SLOVENSKI STANDARD
oSIST prEN 902:2014

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Kemikalije, ki se uporabljajo za pripravo pitne vode - Vodikov peroksid

Chemicals used for treatment of water intended for human consumption - Hydrogen peroxide

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Wasserstoffperoxid

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Peroxyde d'hydrogène

Ta slovenski standard je istoveten z: **prEN 902**

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Chemicals used for treatment of water intended for human consumption - Hydrogen peroxide

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Peroxyde d'hydrogène

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Wasserstoffperoxid

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 164.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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Foreword

This document (prEN 902:2014) has been prepared by Technical Committee CEN/TC 164 “Water supply”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 902:2009.

The significant technical differences between this edition and EN 902:2009 are as follows:

a) deletion of the reference to EU Directive 67/548/EEC of June 27,1967 in order to take into account the latest Directive in force (see [1]);

b) use of the changed classification and labelling (see [1]).

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.

NOTE 1 Conformity with this 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.

NOTE 2 This product is a biocide and has to comply with the relevant legislation in force. In the European Union, at the time of publication, this legislation is REGULATION (EU) No 528/2012 [1]).

1 Scope

This document is applicable only to hydrogen peroxide and not to mixtures with other chemicals used for treatment of water intended for human consumption. It describes the characteristics of hydrogen peroxide and specifies the requirements and the corresponding test methods for hydrogen peroxide. It gives information on its use in water treatment. It also determines the rules relating to safe handling and use (see Annex B).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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)*

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

ISO 6206, *Chemical products for industrial use — Sampling — Vocabulary*

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*

3 Description

3.1 Identification

3.1.1 Chemical name

Hydrogen peroxide

3.1.2 Synonym or common name

None

3.1.3 Relative molecular mass

34,02

3.1.4 Empirical formula

H_2O_2

3.1.5 Chemical formula

H_2O_2

3.1.6 CAS Registry Number[1)]

7722-84-1

1) Chemical Abstracts Service Registry Number.

3.1.7 EINECS reference[2)]

231-765-0

3.2 Commercial form

The product is supplied as an aqueous solution.

3.3 Physical properties

3.3.1 Appearance and odour

The product is colourless liquid, slightly pungent odour.

3.3.2 Density

The density of hydrogen peroxide is given in Table 1.

Table 1 — Density

Solution concentration Mass fraction in%	**Density** g/ml at 20 °C
20	1,075
30	1,114
35	1,132
50	1,195
60	1,241
70	1,289

3.3.3 Solubility in water

The product is miscible with water in all proportions.

3.3.4 Vapour pressure

The vapour pressure of hydrogen peroxide depending on concentration is given in Table 2.

Table 2 — Vapour pressure

Solution concentration Mass fraction in %	**Vapour pressure** kPa at 20 °C
20	2,0
30	1,8
35	1,7
50	1,3
60	1,1
70	0,8

2) European Inventory of Existing Commercial Chemical Substances.

3.3.5 Boiling point at 100 kPa[3)]

The boiling point of hydrogen peroxide depending on concentration is given in Table 3.

Table 3 — Boiling point

Solution concentration Mass fraction in %	**Boiling point** °C at 100 kPa
20	103
30	106
35	108
50	114
60	119
70	125

3.3.6 Crystallization point

The crystallisation point of hydrogen peroxide depending on concentration is given in Table 4.

Table 4 — Crystallization point

Solution concentration Mass fraction in %	**Crystallization point** °C
20	– 14,6
30	– 25,7
35	– 32,5
50	– 51
60	– 55
70	– 37

3.3.7 Specific heat

The specific heat of hydrogen peroxide depending on concentration is given in Table 5.

Table 5 — Specific heat

Solution concentration Mass fraction in %	**Specific heat** kJ/(kg.K)
20	3,82 at 20 °C
50	3,32 at 20 °C
100	2,63 at 25 °C

3) 100 kPa = 1 bar.

3.3.8 Viscosity, dynamic

The viscosity of hydrogen peroxide depending on concentration is given in Table 6.

Table 6 — Viscosity

Solution concentration Mass fraction in %	**Viscosity** MPa.s at 20 °C
20	1,04
30	1,07
35	1,10
50	1,17
60	1,20
70	1,24
100	1,25

3.3.9 Critical temperature

The critical temperature of pure hydrogen peroxide is 457 °C.

3.3.10 Critical pressure

The critical pressure of pure hydrogen peroxide is 21,7 mPa.

3.3.11 Physical hardness

Not applicable.

3.4 Chemical properties

Hydrogen peroxide is a weak acid.

According to species in solution, it is an oxidizing agent (E° =1,776 V) or a reducing agent (E °= 0,682 V).
Oxidizing agent:

$$H_2O_2 + 2H^+ + 2e^- \text{-----> } 2H_2O$$

Reducing agent:

$$H_2O_2 \text{-----> } O_2 + 2H^+ + 2e^-$$

NOTE 1 It can be activated by ultraviolet light, ozone or metals to generate free radicals.

NOTE 2 Singlet oxygen can be obtained by reaction of hydrogen peroxide with hypochlorite.

4 Purity criteria

4.1 General

This European Standard specifies the minimum purity requirements for hydrogen peroxide 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 this 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 lead 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 hydrogen peroxide is usually available in concentrated solution with concentration within the range of mass fraction of 20 % to 70 %. Diluted products are also available.

The concentration of hydrogen peroxide shall be equal to or greater than the manufacturer specified value.

4.3 Impurities and main by-products

Not applicable.

4.4 Chemical parameters

The product shall conform to the requirements specified in Table 7.

Table 7 — Chemical parameters

Parameter		Limit in mg/kg of hydrogen peroxide (mass fraction 100 %)	
		Type 1	Type 2
Arsenic (As)	max.	0,5	1
Cadmium (Cd)	max.	0,5	1
Chromium (Cr)	max.	0,5	1
Mercury (Hg)	max.	0,5	1
Nickel (Ni)	max.	1	5
Lead (Pb)	max.	0,5	1
Antimony (Sb)	max.	0,5	1
Selenium (Se)	max.	0,5	1
NOTE Cyanide which does not exist in a strong oxidizing medium such as hydrogen peroxide is not a relevant chemical parameter. Pesticides and polycyclic aromatic hydrocarbons are not by-products of the manufacturing process. For parametric values of chemical parameters in drinking water, see [2].			