SLOVENSKI STANDARD
SIST EN 878:2004

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Nadomešča:
SIST EN 878:1999

Kemikalije, ki se uporabljajo za pripravo pitne vode - Aluminijev sulfat

Chemicals used for treatment of water intended for human consumption - Aluminium sulfate

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Aluminiumsulfat

Produits chimiques utilisés pour le traitement de l'eau destinée a la consommation humaine - Sulfate d'aluminium

Ta slovenski standard je istoveten z: **EN 878:2004**

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

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English version

Chemicals used for treatment of water intended for human consumption - Aluminium sulfate

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Sulfate d'aluminium

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Aluminiumsulfat

This European Standard was approved by CEN on 16 April 2004.

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. 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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Contents

Foreword

This document (EN 878:2004) 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 December 2004, and conflicting national standards shall be withdrawn at the latest by December 2004.

This document supersedes EN 878:1997.

Significant technical differences between this edition and EN 878:1997 are as follows :

a) deletion of the reference to EU Directive 80/778/EEC of 15 July 1980 ;

b) introduction of an annex B (normative) giving general rules relating to safety ;

c) expansion of annex A by addition of A.2 "Quality of commercial product".

Annex A is informative.

Annex B is normative.

This document includes a Bibliography.

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

Introduction

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

a) this 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 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 aluminium sulfate used for treatment of water intended for human consumption. It describes the characteristics of aluminium sulfate and specifies the requirements for aluminium sulfate and gives reference to the analytical methods. It gives information on its use in water treatment. It also determines the rules relating to safe handling and use of aluminium sulfate (see annex B).

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 (including amendments).

EN 1302, *Chemicals used for treatment of water intended for human consumption – Aluminium-based coagulants - Analytical methods.*

ISO 3165, *Sampling of chemical products for industrial use - Safety in sampling.*

ISO 6206, *Chemical products for industrial use - Sampling - Vocabulary.*

ISO 8213, *Chemical products for industrial use - Sampling techniques - Solid chemical products in the form of particles varying from powders to coarse lumps.*

3 Description

3.1 Identification

3.1.1 Chemical name

Aluminium sulfate.

3.1.2 Synonym or common names

Aluminium sulfate, cake alum, alum.

NOTE In English the generic term "alum" is imprecise and is deprecated and in German the term "Alaun" is misleading.

3.1.3 Relative molecular mass

342,14 for $Al_2(SO_4)_3$.

3.1.4 Empirical formula

$Al_2(SO_4)_3$.

3.1.5 Chemical formula

$Al_2(SO_4)_3\ n\ H_2O$.

3.1.6 CAS Registry Number [1)]

$Al_2(SO_4)_3$: 10043-01-3.

$Al_2(SO_4)_3 \cdot 16\ H_2O$: 16828-11-8.

$Al_2(SO_4)_3 \cdot 18\ H_2O$: 7784-31-8.

3.1.7 EINECS reference [2)]

$Al_2(SO_4)_3$: 233-135-0.

3.2 Commercial forms

Aluminium sulfate is available in solid hydrated forms, with different particle sizes (slabs, kibbled, ground, granulated) and as aqueous solutions.

3.3 Physical properties

3.3.1 Appearance

The product is a white solid or colourless to yellow, clear liquid.

3.3.2 Density

The density of a typical aluminium sulfate solution is given in Table 1 and varies depending on the concentration of the active matter (aluminium content), expressed in grams per kilogram of solution (Al g/kg).

Table 1 — Density of solution

Al g/kg of solution	Density at 15 °C g/ml
40,8	1,310
41,6	1,315
42,5	1,320
43,3	1,325
44,2	1,330
45,0	1,335

3.3.3 Solubility

The theoretical limit of active matter content for a typical solution is given in Table 2.

1) Chemical Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

Table 2 — Solubility

Temperature °C	Active matter in Al g/kg of solution
- 1	44,7
24	44,8

The practical limit of solubility depends on the temperature and the device used for solubilization of the solid form (slabs, kibbled, ground or granulated).

An indication of practical limits is given in Table 3.

Table 3 — Indication of practical limits of solubility

Temperature °C	Active matter Al g/kg of solution	Solubility in grams solid form (containing Al 90 g/kg of solid) per kilogram of solution
15	37	410

3.3.4 Vapour pressure at 20 °C

Not known.

3.3.5 Boiling point at 100 kPa [3)]

Not known.

3.3.6 Crystallization point

The crystallization point of aluminium sulfate varies, depending on the concentration of the active matter.

For example :

— - 7 °C for a typical solution of aluminium content of 42,4 g/kg of solution.

3.3.7 Specific heat

Not known.

3.3.8 Viscosity (dynamic)

The viscosity of aluminium sulfate solution varies greatly, depending on the concentration of the active matter.

For a typical solution of aluminium content of 42,4 g/kg of solution, the viscosity is given in Table 4.

3) 100 kPa = 1 bar.

Table 4 — Viscosity

Temperature °C	Viscosity mPa.s
0	40,0
10	26,5
20	18,6
30	13,2
40	8,8

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

Aluminium sulfate is an acidic hydrated salt or solution. Very dilute solutions hydrolyse and form a precipitate of aluminium hydroxide.

NOTE Since aluminium compounds are amphoteric in nature, the solubility of aluminium depends on the pH value and the product should be used within an appropriate pH range.

4 Purity criteria

4.1 General

This European Standard specifies the minimum purity requirements for aluminium 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 can be present and, if so, this shall be notified to the user and when necessary to relevant authorities.

NOTE Users of the product should 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 the product standard, and other relevant factors.

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 a change in 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 active matter (aluminium content) in the product expressed as grams per kilogram of product shall be within ± 3 % of the manufacturer's declared values.