



SLOVENSKI STANDARD
SIST EN 12926:2001
01-december-2001

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

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumperoxodisulfat

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

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ICS:

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EUROPEAN STANDARD

EN 12926

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2000

ICS 71.100.80

English version

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

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumperoxodisulfat

This European Standard was approved by CEN on 25 June 2000.

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.

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

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Contents

	Page
Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Description	5
3.1 Identification.....	5
3.2 Commercial form.....	6
3.3 Physical properties.....	6
3.4 Chemical properties	7
4 Purity criteria	7
4.1 Composition of commercial product	7
4.2 Impurities and main by-products	7
4.3 Toxic substances	7
5 Test methods.....	8
5.1 Sampling	8
5.2 Analysis	8
6 Labelling - Transportation - Storage.....	12
6.1 Means of delivery.....	12
6.2 Risk and safety labelling according to the EU directives	12
6.3 Transportation regulations and labelling	13
6.4 Marking	13
6.5 Storage.....	14
Annex A (informative) General information on sodium peroxodisulfate.....	15
Annex B (normative) General rules relating to safety	16
Annex C (normative) Determination of arsenic, antimony and selenium (atomic absorption spectrometry hydride technique).....	17
Bibliography	23

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 January 2001, and conflicting national standards shall be withdrawn at the latest by January 2001.

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.

Annex A is informative.

The annexes B and C are normative.

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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 :

- a) 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 ;
- b) 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.

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1 Scope

This European Standard is applicable to sodium peroxodisulfate used for treatment of water intended for human consumption. It describes the characteristics of sodium peroxodisulfate and specifies the requirements and the corresponding test methods for sodium peroxodisulfate. 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 (including amendments).

EN 1483, *Water quality – Determination of mercury.*

EN ISO 3696, *Water for analytical laboratory use - Specification and test methods (ISO 3696:1987).*

ISO 3165, *Sampling of chemical products for industrial use - Safety in sampling.*

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.*

ISO 8288:1986, *Water quality - Determination of cobalt, nickel, copper, zinc, cadmium and lead - Flame atomic absorption spectrometric methods.*

ISO 9174, *Water quality - Determination of chromium - Atomic absorption spectrometric methods.*

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3 Description

3.1 Identification

3.1.1 Chemical name

Sodium peroxodisulfate.

3.1.2 Synonym or common name

Sodium persulfate.

3.1.3 Relative molecular mass

238,11.

3.1.4 Empirical formula

$\text{Na}_2\text{S}_2\text{O}_8$.

3.1.5 Chemical formula

$\text{Na}_2\text{S}_2\text{O}_8$.

3.1.6 CAS Registry Number ¹⁾

7775-27-1.

3.1.7 EINECS reference ²⁾

231-892-1.

3.2 Commercial form

Sodium peroxodisulfate is available as a crystalline powder.

3.3 Physical properties

3.3.1 Appearance and odour

The product is white, odourless, crystalline free-flowing salt.

3.3.2 Density

The bulk density of the product is approximately 1,15 g/cm³.

3.3.3 Solubility in water

The solubility of the product in water is approximately :

515 g/l at 10 °C ;

545 g/l at 20 °C ;

605 g/l at 40 °C ;

680 g/l at 60 °C.

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3.3.4 Vapour pressure

Not applicable.

3.3.5 Boiling point at 100 kPa ³⁾

Not applicable.

3.3.6 Melting point

The product decomposes above 65 °C.

3.3.7 Specific heat

Not known.

¹⁾ Chemical Abstracts Service Registry Number

²⁾ European Inventory of Existing Commercial Chemical Substances

³⁾ 100 kPa = 1 bar.

3.3.8 Viscosity (dynamic)

Not applicable.

3.3.9 Critical temperature

Not applicable.

3.3.10 Critical pressure

Not applicable.

3.3.11 Physical hardness

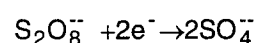
Not applicable.

3.4 Chemical properties

Sodium peroxodisulfate is a powerful oxidizing agent.

Sodium peroxodisulfate also serves as a source of radicals.

The standard reduction potential E_0 sodium peroxodisulfate for the reaction :



is + 2,06 V at 25 °C.

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4 Purity criteria <https://standards.iteh.ai/catalog/standards/sist/a40ad17c-c34a-4852-a154-356481938169/sist-en-12926-2001>

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.

4.1 Composition of commercial product

The commercial product shall contain not less than 99 percent by mass (% (*m/m*)) of $\text{Na}_2\text{S}_2\text{O}_8$.

4.2 Impurities and main by-products

Sodium peroxodisulfate does not contain significant concentrations of impurities or by-products.

4.3 Toxic substances

NOTE For the purpose of this standard, "Toxic substances" are those defined in the EU Directive 80/778/EU of 15 July 1980 (see [1]).

The content of toxic substances shall conform to the requirements specified in Table 1.

Table 1 — Toxic substances

Parameter		Limit in mg/kg of Na ₂ S ₂ O ₈	
		Type 1	Type 2
Arsenic (As)	max.	0,05	5
Cadmium (Cd)	max.	0,05	2
Chromium (Cr)	max.	0,5	5
Mercury (Hg)	max.	2	2
Nickel (Ni)	max.	0,2	5
Lead (Pb)	max.	0,05	5
Antimony (Sb)	max.	5	10
Selenium (Se)	max.	5	10

NOTE Cyanide which does not exist in a strong oxidizing medium such as sodium peroxodisulfate is not a relevant toxic substance. Pesticides and polycyclic aromatic hydrocarbons are not by-products of the manufacturing process.

5 Test methods

5.1 Sampling

Observe the recommendations of ISO 3165 and take account of ISO 6206. Prepare the laboratory sample(s) required by the relevant procedure described in ISO 8213.

5.2 Analysis

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5.2.1 Determination of sodium peroxodisulfate (main product)

5.2.1.1 Principle

Determination of peroxodisulfate content by back-titrating a predetermined excess of iron (II) with potassium permanganate.

5.2.1.2 Reagents

All reagents shall be of a recognized analytical grade and the water used shall conform to grade 3 in accordance with EN ISO 3696.

5.2.1.2.1 Potassium permanganate standard volumetric solution ; $c(\text{KMnO}_4) = 0,02 \text{ mol/l}$.

5.2.1.2.2 Sulfuric acid (H_2SO_4), density $\rho = 1,84 \text{ g/ml}$.

5.2.1.2.3 Phosphoric acid (H_3PO_4), density $\rho = 1,68 \text{ g/ml}$.

5.2.1.2.4 Iron (II) sulfate solution ; $c(\text{FeSO}_4) = 0,1 \text{ mol/l}$.

Dissolve 77 g of iron (II) ammonium sulfate in 500 ml water, add 150 ml of sulfuric acid (5.2.1.2.2) and 50 ml of phosphoric acid (5.2.1.2.3) and make up to 2 000 ml with water. Filter before use.

5.2.1.2.5 Potassium chloride (KCl) crystals.

5.2.1.2.6 Potassium chloride ; $c(\text{KCl}) = 3 \text{ mol/l}$.

Dissolve 224 g potassium chloride (5.2.1.2.5) in water, add 2 ml of phosphoric acid (5.2.1.2.3) and make up to 1 000 ml with water.

5.2.1.3 Apparatus

Ordinary laboratory apparatus and glassware, together with the following:

5.2.1.3.1 Automated potentiometric titration apparatus with program-control of the addition of the solution from the burette.

5.2.1.4 Procedure

5.2.1.4.1 Preparation of test solution

Weigh, to the nearest of 0,1 mg, 0,30 g of sodium peroxodisulfate (m), transfer to a 250 ml glass beaker and dissolve with a small amount of water.

5.2.1.4.2 Determination

Introduce the test solution (5.2.1.4.1) for the potentiometric titration in the apparatus (5.2.1.3.1). Add a predetermined excess of the iron (II) sulfate solution (5.2.1.2.4) and titrate against the potassium permanganate standard volumetric solution (5.2.1.2.1). Record the volume (V) used.

Carry out a blank determination, in duplicate, at the start of the determination and after ten titrations of test solutions.

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5.2.1.5 Expression of results

The sodium peroxodisulfate content, C_1 , expressed as a percentage by mass (% (m/m)), is given by the following equation :

$$C_1 = \frac{(V_0 - V) \times 0,1 \times c \times 100 \times 119,05}{1\,000 \times m}$$

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where

- m is the mass in grams of the test portion ;
- c is the actual concentration expressed in moles per litre of the permanganate standard volumetric solution ;
- V_0 is the volume in millilitres of the potassium permanganate standard volumetric solution used for the blank determination ;
- V is the volume in millilitres of the potassium permanganate standard volumetric solution used for the determination ;
- 119,05 is the mass in grams of sodium peroxodisulfate, corresponding to 1,00 ml of potassium permanganate solution $c(\text{KMnO}_4) = 1,00 \text{ mol/l}$.

The content of active oxygen, (C_2), expressed in percent by mass (% (m/m)) is given by the following equation :

$$C_2 = C_1 \times 0,0672.$$

5.2.2 Impurities

Not applicable.