SLOVENSKI STANDARD
SIST EN 899:1999

01-april-1999

Kemikalije, ki se uporabljajo za pripravo pitne vode – Žveplova kislina

Chemicals used for treatment of water intended for human consumption - Sulfuric acid

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Schwefelsäure

Produits chimiques utilisés pour le traitement de l'eau destinée a la consommation humaine - Acide sulfurique

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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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English version

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Contents

Foreword

This European Standard 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of an identical text or by endorsement, at the latest by June 1997, and conflicting national standards shall be withdrawn at the latest by June 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

0 Introduction

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

1) This standard provides no information as to whether the product may be used without restriction in any of 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.

1 Scope

This European standard is applicable to sulfuric acid used for treatment of water intended for human consumption. It describes the characteristics of sulfuric acid and specifies the requirements and the corresponding test methods for sulfuric acid.

2 Normative references

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 26595	Water quality - Determination of total arsenic - Silver diethyldithiocarbamate spectrophotometric method (ISO 6595:1982)
EN ISO 3696	Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)
ISO 910	Sulfuric acid and oleum for industrial use - Determination of total acidity, and calculation of free sulfur trioxide content of oleum - Titrimetric method
ISO 3165	Sampling of chemical products for industrial use - Safety in sampling
ISO 3423	Sulfuric acid and oleums for industrial use - Determination of sulphur dioxide content -Iodometric method
ISO 5666-1	Water quality - Determination of total mercury by flameless atomic absorption spectrometry - Part 1 : Method after digestion with permanganate -peroxodisulfate
ISO 6206	Chemical products for industrial use - Sampling - Vocabulary
ISO 6332	Water quality - Determination of iron - Spectrometric method using 1,10-phenanthroline
ISO 8288	Water quality - Determination of cobalt, nickel, copper, zinc, cadmium and lead - Flame atomic absorption spectrometric methods.
ISO 9174	Water quality - Determination of total chromium - Atomic absorption spectrometric methods

ISO 9965	Water quality - Determination of selenium - Atomic absorption spectrometric method (hydride technique)
ISO/DIS 11885	Water quality -The determination of 33 elements by inductively coupled plasma atomic emission spectroscopy

3 Description

3.1 Identification

3.1.1 Chemical name : sulfuric acid

3.1.2 Synonym or common names : 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

3.2 Commercial forms

Sulfuric acid as specified in this standard is a clear to slightly turbid, colourless liquid, which may be mixed with water in any ratio.

The usual commercial concentrations of sulfuric acid available are 96 percent by mass (% (*m/m*)) or 98 % (*m/m*).

Other concentrations of sulfuric acid between 25 % (m/m) and 80 % (m/m) are also available.

For some water treatment applications diluted acid may be used.

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1) Chemical Abstracts Service Registry Number.
2) European Inventory of Existing Commercial Chemical Substances.

3.3 Physical properties

3.3.1 Appearance

The product is clear or slightly turbid, coulourless liquid.

3.3.2 Density

1,84 g/cm^3 for sulfuric acid concentration of 96 % (*m/m*) at 20 °C.
1,71 g/cm^3 for sulfuric acid concentration of 78 % (*m/m*) at 20 °C.
1,18 g/cm^3 for sulfuric acid concentration of 25 % (*m/m*) 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 [3] for sulfuric acid concentration of 96 % (*m/m*) at 20 °C.
Below 0,1 kPa for sulfuric acid concentration of 78 % (*m/m*) at 20 °C.
Below 1,9 kPa for sulfuric acid concentration of 25 % (*m/m*) at 20 °C.

3.3.5 Boiling point at 100 kPa [4]

+ 310 °C for sulfuric acid concentration of 96 % (*m/m*).
approximately + 200 °C for sulfuric acid contration of 78 % (*m/m*).
+ 106,5 °C for sulfuric acid concentration of 25 % (*m/m*).

3.3.6 Melting point

+ 5 °C for sulfuric acid concentration of 98 % (*m/m*).
- 10 °C for sulfuric acid concentration of 96 % (*m/m*).
- 11 °C for sulfuric acid concentration of 78 % (*m/m*).
- 22 °C for sulfuric acid concentration of 25 % (*m/m*).

3.3.7 Specific heat

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

3.3.8 Viscosity, dynamic

22 mPa•s for sulfuric acid concentration of 96 % (*m/m*) at 20 °C.
16,7 mPa•s for sulfuric acid concentration of 78 % (*m/m*) at 20 °C.

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3) 0,1 kPa = 1 m bar
4) 100 kPa = 1 bar.

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 oxidizing properties ;
- with combustible materials due to oxidizing and dehydrating properties.

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

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

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

4 Purity criteria

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 a change in the production process or raw materials leads to significant quantities of other impurities or by products being present, this shall be notified to the user.

4.1 Composition of commercial product

The following requirements shall apply to sulfuric acid :

- if sold as concentrated acid, the mass content of sulfuric acid shall be in the range of 92 % (*m/m*) to 98 % (*m/m*) sulfuric acid. The product shall contain the stated mass concentration of sulfuric acid within ± 1 %.

4.2 Impurities and main by-products

The product shall comply with the requirements specified in table 1.