BS EN 16399:2013

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Chemicals used for treatment of swimming pool water — Sodium thiosulfate

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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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English Version

Chemicals used for treatment of swimming pool water - Sodium thiosulfate

Produits chimiques utilisés pour le traitement de l'eau des piscines - Thiosulfate de sodium

Produkte zur Aufbereitung von Schwimm-und Badebeckenwasser - Natriumthiosulfat

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 16399:2013) 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of an identical text or by endorsement, at the latest by June 2014, and conflicting national standards shall be withdrawn at the latest by June 2014.

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Introduction

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

1) 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;

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 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.

1 Scope

This European Standard is applicable only to sodium thiosulfate and not to mixtures with other chemicals used for treatment of swimming pool water. It describes the characteristics of sodium thiosulfate and specifies the requirements and the corresponding test methods for sodium thiosulfate. It gives information on its use in swimming water treatment. It also determines the rules relating to safe handling and use (see Annex A).

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 12125, *Chemicals used for treatment of water intended for human consumption — Sodium thiosulfate*

3 Description

3.1 Identification

3.1.1 Chemical name

Sodium thiosulfate.

3.1.2 Synonym or commons names

Sodium thiosulfate, sodium hyposulfite.

3.1.3 Relative molecular mass

158,11 (anhydrous).

3.1.4 Empirical formula

$Na_2S_2O_3$.

3.1.5 Chemical formula

$Na_2S_2O_3$.

3.1.6 CAS[1)] Registry Number

7772-98-7 (anhydrous); 10102-17-7 (pentahydrate).

3.1.7 EINECS[2)] reference

231-867-5.

1) CAS : Chemical Abstracts Service.

2) EINECS : European INventory of Existing Commercial Chemical Substances.

3.2 Commercial form

The product is a crystalline powder.

3.3 Physical properties

3.3.1 Appearance

The hydrated product is colourless crystal. The anhydrous product is a white powder.

3.3.2 Density

The particle density of the hydrated product is 1,69 g/cm^3 to 1,73 g/cm^3 at 20 °C.

3.3.3 Solubility in water

The solubility of the product in water is 700 g/l at 20 °C (anhydrous); for pentahydrate: 2910 g/l at 45 °C.

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 starts to decompose at 45 °C to 50 °C.

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) 100 kPa = 1 bar.

3.4 Chemical properties

The pH value of a diluted aqueous solution of sodium thiosulfate is approximately neutral (6,5 to 8). Sodium thiosulfate dissolves silver halogenids and other silver salts.

At elevated temperatures (>50 °C) sulfur dioxide is generated.

Sodium thiosulfate releases sulfur dioxide when mixed with acids.

Sodium thiosulfate reacts violently with oxidising agents; e.g. with sodium hypochlorite or hydrogen peroxide.

It shall not get into contact with acids, iodine, lead and silver salts.

4 Purity criteria

4.1 General

This European Standard specifies the minimum purity requirements for sodium thiosulfate used for the treatment of water for swimming pools. 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.

Users of this product should check the national regulations in order to clarify whether it is of appropriate purity for treatment of water for swimming pools, 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 toxic substances 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 concentration of sodium thiosulfate anhydrous shall not be less than a mass fraction of 95 % of $Na_2S_2O_3$.

The concentration of sodium thiosulfate pentahydrate shall not be less than a mass fraction of 95 % of $Na_2S_2O_3 \cdot 5H_2O$.

4.3 Chemical parameters

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

Table 1 — Chemical parameters

Parameter		Limit in mg/kg
Arsenic (As)	max.	0,5
Cadmium (Cd)	max.	0,1
Chromium (Cr)	max.	5
Mercury (Hg)	max.	0,1
Nickel (Ni)	max.	5
Lead (Pb)	max.	5
Antimony (Sb)	max.	2
Selenium (Se)	max.	2

NOTE Pesticides and polycyclic aromatic hydrocarbons and cyanides (CN^-) are not relevant in sodium thiosulfate because the raw materials used in the manufacturing are free of them.

5 Test methods

The sampling and the analytical methods are those described in EN 12125.

6 Labelling - Transportation - Storage

6.1 Means of delivery

Sodium thiosulfate shall be delivered in paper bags with polyethylene lining, or in polyethylene bags, with net contents of 1 kg to 50 kg.

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.

6.2 Labelling according to the EU legislation[4)]

At the date of the publication of this European Standard, no labelling requirements apply to sodium thiosulfate.

The regulation [1], and its amendments for the purposes of its adaptation to technical and scientific progress contains a list of substances classified by the EU. Substances not listed in this regulation should be classified on the basis of their intrinsic properties according to the criteria in the regulation by the person responsible for the marketing of the substance.

6.3 Transportation regulations and labelling

Sodium thiosulfate is not classified as a dangerous product for road, rail, sea and air transportation.

4) See [1].

6.4 Marking

The marking shall include the following:

— the name “sodium thiosulfate” and trade name;

— the net mass;

— the name and address of the supplier and/or manufacturer;

— the statement “This product conforms to EN 16399”.

6.5 Storage

6.5.1 Long term stability

Product is stable when stored in containers in a cool and dry place.

6.5.2 Storage incompatibilities

The product shall be kept away from acids, such as hydrochloric acid and sulfuric acid, to avoid the risk of sulfur dioxide evolution.

The product shall be kept away from oxidising substances, such as sodium hypochlorite and hydrogen peroxide.

Annex A
(informative)

General information on sodium thiosulfate

A.1 Origin

A.1.1 Raw materials

Sodium thiosulfate is manufactured from sodium hydroxide, sodium hydrogen sulfite (solution) and sulfur.

A.1.2 Manufacturing process

The raw materials react under pressure at elevated temperatures.

A.2 Use

A.2.1 Function

Sodium thiosulfate is used as a reducing agent to remove excess chlorine, chlorine dioxide or ozone in the swimming pool water:

$$Na_2S_2O_3 + 4\ Cl_2 + 5H_2O \rightarrow 2\ NaHSO_4 + 8\ HCl.$$

A.2.2 Form in which it is used

It is used as delivered.

A.2.3 Treatment dose

The treatment dose depends on the content of oxidants in the water. For chlorine, for example, in water the stoichiometric dose is 0,56 mg of $Na_2S_2O_3$ for 1 mg of Cl_2, but in practice an excess over the stoichiometric dose can be required.

A.2.4 Means of application

It is applied using a metering pump or directly into the swimming pool.

A.2.5 Secondary effects

The use of sodium thiosulfate increases the content of sodium and sulfate and can consume oxygen dissolved in the water.

A.2.6 Removal of excess product

The excess product is removed by oxidation.

A.3 General rules relating to safety

A.3.1 Rules for safe handling and use

The supplier will provide current safety instructions.

A.3.2 Emergency procedures

A.3.2.1 First aid

If sodium thiosulfate is in contact with the eyes or the skin, it is recommended to rinse with plenty of water. If it is swallowed, it is recommended to seek immediately medical advice.

A.3.2.2 Spillage

It is recommended to collect and to remove any spillage avoiding the formation of dust.

Any remaining product can be flushed away with plenty of water to which an oxidising agent is added.

A.3.2.3 Fire

The product is not combustible.

Decomposition can be caused by fire with release of sulfur dioxide. It is recommended to wear suitable respiratory equipment.

There are no restrictions on extinguishing media in fire situations.

Bibliography

[1] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (REACH)

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