



SLOVENSKI STANDARD

SIST EN 12926:2008

01-december-2008

Nadomešča:
SIST EN 12926:2001

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

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumperoxodisulfat

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

[SIST EN 12926:2008](#)

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Ta slovenski standard je istoveten z: EN 12926:2008

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 12926

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2008

ICS 71.100.80

Supersedes EN 12926:2000

English Version

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

Produits chimiques 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 30 July 2008.

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 CEN Management Centre 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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 12926:2008) 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 March 2009, and conflicting national standards shall be withdrawn at the latest by March 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12926:2000.

Significant technical difference between this edition and EN 12926:2000 is as follows:

- deletion of reference to EU Directive 80/778/EEC of July 15, 1980 in order to take into account of the latest Directive in force (see [1]).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, 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 European Standard:

- a) this European 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.

NOTE Conformity with this European Standard does not confer or imply acceptance or approval of the product in any of the Member States of the EU or EFTA. The use of the product covered by this European Standard is subject to regulation or control by National Authorities.

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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

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1233, *Water quality – Determination of chromium – Atomic absorption spectrometric methods*

EN 1483, *Water quality – Determination of mercury – Method using atomic absorption spectrometry*

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*

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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

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

EN 12926:2008 (E)**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.

¹⁾ Chemical Abstracts Service Registry Number

²⁾ European Inventory of Existing Commercial Chemical Substances

³⁾ 100 kPa = 1 bar

3.3.7 Specific heat

Not known.

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 is + 2,06 V at 25 °C for the following reaction:

**4 Purity criteria****4.1 General**

This European Standard specifies the minimum purity requirements for sodium peroxodisulfate used for the treatment of water intended for human consumption. Limits are given for impurities commonly present in the product. Depending on the raw material and the manufacturing process other impurities may be present and, if so, this shall be notified to the user and when necessary to relevant authorities.

NOTE Users of this product should check the national regulations in order to clarify whether it is of appropriate purity for treatment of water intended for human consumption, taking into account raw water quality, required dosage, contents of other impurities and additives used in the product not stated in the product standard.

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

4.2 Composition of commercial product

The commercial product shall contain not less than 99 mass fraction percent of $\text{Na}_2\text{S}_2\text{O}_8$.

4.3 Impurities and main by-products

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

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4.4 Chemical parameters

NOTE For the purpose of this standard, "chemical parameters" are those defined in the EU Directive 98/83/EC of 3 November 1998 (see [1]).

The content of chemical parameters shall conform to the requirements specified in Table 1.

Table 1 — Chemical parameters

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 chemical parameter. Pesticides and polycyclic aromatic hydrocarbons are not by-products of the manufacturing process.

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5 Test methods

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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

NOTE All measurements should be made with a tolerance of $\pm 10\%$ unless otherwise stated.

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 $\rho = 1,68$ g/ml.

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

5.2.1.2.6 Potassium chloride; $c(\text{KCl}) = 3$ 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

5.2.1.3.1 Ordinary laboratory apparatus and glassware.

5.2.1.3.2 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) in the potentiometric titration apparatus (5.2.1.3.2). 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.

5.2.1.5 Expression of results

The sodium peroxodisulfate content, C_1 , expressed as a mass fraction percentage is given by the following equation:

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

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;