SLOVENSKI STANDARD
oSIST prEN 889:2020

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Kemikalije, ki se uporabljajo za pripravo pitne vode - Železov (II) sulfat

Chemicals used for treatment of water intended for human consumption - Iron (II) sulfate

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Eisen(II)sulfat

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Sulfate de fer (II)

Ta slovenski standard je istoveten z: **prEN 889**

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

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ICS 71.100.80

Will supersede EN 889:2004

English Version

Chemicals used for treatment of water intended for human consumption - Iron (II) sulfate

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Sulfate de fer (II)

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Eisen(II)sulfat

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

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European foreword

This document (prEN 889:2020) 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 890:2004.

In comparison with the previous edition, the following technical modifications have been made:

- removal of the analytical methods from this document and referred to EN 17215 as analytical method standard;
- harmonization of the table for elements (Table 2, section 5.4) for all iron product standards;
- update of the information of risk and safety labelling of the product to comply with the new regulations (see 7.2 and [2]);
- addition of Iron (II) sulfate monohydrate.

Introduction

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

a) this document 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 document 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 document is subject to regulation or control by National Authorities.

1 Scope

This document is applicable to iron (II) sulfate heptahydrate and iron (II) sulfate monohydrate used for treatment of water intended for human consumption. It describes the characteristics of iron (II) sulfate heptahydrate and monohydrate, specifies the requirements and the corresponding analytical methods and gives information on their use in water treatment.

2 Normative references

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

EN 17215, *Chemicals used for treatment of water intended for human consumption — Iron-based coagulants — Analytical methods*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at http://www.iso.org/obp
- IEC Electropedia: available at https://www.electropedia.org/

4 Description

4.1 Identification

4.1.1 Chemical names

a) Iron (II) sulfate heptahydrate

b) Iron (II) sulfate monohydrate

c) Iron (II) sulfate solution

4.1.2 Synonym or common names

a) Ferrous sulfate, iron vitriol, copperas, green salt

b) Ferrous sulfate, monohydrate

c) Ferrous sulfate, solution

4.1.3 Relative molecular mass

a) 278,02

b) 169,96

c) 151,94

4.1.4 Empirical formula

a) $FeSO_4 . 7H_2O$.

b) $FeSO_4 . H_2O$

c) $FeSO_4$

4.1.5 Chemical formula

a) $FeSO_4 . 7H_2O$.

b) $FeSO_4 . H_2O$

c) $FeSO_4$

4.1.6 CAS Registry Number[1)]

a) 7782-63-0

b) 17375-41-6

c) 7782-63-0, 7720-78-7

4.1.7 EINECS reference[2)]

231-753-5 ($FeSO_4$).

4.2 Commercial forms

a) Iron (ll) sulfate heptahydrate is available as damp crystals, and free-flowing crystals.

b) Iron (II) sulfate monohydrate is available as dry crystals

c) Iron (II) sulfate is available as a solution, there is no difference between solutions prepared from the heptahydrate or monohydrate.

4.3 Physical properties

4.3.1 Appearance

Iron (ll) sulfate heptahydrate is a light green crystal when damp.

Iron (II) sulfate heptahydrate in free flowing form is an off-white crystal.

Iron (II) sulfate monohydrate is a grey crystalline powder.

Iron (II) sulfate solutions are dark green in colour.

4.3.2 Density

The density of a) iron (ll) sulfate heptahydrate is equal to 1,9 g/cm^3 at 20 °C.

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1) Chemical Abstracts Service Registry Number

2) European Inventory of Existing Commercial Chemical Substances

The density of b) iron (ll) sulfate monohydrate is equal to 1,4 - 1,7 g/cm³ at 25 °C.

The bulk density of commercial form a) is equal approximately to 0,8 - 1 kg/dm³.

The bulk density of commercial form (b) is equal approximately to 0,8 - 1,2 kg/dm³.

The density of c) saturated solution is 1,25 g/cm³ at 20 °C.

4.3.3 Solubility (in water)

The solubility of iron (II) sulfate heptahydrate is approximately 550 g/dm³ at 25 °C.

The solubility of iron (II) sulfate monohydrate is 90 g/dm³ at 20 °C.

4.3.4 Vapour pressure

Not applicable.

4.3.5 Boiling point at 100 kPa[3)]

Not applicable.

4.3.6 Melting point

For the iron (ll) sulfate heptahydrate loss of water of crystallization starts at approximately 64 °C, with decomposition at approximately 300 °C.

4.3.7 Specific heat

Not known.

4.3.8 Viscosity (dynamic)

Not applicable.

4.3.9 Critical temperature

Not applicable.

4.3.10 Critical pressure

Not applicable.

4.3.11 Physical hardness

Not applicable.

4.4 Chemical properties

Iron (II) sulfate heptahydrate or monohydrate and in particular their solutions have acid and reducing properties. They react by oxidation or hydrolysis (depending on the pH).

5 Purity criteria

5.1 General

This document specifies the minimum purity requirements for iron (II) sulfate used for the treatment of water intended for human consumption. Limits are given for impurities commonly present in the product.

3) 100 kPa = 1 bar

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 can 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 chemical 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.

5.2 Composition of commercial product

For the heptahydrate product, it shall contain not less than a mass fraction of 82 % of $FeSO_4 \cdot 7H_2O$ (i.e. not less than a mass fraction of 16 % of Fe) and shall be within ± 3 % of the manufacturer's declared values.

For the monohydrate product, it shall contain not less than 82 % of of $FeSO_4 \cdot H_2O$ (i.e. not less than a mass fraction of 26 % of Fe) and shall be within ± 3 % of the manufacturer's declared values.

5.3 The grade of the product

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

The concentration limits refer to Fe (ll).

Table 1 — The limit values for grades 1, 2 and 3

Parametre		Limit Mass fraction of Fe (ll) content in %		
		Grade 1	**Grade 2**	**Grade 3**
Manganese	max.	0,5	1	2
Insoluble matters:				
- damp crystal heptahydrate form	max.	0,6	0,6	0,6
- heptahydrate free flowing form	max.	3	3	3
- Monohydrate form		0,6	0,6	0,6
NOTE An excess of insoluble matters indicates the presence of foreign matter. Iron as a component of the product will usually be removed in the treatment process.				

5.4 The limit values for different types

The product shall conform to the requirements specified in Table 2.

The concentration limits are specified in milligrams per kilogram of Fe (II).