BRITISH STANDARD

BS EN 15797:2010

Chemicals used for the treatment of swimming pool water — Iron based coagulants

ICS 13.060.25; 71.100.80

BSI
British Standards

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee CII/59, Chemicals for drinking water treatment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2010

ISBN 978 0 580 61783 6

Amendments/corrigenda issued since publication

Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15797

January 2010

ICS 71.100.80

English Version

Chemicals used for the treatment of swimming pool water - Iron based coagulants

Produits chimiques utilisés pour le traitement de l'eau des piscines - Coagulants à base de fer

Produkte zur Aufbereitung von Schwimm- und Badebackenwasser - Flockungsmittel auf Eisenbasis

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Foreword

This document (EN 15797:2010) 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of an identical text or by endorsement, at the latest by July 2010, and conflicting national standards shall be withdrawn at the latest by July 2010.

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Introduction

In respect of potential adverse effects on the quality of water for swimming pools, caused by the products covered by this European Standard:

a) this document provides no information as to whether the products 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 these products remain in force.

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

1 Scope

This European Standard is applicable to iron based coagulants (iron (III) chloride, iron (III) chloride sulfate and iron (III) sulfate liquid) used directly or for the production of formulations for treatment of water for swimming pools.

It describes the characteristics of iron based coagulants and specifies the requirements and the corresponding test methods for iron based coagulants. It gives information on their use in swimming pool water treatment. General information on iron based coagulants is given in Annex A.

It also determines the rules relating to safe handling and use (see Annex B).

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 888, *Chemicals used for treatment of water intended for human consumption — Iron (III) chloride*

EN 890*, Chemicals used for treatment of water intended for human consumption — Iron (III) sulfate liquid*

EN 891, *Chemicals used for treatment of water intended for human consumption — Iron (III) chloride sulfate*

3 Description

For the identification, the commercial form, the physical properties and the chemical properties see the relevant subclauses of EN 888, EN 890 and EN 891.

4 Purity criteria

4.1 General

This document specifies the minimum purity requirements for iron based coagulants used for the treatment of water for swimming pools. Limits are given for impurities commonly present in the products. 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 these products should check the national regulations in order to clarify whether they are of appropriate purity for treatment of water for swimming pools, taking into account water quality, required dosage, contents of other impurities and additives used in these products not stated in these product standards.

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 other impurities by-products or additives being present, this shall be notified to the user.

4.2 Composition of commercial product

The concentration of active matter in the product expressed as mass fraction in % of $FeCl_3$, $Fe_2(SO_4)_3$ or $FeClSO_4$ shall be within ± 3 % of the manufacturer's declared values.

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NOTE The concentration of iron active matter in commercial products varies. Typical values are given in Table 1.

Table 1 – Typical values for the concentration of iron active matter in commercial products

Product	Commercial form	Concentration Mass fraction in %
Iron (III) chloride	Solid	99 in $FeCl_3$
	Solid hexahydrate	59 in $FeCl_3$
	Solution	40 in $FeCl_3$
Iron (III) sulfate	Solution	30 in $Fe_2(SO_4)_3$
Iron (III) chloride sulfate	Solution	36,9 in $FeClSO_4$

4.3 Impurities and main by-products

The content of manganese, iron (II) and insoluble matters shall conform to the requirements specified in EN 888, EN 890 and EN 891.

4.4 Chemical parameters

The content of arsenic, cadmium, chromium, mercury, nickel, lead, antimony and selenium for each grade and type of products shall conform to the requirements specified in EN 888, EN 890 and EN 891.

5 Test methods

The methods for sampling and analysis are those specified respectively in EN 888, EN 890 and EN 891.

6 Labelling - Transportation - Storage

6.1 Means of delivery

Solids: the products shall be delivered in suitable packages, paper or plastics bags

Liquids: the products shall be delivered in containers of corrosion-resistant materials suitable for the purpose.

NOTE The manufacturer can provide advice on suitable materials.

In order that the purity of the products 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.

6.2 Risk and safety labelling in accordance with the EU Directives[1)]

Iron (III) chloride is not subject to labelling regulations.

1) See [1].

The following labelling requirements shall apply to the following iron based coagulants at the date of the publication of this document:

Iron (III) sulfate liquid:

a) symbols and indications of danger:

C: Corrosive;

b) nature of special risks attributed to dangerous substances:

R 36/38: Irritating to eyes and skin;

c) safety advice concerning dangerous substances:

1) S 26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice;

2) S 36/37/39: Wear suitable protective clothing, gloves and eye/face protection.

Iron (III) chloride sulfate:

d) Symbols and indications of danger:

C: Corrosive;

e) Nature of special risks attributed to dangerous substances:

1) R 21/22: Harmful in contact with skin and if swallowed;

2) R 34: Causes burns;

3) R 36/38: Irritating to eyes and skin;

f) Safety advice concerning dangerous substances:

1) S 24/25: Avoid contact with skin and eyes;

2) S 37/39: Wear suitable gloves and eye/face protection.

NOTE Annex I of the Directive 67/548/EEC on Classification, packaging and labelling of dangerous substances and its amendments and adaptations in the European Union contains a list of substances classified by the EU. Substances not listed in that Annex I should be classified on the basis of their intrinsic properties according to the criteria in the Directive by the person responsible for the marketing of the substance.

6.3 Transportation regulations and labelling

6.3.1 General

The following classification requirements shall apply to the following iron based coagulants at the date of the publication of this document.

6.3.2 Iron (III) chloride

Depending on the composition, the commercial product can be subject to transportation regulations and, if so, at the date of the publication of this document the iron (III) chloride is listed as UN[2)] number 1773 and the solutions as UN number 2582.

a) ADR[3)] / RID[4)]

   1) class 8, classification code C2; packing group III (E) for iron (III) chloride;

   2) class 8, classification code C1; packing group III (E) for solutions.

b) IMDG[5)]: class 8;

c) IATA[6)]: class 8.

6.3.3 Iron (III) sulfate liquid

At the date of the publication of this document, the commercial product is subject to transportation regulations and is listed as UN number 1760.

a) ADR[3)] / RID[4)]: class 8; classification code C9; packing group I (E);

b) IMDG[5)]: class 8, packing group I;

c) IATA[6)]: class 8, packing group I.

6.3.4 Iron (III) chloride sulfate:

At the date of the publication of this document, the commercial product is subject to transportation regulations and is listed as UN number 2582.

a) ADR3) / RID4): class 8; classification code C1; packing group III (E);

b) IMDG[5)]: class 8;

c) IATA[6)]: class 8.

6.4 Marking

The marking shall include the following information:

a) the name:

   1) "iron (III) chloride"; or

   2) "iron (III) sulfate liquid"; or

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2) United nations Number.

3) European Agreement concerning the international carriage of Dangerous goods by Road.

4) Regulations concerning International carriage of Dangerous goods by rail.

5) International Maritime Transport of Dangerous Goods Code.

6) International Air Transport Association. Dangerous Goods Regulations.

3) "iron (III) chloride sulfate";

b) the trade name, commercial form, class, grade and type;

c) the net mass;

d) the name and the address of the supplier and/or manufacturer;

e) the statement "This product conforms to EN 15797".

6.5 Storage

6.5.1 Long term stability

6.5.1.1 Iron (III) chloride

Products are stable, but for solutions see 6.5.2.1.

6.5.1.2 Iron (III) sulfate liquid

Storable in stainless steel (316 and 440), rubber and plastics containers or tanks.

NOTE Some sedimentation of yellow iron (III) sulfate can occur.

6.5.1.3 Iron (III) chloride sulfate

Unlimited storage in plastics or rubber lined containers or tanks.

NOTE Some sedimentation of yellow iron(III) chloride sulfate can occur.

6.5.2 Storage incompatibilities

6.5.2.1 Iron (III) chloride

Solid products: keep barrels dry and tightly closed. Keep away from water, these products are hygroscopic.

Solutions: keep away from alkalis, these products react aggressively towards metals and strong oxidizing agents (chlorites, hypochlorites and sulfites).

6.5.2.2 Iron (III) sulfate liquid

Iron (III) sulfate liquid is corrosive:

— avoid contact with metals (except stainless steel 316 and 440);

— avoid contact with alkalis;

— avoid contact with oxidizing agents especially chlorites and hypochlorites.

6.5.2.3 Iron (III) chloride sulfate

Iron (III) chloride sulfate has a highly acid and corrosive character. Avoid any contact with metals. Keep away from alkaline agents. Avoid contact with agents capable of liberating chlorine.

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Annex A
(informative)

General information on iron based coagulants

A.1 Origin

A.1.1 Raw materials

See EN 888, EN 890 and EN 891.

A.1.2 Manufacturing process

See EN 888, EN 890 and EN 891.

A.2 Use

A.2.1 Function

The products are used as primary coagulants to enhance the removal of dissolved, colloidal and suspended material (including micro-organisms) by filtration.

A.2.2 Form in which the product is used

The products are used either as delivered or prediluted according to the manufacturer's recommendations.

A.2.3 Treatment dose

The treatment dose depends on the quality of the swimming pool water. The minimum dose is normally approximately 2 g/m^3 to 10 g/m^3 expressed as Fe of water recirculated through the filter.

A.2.4 Means of application

The products are usually applied using a positive-displacement metering pump. Sufficient turbulence should be provided at the point of addition to promote rapid dispersion.

The products are dosed prior to medium rate sand filters; a delay time of at least 10 s should be provided between dosing and the water reaching the filters whereby the flow velocity of the water should not exceed 1,5 m/s.

A.2.5 Secondary effects

a) reduction of pH value and alkalinity;

b) increase of respective anion concentration.

A.2.6 Removal of excess product

The coagulation process includes the hydrolysis of the ferric ions to ferric hydroxide. This precipitate is removed by sedimentation, flotation and/or filtration.

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Annex B
(normative)

General rules relating to safety

B.1 Rules for safe handling and use

The supplier shall provide current safety instructions.

B.2 Emergency procedures

B.2.1 First aid

In case of contact with the skin, take off immediately all contaminated clothing; wash thoroughly with plenty of cold water and seek medical advice if irritation persists.

In case of contact with the eyes, immediately rinse with plenty of cold water and seek medical advice.

In case of inhalation, remove to fresh air, loosen clothing and seek medical advice.

In case of ingestion, do not induce vomiting, provided patient is conscious, wash the mouth out with water and seek medical advice.

B.2.2 Spillage

a) For iron (II) chloride collect the major of the spillage; neutralize the remainder with calcium hydroxide and rinse with plenty of water;

b) For iron (III) sulfate liquid:

   1) Small spillage: wash away with large quantities of water;

   2) Large spillage: neutralize with lime or soda ash, then dispose of according to local regulations. Water can be used if washings can go to drain. Immediately inform police and local authorities if product has entered public drains or waterways;

c) For iron (III) chloride sulfate remove with liquid binder as much of the concentrated product as possible. Then rinse with water.

B.2.3 Fire

The products are not combustible.

For iron (III) chloride these products can liberate chlorine and hydrogen chloride at excessive heat.

For iron (III) sulfate in contact with metals, iron (III) sulfate can liberate the flammable gas hydrogen.

Bibliography

[1] 67/548/EEC: Council Directive of 27 June 1967 on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances and its amendments and adaptations

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