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**Kemikalije, ki se uporabljajo za pripravo pitne vode - Železov (III) klorid sulfat**

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Eisen (III)chloridsulfat

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

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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  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 891**

April 2020

ICS 71.100.80

Will supersede EN 891:2004

English Version

## Chemicals used for treatment of water intended for human consumption - Iron (III) chloride sulfate

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Eisen(III)chloridsulfat

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

If this draft becomes a European Standard, 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.

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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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (prEN 891:2020) 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 891:2004.

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

- removed the analytical methods from this standard 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]).

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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 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.

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## 1 Scope

This document is applicable to iron (III) chloride sulfate used for treatment of water intended for human consumption. It describes the characteristics of iron (III) sulfate and specifies the requirements and the corresponding analytical methods for iron (III) chloride sulfate and gives information on its use in water treatment. It also determines the rules relating to safe handling and use of iron (III) chloride sulfate.

## 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

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### 4.1 Identification

#### 4.1.1 Chemical name

Iron (III) chloride sulfate solution.

#### 4.1.2 Synonym or common names

Ferric chloride sulfate, ferric chloro sulfate, chlorinated copperas.

#### 4.1.3 Relative molecular mass

187,36.

#### 4.1.4 Empirical formula

FeClSO<sub>4</sub>.

#### 4.1.5 Chemical formula

FeClSO<sub>4</sub>.

#### 4.1.6 CAS Registry Number<sup>1)</sup>

12410-14-9.

<sup>1)</sup> Chemical Abstracts Service Registry Number.

**prEN 891:2020 (E)****4.1.7 EINECS reference<sup>2)</sup>**

235-649-0.

**4.2 Commercial form**

Iron (III) chloride sulfate is available as solution.

**4.3 Physical properties****4.3.1 Appearance**

Iron (III) chloride sulfate is a dark brown solution.

**4.3.2 Density**

The density of iron (III) chloride sulfate solution is approximately 1,5 g/ml.

**4.3.3 Solubility (in water)**

Iron (III) chloride sulfate is dilutable (see A.3.2).

**4.3.4 Vapour pressure**

Not applicable.

**4.3.5 Boiling point at 100 kPa<sup>3)</sup>**

102 °C.

**4.3.6 Freezing point**

For the iron (III) chloride sulfate the freezing starts at approximately -50 °C.

Below -15 °C, sharp increase in viscosity.

**4.3.7 Specific heat**

Not known.

**4.3.8 Viscosity (dynamic)**

For the iron (III) chloride sulfate the viscosity is approximately 70 mPa.s at 10 °C.

**4.3.9 Critical temperature**

Not applicable.

**4.3.10 Critical pressure**

Not applicable.

**4.3.11 Physical hardness**

Not applicable.

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<sup>2)</sup> European Inventory of Existing Commercial Chemical Substances.

<sup>3)</sup> 100 kPa = 1 bar.



## 4.4 Chemical properties

The solutions of iron (III) chloride sulfate are acidic and corrosive.

## 5 Purity criteria

### 5.1 General

This document specifies the minimum purity requirements for iron (III) chloride sulfate 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 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 lead to significant quantities of impurities, by-products, or additives being present, this shall be notified to the user.

### 5.2 Composition of commercial product

The product shall contain not less than a mass fraction of 37 % of  $\text{FeClSO}_4$  (i.e. not less than a mass fraction of 11 % of Fe) and shall be within  $\pm 3$  % of the manufacturer's declared values.

The solution will typically contain 0-1 % free acid.

### 5.3 The grade of the product

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

The concentration limits refer to Fe (III).

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

Parametre		Limit		
		Mass fraction of Fe (III) content in %		
		Grade 1	Grade 2	Grade 3
Manganese	max.	0,5	1	2
Iron(II) <sup>a</sup>	max.	2,5	2,5	2,5
Insoluble matters <sup>b</sup>	max.	0,2	0,2	0,2
<p><sup>a</sup> Fe (II) has a lower coagulant efficiency compared to Fe (III). Also hydrolysis of Fe (II) starts at pH value 8, and therefore Fe (II) can remain into the water at lower pH values.</p> <p><sup>b</sup> An excess of insoluble matters indicates the presence of foreign matter. Iron is a component of the product will usually be removed in the treatment process.</p>				

## 5.4 The type of the product

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

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

**Table 2 — The limit values for the types 1, 2 and 3**

Parameter		Limit in mg/kg of Fe (III)		
		Type 1	Type 2	Type 3
Arsenic (As)	max.	7	20	50
Cadmium (Cd)	max.	1,5	25	50
Chromium (Cr)	max.	100	350	500
Mercury (Hg)	max.	2	5	10
Nickel (Ni)	max.	300	350	500
Lead (Pb)	max.	20	100	400
Antimony (Sb)	max.	10	20	60
Selenium (Se)	max.	10	20	60

NOTE Cyanide (CN<sup>-</sup>), pesticides and polycyclic aromatic hydrocarbons are not relevant since the raw materials used in the manufacturing process are free of them. For maximum impact of iron (III) chloride sulfate on trace metal content in drinking water see A.2.

## 6 Test methods

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### 6.1 Sampling

Use the relevant methods described in EN 17215.

### 6.2 Analyses

Use the relevant methods described in EN 17215.

## 7 Labelling - Transportation - Storage

### 7.1 Means of delivery

The product shall be delivered in tankers or containers made of suitable non-corrosive materials.

In order that the purity of the product is not affected, the means of delivery shall not have been used previously for any different product or it shall have been specially cleaned and prepared before use.

### 7.2 Risk and safety labelling according to the EU Directives<sup>4)</sup>

The following is an example of labelling. The manufacturer should confirm the classifications for their product. Users are instructed to read the manufactures data sheet.

<sup>4)</sup> See [2].