
INTERNATIONAL STANDARD



983

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Sodium hydroxide for industrial use — Determination of iron content — 1,10-Phenanthroline photometric method

Hydroxyde de sodium à usage industriel — Dosage du fer — Méthode photométrique à la 1,10-phénanthroline

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

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

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

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.

This International Standard cancels and replaces ISO Recommendation R 983-1969, of which it constitutes a technical revision.

Sodium hydroxide for industrial use – Determination of iron content – 1,10-Phenanthroline photometric method

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a 1,10-phenanthroline photometric method for the determination of the iron content of sodium hydroxide for industrial use.

This method is more sensitive and more widely used than the 2,2'-bipyridyl method which was specified in ISO/R 983-1969.

The method is applicable to products having iron contents equal to or greater than 0,5 mg/kg.

2 REFERENCE

ISO 3195, *Sodium hydroxide for industrial use – Sampling – Test sample – Preparation of the main solution for carrying out certain determinations.*¹⁾

3 PRINCIPLE

Reduction of the trivalent iron by hydroxylammonium chloride, followed by the formation of a bivalent iron/1,10-phenanthroline complex in a buffered system. Photometric measurement of the coloured complex at a wavelength of about 510 nm.

4 REAGENTS

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

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

4.2 Ammonia solution, ρ approximately 0,91 g/ml, about 25 % (m/m) NH_3 solution or approximately 13 N, with a maximum iron content of 0,2 mg/kg.

4.3 Hydroxylammonium chloride ($\text{NH}_2\text{OH}\cdot\text{HCl}$), 10 g/l solution.

4.4 Buffer solution, pH 4,9.

Dissolve 272 g of sodium acetate trihydrate ($\text{CH}_3\text{COONa}\cdot 3\text{H}_2\text{O}$) in about 500 ml of water. Add 240 ml

of glacial acetic acid (ρ approximately 1,05 g/ml, 99 to 100 % (m/m) solution or approximately 17,4 N) to the solution, dilute to 1 000 ml and mix.

4.5 Bromine water, saturated at room temperature.

4.6 1,10-phenanthroline hydrochloride monohydrate ($\text{C}_{12}\text{H}_8\text{N}_2\cdot\text{HCl}\cdot\text{H}_2\text{O}$), 2,5 g/l solution.

This reagent may be replaced by 1,10-phenanthroline monohydrate ($\text{C}_{12}\text{H}_8\text{N}_2\cdot\text{H}_2\text{O}$), 2,5 g/l solution.

4.7 Iron, standard solution, corresponding to 0,200 g of Fe per litre.

Dissolve 1,404 3 g of ammonium iron(II) sulphate hexahydrate [$(\text{NH}_4)_2\text{Fe}(\text{SO}_4)_2\cdot 6\text{H}_2\text{O}$], weighed to the nearest 0,000 1 g, in 200 ml of water. Add 20 ml of sulphuric acid, ρ approximately 1,84 g/ml, cool to room temperature, dilute to the mark in a 1 000 ml one-mark volumetric flask and mix.

4.8 Iron, standard solution corresponding to 0,010 g of Fe per litre.

Transfer 25,0 ml of the standard iron solution (4.7) to a 500 ml one-mark volumetric flask, dilute to the mark and mix.

Prepare this solution immediately before use.

1 ml of this standard solution contains 0,010 mg of Fe.

4.9 Methyl orange, 0,5 g/l solution.

5 APPARATUS

Ordinary laboratory apparatus and

5.1 Spectrophotometer, or

5.2 Photoelectric absorptiometer, fitted with filters giving a maximum transmission between 500 and 520 nm.

6 PROCEDURE

6.1 Test portion

Weigh, to the nearest 0,01 g, in a weighing bottle fitted

1) At present at the stage of draft.