BS EN 15078:2013

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Chemicals used for treatment of swimming pool water — Sulfuric acid

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National foreword

This British Standard is the UK implementation of EN 15078:2013. It supersedes BS EN 15078:2006 which is withdrawn.

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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Chemicals used for treatment of swimming pool water - Sulfuric acid

Produits chimiques utilisés pour le traitement de l'eau des piscines - Acide sulfurique

Produkte zur Aufbereitung von Schwimm- und Badebeckenwasser - Schwefelsäure

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Foreword

This document (EN 15078:2013) 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of an identical text or by endorsement, at the latest by November 2013, and conflicting national standards shall be withdrawn at the latest by November 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15078:2006.

Significant technical differences between this edition and EN 15078:2006 are as follows:

— Replacement of warning and safety precautions notes by labelling according to Regulation (EC) No 1272/2008 [2].

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

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

a) 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;

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 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 to sulfuric acid used directly or for the production of formulations for the treatment of water for swimming pools. It describes the characteristics and specifies the requirements and the corresponding test methods for sulfuric acid. It gives information on its use for treatment of water for swimming pools. It also determines the rules relating to safe handling and use (see Annex B).

2 Normative reference

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 899, *Chemicals used for treatment of water intended for human consumption — Sulfuric acid*

3 Description

3.1 Identification

3.1.1 Chemical name

Sulfuric acid.

3.1.2 Synonym or common name

Oil of vitriol.

3.1.3 Relative molecular mass

98.

3.1.4 Empirical formula

H_2SO_4.

3.1.5 Chemical formula

H_2SO_4.

3.1.6 CAS Registry Number [1)]

7664-93-9.

3.1.7 EINECS reference [2)]

231-639-5.

1) Chemical Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

3.2 Commercial forms

Sulfuric acid is available as aqueous solutions.

NOTE For some water treatment applications, diluted acid can be used.

3.3 Physical properties

3.3.1 Appearance

The product is clear or slightly turbid, colourless liquid.

3.3.2 Density

1,84 g/ml for sulfuric acid concentration of mass fraction of 96 % at 20 °C.

1,71 g/ml for sulfuric acid concentration of mass fraction of 78 % at 20 °C.

1,18 g/ml for sulfuric acid concentration of mass fraction of 25 % at 20 °C.

3.3.3 Solubility in water

At all concentrations, the product is miscible with water.

3.3.4 Vapour pressure

Below 0,000 01 kPa for sulfuric acid concentration of mass fraction of 96 % at 20 °C.

Below 0,1 kPa for sulfuric acid concentration of mass fraction of 78 % at 20 °C.

Below 1,9 kPa for sulfuric acid concentration of mass fraction of 25 % at 20 °C.

3.3.5 Boiling point at 100 kPa [3)]

+ 310 °C for sulfphuric acid concentration of mass fraction of 96 %.

Approximately + 200 °C for sulfuric acid concentration of mass fraction of 78 %.

+ 106,5 °C for sulfuric acid concentration of mass fraction of 25 %.

3.3.6 Melting point

+ 5 °C for sulfuric acid concentration of mass fraction of 98 %.

- 10 °C for sulfuric acid concentration of mass fraction of 96 %.

- 11 °C for sulfuric acid concentration of mass fraction of 78 %.

- 22 °C for sulfuric acid concentration of mass fraction of 25 %.

3.3.7 Specific heat

1,465 kJ/(kg.K) for sulfuric acid concentration of mass fraction of 96 % at 20 °C.

3) 100 kPa = 1 bar.

3.3.8 Viscosity (dynamic)

22 mPa.s for sulfuric acid concentration of mass fraction of 96 % at 20 °C.

16,7 mPa.s for sulfuric acid concentration of mass fraction of 78 % at 20 °C.

3.3.9 Critical temperature

Not applicable.

3.3.10 Critical pressure

Not applicable.

3.3.11 Physical hardness

Not applicable.

3.4 Chemical properties

Concentrated sulfuric acid reacts violently:

— with bases or with water (exothermic reaction);

— with reducing agents due to oxidising properties;

— with combustible materials due to oxidising and dehydrating properties.

The concentrated acid is a strong oxidising agent and can cause ignition in contact with organic materials.

Sulfuric acid (of sulfuric acid content less than a mass fraction of 70 %) attacks most common metals, e.g. iron, zinc, liberating the flammable gas hydrogen.

WARNING — Mixing with water produces a marked temperature rise. Therefore ALWAYS ADD THE ACID TO THE WATER (NEVER THE REVERSE), slowly and agitating continuously.

4 Purity criteria

4.1 General

This European Standard specifies the minimum purity requirements for sulfuric acid 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 the 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, contents of other impurities and additives used in the products not stated in the 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 usual commercial concentrations of sulfuric acid available have a mass fraction of 96 % or 98 %.

Other concentrations of sulfuric acid between a mass fraction of 25 % and 80 % are also available.

If sold as concentrated acid, the mass fraction of sulfuric acid shall be in the range of 92 % to 98 %.

The concentration of sulfuric acid shall be within a mass fraction of ± 1 % of the manufacturer's declared value.

4.3 Chemical parameters and indicator parameters

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

Table 1 — Chemical parameters and indicator parameters

Parameter		**Limit of H_2SO_4** mg/kg
Sulfur dioxide (SO_2)	max.	100
Iron (Fe)	max.	100
Arsenic (As)	max.	0,4
Cadmium (Cd)	max.	0,1
Chromium (Cr)	max.	4
Mercury (Hg)	max.	0,1
Nickel (Ni)	max.	4
Lead (Pb)	max.	4
Antimony (Sb)	max.	1
Selenium (Se)	max.	1
NOTE For chemical parameter values of trace metals in drinking water, see [1].		

5 Test methods

The sampling and the analytical methods are those described in EN 899.

6 Labelling – Transportation – Storage

6.1 Means of delivery

Sulfuric acid shall be delivered in containers made of, or lined with, one of the materials given in EN 899, depending on the temperature and concentration of the acid.

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 EU legislation [4)]

The following labelling requirements shall apply to sulfuric acid at the date of publication of this European Standard.

Figure 1 —GHS 05

— Signal word:

Danger

— Classification and hazard statement:

H 314 Causes severe skin burns and eye damage

The regulation [2], 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

Sulfuric acid of concentration greater than a mass fraction of 51 % is listed as UN number [5)] 1830.

— RID [6)] /ADR [7)]: class 8, classification code C1, packing group II.

— IMDG [8)]: class 8, packing group II.

— IATA [9)]: class 8, packing group II.

4) See [2].

5) United Nations Number.

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

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

8) International Maritime transport of Dangerous Goods.

9) International Air Transport Association.

6.4 Marking

The marking shall include the following information:

— name "sulfuric acid", trade name and mass fraction;

— net mass;

— name and address of supplier and/or manufacturer;

— statement "this product conforms to EN 15078".

6.5 Storage

6.5.1 Long term stability

The product is stable if the container is made of suitable material (see EN 899) and tightly closed.

NOTE There is a risk of concentrated sulfuric acid freezing at temperatures below 10 °C.

6.5.2 Storage incompatibilities

The product shall not be allowed to come into contact with moisture, alkalis, metal powders, sulfides, sulfites, nitrates, chlorates, chlorites, hypochlorites or organic materials.

Annex A
(informative)

General information on sulfuric acid

A.1 Origin

A.1.1 Raw materials

Sulfuric acid is manufactured from sulfur dioxide gas, which is produced, for example, by burning elemental sulfur or roasting of metal sulfide ores.

A.1.2 Manufacturing process

Sulfuric acid is produced by the catalytic oxidation of sulfur dioxide (SO_2) to sulfur trioxide (SO_3), absorption of sulfur trioxide in sulfuric acid and dilution with water to the required grade.

A.2 Use

A.2.1 Function

In the treatment of water for swimming pools, sulfuric acid is used to adjust the pH value.

A.2.2 Form in which it is used

Sulfuric acid used for treatment of swimming pool water typically has a content of 30 % mass fraction to 45 % mass fraction and is used as delivered.

A.2.3 Treatment dose

The treatment dose depends on the chemical characteristic of the swimming pool water to be treated, e.g. pH value, sulfate content, and on the type of the water treatment.

A.2.4 Means of application

The treatment dose is usually applied using a metering pump.

A.2.5 Secondary effects

Temperature rise at the injection point.

Corrosion of equipment and piping can occur, if sulfuric acid is added in excess.

A.2.6 Removal of excess product

The excess product is removed by neutralisation.

Annex B
(normative)

General rules relating to safety

B.1 Rules for safe handling and use

The supplier shall provide current safety instructions.

The place where sulfuric acid is stored or handled shall be made of acid-proof material inside a bunded area, to catch any spillage.

B.2 Emergency procedures

B.2.1 First aid

Immediately take off all contaminated clothing.

In case of contact with skin, wash immediately with plenty of water.

In case of contact with eyes: if even small amounts of sulfuric acid enter the eyes, immediately rinse with water for at least 15 min, with the eye lids held open. Immediately consult a doctor.

B.2.2 Spillage

Dilute small spillages with plenty of water, neutralise with lime or sodium carbonate. Small quantities shall be rinsed off with plenty of water.

Never use flammable material to absorb acid spills.

Large spillage: the acid shall be contained (see B.1), pumped to an appropriate container or tank. Seek expert assistance.

B.2.3 Fire

Sulfuric acid is not combustible.

Extinguishing media: no restriction in fire situations, however concentrated sulfuric acid reacts violently with water.

Bibliography

[1] 98/83/EC: Council Directive of 3rd November 1998 on the quality of water intended for human consumption

[2] 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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