



SLOVENSKI STANDARD
SIST EN 896:2000
01-november-2000

Kemikalije, ki se uporabljajo za pripravo pitne vode - Natrijev hidroksid

Chemicals used for treatment of water intended for human consumption - Sodium hydroxide

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumhydroxid

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Hydroxyde de sodium

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ICS:

13.060.20	Pitna voda	Drinking water
71.100.80	Kemikalije za čiščenje vode	Chemicals for purification of water

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EUROPEAN STANDARD

EN 896

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 1998

ICS 71.100.80

Descriptors: potable water, water treatment, chemical compounds, sodium hydroxide, description, physical properties, chemical properties, impurities, toxic substances, tests, labelling, storage, utilization

English version

Chemicals used for treatment of water intended for human consumption - Sodium hydroxide

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Hydroxyde de sodium

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumhydroxid

This European Standard was approved by CEN on 22 July 1998.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 164 "Water supply", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 1999, and conflicting national standards shall be withdrawn at the latest by February 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by this Standard :

- 1) this Standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA ;
- 2) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

1 Scope

This European Standard is applicable to sodium hydroxide used for treatment of water intended for human consumption. It describes the characteristics of sodium hydroxide and specifies the requirements and the corresponding test methods for sodium hydroxide. It gives information on its use in water treatment.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN ISO 3696	Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)
ISO 979	Sodium hydroxide for industrial use - Method of assay
ISO 3165	Sampling of chemical products for industrial use - Safety in sampling
ISO 3196	Sodium hydroxide for industrial use - Determination of carbonates content - Titrimetric method
ISO 5666-1:1983	Water quality - Determination of total mercury by flameless atomic absorption spectrometry - Part 1 : Method after digestion with permanganate-peroxodisulfate
ISO 6206	Chemical products for industrial use - Sampling - Vocabulary
ISO 8213	Chemical products for industrial use - Sampling techniques - Solid chemical products in the form of particles varying from powders to coarse lumps

3 Description

3.1 Identification

3.1.1 Chemical name

Sodium hydroxide.

3.1.2 Synonym or common name

Caustic soda.

3.1.3 Relative molecular mass

40.

3.1.4 Empirical formula

NaOH.

3.1.5 Chemical formula

NaOH.

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3.1.6 CAS Registry Number ¹⁾[894c8d56def3/sist-en-896-2000](https://standards.iteh.ai/catalog/standards/sist/688c500f-49ca-4635-bb79-894c8d56def3/sist-en-896-2000)

1310-73-2.

3.1.7 EINECS reference ²⁾

215-185-5.

3.2 Commercial forms

The product is available as flakes, pearls, solid, or as an aqueous solution of different concentrations.

¹⁾ Chemicals Abstracts Service Registry Number.

²⁾ European Inventory of Existing Commercial Chemical Substances.

3.3 Physical properties

3.3.1 Appearance

Solid : White, deliquescent.

Solution : Clear, slightly turbid colourless solution, slightly viscous.

3.3.2 Density

Solid : 2,1 g/cm³.

Bulk density of pearls : about 1,2 kg/dm³.

Solution of concentration of 50 % (m/m) : 1,52 g/ml at 20 °C.

3.3.3 Solubility (in water)

Highly soluble at all temperatures above 20 °C (partial crystallization occurs above concentration 55 % (m/m) , (see figure 1).

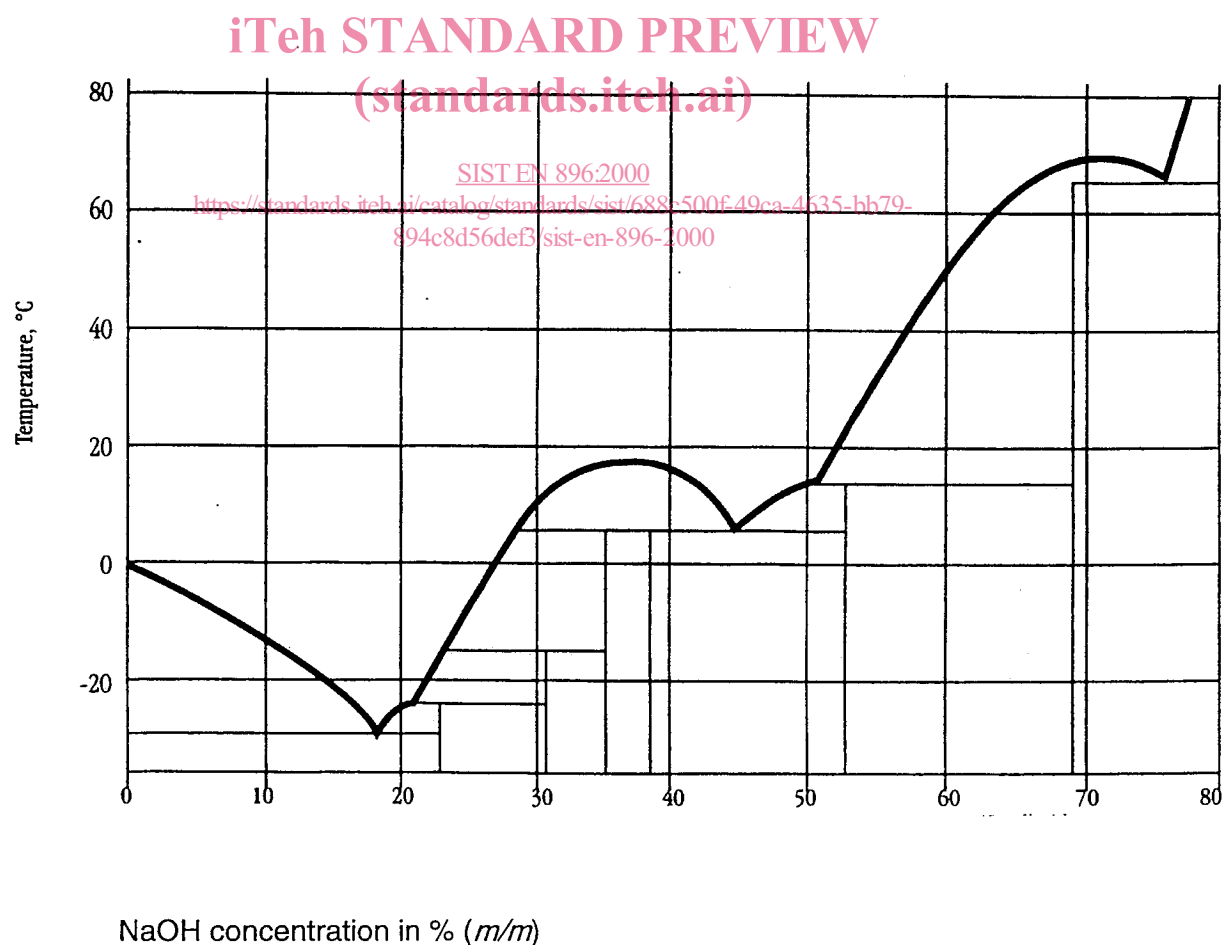


Figure 1

3.3.4 Vapour pressure

Solution of concentration of 50 % (*m/m*) :

- 120 Pa at 20 °C ;
- 450 Pa at 40 °C ;
- 5 000 Pa at 80 °C.

3.3.5 Boiling point at 100 kPa³⁾

About 145 °C for a solution of concentration of 50 % (*m/m*).

3.3.6 Crystallization point

+ 12 °C for a solution of concentration of 50 % (*m/m*) (see figure 1).

3.3.7 Specific heat

3220 J/kg.K at 20 °C for a solution of concentration of 50 % (*m/m*).

3.3.8 Viscosity (dynamic)

For a solution of concentration of 50 % (*m/m*):

- 100 Pa.s at 20 °C ;
- 25 Pa.s at 40 °C ;
- 5 Pa.s at 80 °C.

3.3.9 Critical temperature

Not applicable.

3.3.10 Critical pressure

Not applicable.

3.3.11 Physical hardness

Not applicable.

³⁾ 100 kPa = 1 bar.

3.4 Chemical properties

Solutions of sodium hydroxide are strongly alkaline.

Dilution of sodium hydroxide is very exothermic.

4 Purity criteria

4.1 Genera

Limits have been given for impurities and toxic substances where these are likely to be present in significant quantities from the current production process and raw materials. If a change in the production process or raw materials leads to significant quantities of other impurities or by-products being present, this shall be notified to the user.

4.2 Composition of commercial product

The product shall contain not less than 96 % (*m/m*) of NaOH for the solid form. Typical concentration for solutions of sodium hydroxide is either 50 % (*m/m*) or 30 % (*m/m*), and shall be in any case within the manufacturers stated tolerance.

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4.3 Impurities and main by-products (standards.iteh.ai)

The product shall conform to the requirements specified in table 1.

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The concentration limits refer to pure NaOH 100 % (*m/m*).

Table 1 : Impurities

Impurity		Limit in % (<i>m/m</i>) of NaOH
Sodium chloride (NaCl) ¹⁾	max.	2,4
Sodium carbonate (Na ₂ CO ₃) ²⁾	max.	0,4
Sodium chlorate (NaClO ₃) ³⁾	max.	0,7
<p>1) Too high concentrations can cause problems with some ion exchange resins.</p> <p>2) Sodium carbonate is formed in contact with atmospheric carbon dioxide.</p> <p>3) The presence of any oxidizing agent in sodium hydroxide is to be avoided.</p>		

4.4 Toxic substances

NOTE : For the purpose of this standard, "toxic substances" are those defined in the EU Directive 80/778/EEC of 15 July, 1980 (see D.1).

The content of toxic substances shall conform to with the requirements specified in table 2.

The concentration limits are specified in milligrams per kilogram of NaOH.

Table 2 : Toxic substances

Element		Limit in mg/kg of NaOH	
		Type 1	Type 2
Arsenic (As)	max.	2	10
Cadmium (Cd)	max.	1	5
Chromium (Cr)	max.	1	10
Mercury (Hg)	max.	0,1	1
Nickel (Ni)	max.	2	10
Lead (Pb)	max.	5	20
Antimony (Sb)	max.	5	5
Selenium (Se)	max.	5	5

NOTE : Cyanides, pesticides and polycyclic aromatic hydrocarbons are not relevant toxic substances as listed in EU Directive 80/778/EEC because they are not likely to be found in the raw materials.

5 Test methods

5.1 Sampling

Take a sample in accordance with ISO 8213, taking account of ISO 3165 and also ISO 6206. The nature of the caustic alkalis requires to take special care at all points of sampling and preparation for analysis. Sampling techniques shall be such as to limit or prevent atmospheric exposure since sodium hydroxides, both as aqueous solutions or as anhydrous products, rapidly absorb moisture and carbon dioxide (and other acid gases) from the atmosphere. Additional precautions are necessary if trace constituents are to be determined.

NOTE : For sampling liquids see D.3.

5.2 Analyses

5.2.1 Main product

5.2.1.1 Total alkalinity

The total alkalinity shall be determined by titration with a standard volumetric acid solution in accordance with ISO 979.

5.2.1.2 Caustic alkalinity

The caustic alkalinity equals the total alkalinity as NaOH (see 5.2.1.1) minus the alkalinity as Na_2CO_3 multiplied by 0,755 determined in accordance with ISO 3196.

5.2.2 Impurities

5.2.2.1 Sodium chloride

The sodium chloride content shall be determined by potentiometric titration with silver nitrate solution (see B.1).

5.2.2.2 Sodium carbonate

The sodium carbonate content shall be determined by the titrimetric method, in accordance with ISO 3196.

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5.2.2.3 Sodium chlorate

See B.2.

5.2.3 Toxic substances

The contents of toxic substances, except for mercury, shall be determined by inductively coupled, plasma optical emission spectrometry (ICP/OES).

5.2.3.1 Arsenic

The arsenic content shall be determined by inductively coupled plasma optical emission spectrometry (ICP/OES) (see B.3).

5.2.3.2 Cadmium

The cadmium content shall be determined by inductively coupled plasma optical emission spectrometry (ICP/OES) (see B.3).