3238 — Determination of calcium content — EDTA complexometric method.

ISO 3239 — Determination of iron content — 1,10-Phenanthroline photometric method.

ISO 3240 — Determination of acidity or alkalinity.

ISO 3241 — Measurement of pH — Potentiometric method.