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# INTERNATIONAL STANDARD



# 982

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

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## Sodium hydroxide for industrial use – Determination of sulphate content – Barium sulphate gravimetric method

*Hydroxyde de sodium à usage industriel – Dosage des sulfates – Méthode gravimétrique à l'état de sulfate de baryum*

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**Descriptors** : sodium hydroxide, chemical analysis, determination of content, sulphates, gravimetric analysis.

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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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 47 has reviewed ISO Recommendation R 982 and found it technically suitable for transformation. International Standard ISO 982 therefore replaces ISO Recommendation R 982-1969 to which it is technically identical.

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ISO Recommendation R 982 was approved by the Member Bodies of the following countries :

Austria	Iran	Romania
Belgium	Ireland	South Africa, Rep. of
Chile	Israel	Spain
Cuba	Italy	Switzerland
Czechoslovakia	Japan	Thailand
Egypt, Arab Rep. of	Korea, Dem. P. Rep. of	Turkey
France	Netherlands	United Kingdom
Germany	New Zealand	U.S.S.R.
Hungary	Poland	Yugoslavia
India	Portugal	

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

U.S.A.

The Member Body of the following country disapproved the transformation of ISO/R 982 into an International Standard :

United Kingdom

# Sodium hydroxide for industrial use — Determination of sulphate content — Barium sulphate gravimetric method

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a barium sulphate gravimetric method for the determination of the sulphate content of sodium hydroxide for industrial use.

The method is applicable to products having a sulphate content, expressed as sodium sulphate and calculated on NaOH equal to or greater than 0,10 % (m/m).

## 2 REFERENCE

ISO 3195, *Sodium hydroxide for industrial use — Sampling — Test sample — Preparation of the main solution for carrying out certain determinations.*

## 3 PRINCIPLE

Precipitation of sulphate as barium sulphate in dilute hydrochloric acid. Separation of the precipitate, heating at  $800 \pm 25$  °C and weighing.

## 4 REAGENTS

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

**4.1 Hydrochloric acid**,  $\rho$  approximately 1,19 g/ml, about 38 % (m/m) or approximately 12 N solution.

**4.2 Sulphuric acid**,  $\rho$  approximately 1,84 g/ml, about 96 % (m/m) or approximately 36 N solution.

**4.3 Barium chloride dihydrate** ( $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ ), 122 g/l solution, or approximately 1 N.

**4.4 Silver nitrate**, 5 g/l nitric solution.

Dissolve 0,5 g of silver nitrate in a small amount of water, add 10 ml of nitric acid solution,  $\rho$  approximately 1,40 g/ml, and dilute to 100 ml.

**4.5 Methyl orange**, 0,5 g/l solution.

## 5 APPARATUS

Ordinary laboratory apparatus and

**5.1 Platinum crucible**, having a top diameter of approximately 30 mm and a height of approximately 30 mm, with lid.

**5.2 Electric oven**, capable of being controlled at  $110 \pm 2$  °C.

**5.3 Electric furnace**, capable of being controlled at  $800 \pm 25$  °C.

## 6 PROCEDURE

### 6.1 Test portion

Weigh, to the nearest 0,01 g, a mass of the solid or liquid test sample corresponding to approximately 10 g of NaOH (see ISO 3195).

### 6.2 Preparation of the test solution

Place the test portion (6.1) in a 600 ml beaker. In the case of a solid product, dissolve the test portion in 100 ml of water; in the case of a liquid product, dilute to approximately 100 ml. Add 5 drops of the solution of methyl orange (4.5) and slowly, while stirring, the volume of the hydrochloric acid solution (4.1) required for the neutralization. Then add, *immediately*, 2 ml in excess of the acid.

Transfer the solution quantitatively to a 200 ml one-mark volumetric flask, dilute to the mark and mix.

Filter on a dry, ashless, slow-speed filter paper of diameter approximately 90 mm and discard the first 10 ml of the filtrate.

### 6.3 Determination

Place 100,0 ml of the test solution (6.2) in a beaker of suitable capacity (for example 600 ml).

Bring to the boil, stirring continuously, and add 10 ml of the barium chloride solution (4.3) drop by drop (the addition should take about 90 s).

Maintain boiling for 2 min, stirring all the time. Heat on a boiling water bath for 2 h, stop heating and allow to stand for about 16 h.

Filter on an ashless, slow-speed filter paper of diameter approximately 90 mm (pore diameter between 0,4 and 1  $\mu\text{m}$  approximately). Wash the precipitate onto the filter paper with hot water until 10 ml of the liquid flowing from the funnel remain clear for 5 min after the addition of 10 ml of the nitric solution of silver nitrate (4.4).

Place the filter paper and its contents in the platinum crucible (5.1) previously tared after heating in the furnace (5.3) controlled at  $800 \pm 25$  °C and allowing to cool in a desiccator.

Place the crucible and its contents in the oven (5.2) controlled at  $110 \pm 2$  °C, until complete desiccation. Then heat in the furnace, gently at first to char the filter paper, without burning, and then at  $800 \pm 25$  °C for 15 min. Allow to cool in a desiccator to ambient temperature and weigh to the nearest 0,000 1 g.

If the calcined precipitate shows a greyish colour due to the presence of graphitic carbon, add 1 drop of the sulphuric acid solution (4.2) before weighing, again place in the furnace and heat at  $800 \pm 25$  °C for 15 min and allow to cool in the desiccator to ambient temperature.

## 7 EXPRESSION OF RESULTS

The sulphate content, expressed as a percentage by mass of sodium sulphate ( $\text{Na}_2\text{SO}_4$ ), is given by the formula :

$$m_1 \times \frac{200}{100} \times \frac{100}{m_0} \times 0,608\ 6 = 121,72 \frac{m_1}{m_0}$$

where

$m_0$  is the mass, in grams, of the test portion (6.1);

$m_1$  is the mass, in grams, of the barium sulphate precipitate;

0,608 6 is the conversion factor for  $\text{BaSO}_4$  to  $\text{Na}_2\text{SO}_4$ .

## 8 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 the International Standard to which reference is made, or regarded as optional.

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ANNEX  
ISO 982:1976

[https://standards.iteh.ai/catalog/standards/sist/aa695aec-9364-4d81-a166-](https://standards.iteh.ai/catalog/standards/sist/aa695aec-9364-4d81-a166-2024/iso-982-1976)

ISO PUBLICATIONS RELATING TO SODIUM HYDROXIDE FOR INDUSTRIAL USE

ISO 979 – Method of assay.

ISO 980 – Determination of carbonate content – Gas-volumetric method.

ISO 981 – Determination of chloride content – Mercurimetric method.

ISO 982 – Determination of sulphate content – Barium sulphate gravimetric method.

ISO 983 – Determination of iron content – 1,10-Phenanthroline photometric method.

ISO 984 – Determination of silica content – Reduced silicomolybdic complex photometric method.

ISO 985 – Determination of silica content – Gravimetric method by precipitation of quinoline molybdosilicate.

ISO 986 – Determination of calcium – EDTA (disodium salt) complexometric method.

ISO 3195 – Sampling – Test sample – Preparation of the main solution for carrying out certain determinations.

ISO 3196 – Determination of carbon dioxide content – Titrimetric method.

ISO 3197 – Determination of chloride content – Photometric method.

ISO 3198 – Determination of sulphur compounds – Method by reduction and titrimetry.

ISO 3697 – Determination of calcium and magnesium contents – Flame atomic absorption method.