
Kemikalije, ki se uporabljajo za pripravo pitne vode – Aluminijev klorid, aluminijev klorid hidroksid in aluminijev klorid hidroksid sulfat (monomeričen)

Chemicals used for treatment of water intended for human consumption - Aluminium chloride, aluminium chloride hydroxide and aluminium chloride hydroxide sulfate (monomeric)

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Aluminiumchlorid, Aluminiumhydroxid und Aluminiumhydroxidchloridsulfat (monomer)
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Produits chimiques utilisés pour le traitement de l'eau destinée a la consommation humaine - Chlorure d'aluminium, hydroxychlorure d'aluminium et hydroxychlorosulfate d'aluminium (monomeres)
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13.060.20	Pitna voda	Drinking water
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Descriptors: potable water, water treatment, chemical compounds, chlorides, aluminium hydroxidechloridesulfate, description, physical properties, chemical properties, impurities, toxic substances, tests, labelling, storage, utilization

English version

**Chemicals used for treatment of water intended
for human consumption - Aluminium chloride,
aluminium chloride hydroxide and aluminium
chloride hydroxide sulfate (monomeric)**

Produits chimiques utilisés pour le traitement
de l'eau destinée à la consommation humaine -
Chlorure d'aluminium, hydroxychlorure
d'aluminium et hydroxychlorosulfate d'aluminium
(monomères)

Produkte zur Aufbereitung von Wasser für den
menschlichen Gebrauch - Aluminiumchlorid,
Aluminiumhydroxidchlorid und
Aluminiumhydroxidchloridsulfat (monomer)

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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.

The European Standards exist 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

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

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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 August 1997, and conflicting national standards shall be withdrawn at the latest by August 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.

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 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.

1 Scope

This European Standard describes the characteristics and specifies the requirements of aluminium chloride, aluminium chloride hydroxide and aluminium chloride hydroxide sulfate (monomeric) used for treatment of water intended for human consumption and gives reference to the analytical methods. This European standard does not apply to any polymeric form of these salts (see EN 883). Its gives information for their use in water treatment.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate place 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 883	Chemicals used for treatment of water intended for human consumption - Polyaluminium chloride hydroxide and polyaluminium chloride hydroxide sulfate
prEN 1302	Chemicals used for treatment of water intended for human consumption - Aluminium based coagulants - Analytical methods - purity classification
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

- a) Aluminium chloride.
- b) Aluminium chloride hydroxide.
- c) Aluminium chloride hydroxide sulfate.

3.1.2 Synonym or common names

- a) Aluminium chloride.
- b) Aluminium chloride hydroxide.
- c) Aluminium chloride hydroxide sulfate.

3.1.3 Relative molecular mass

- a) 133,3.

3.1.4 Empirical formula

- a) $AlCl_3$.
- b) $Al(OH)_aCl_b$ with $(a + b) = 3$ and a less than or equal to 1,05.
- c) $Al(OH)_aCl_b(SO_4)_c$ with $(a + b + 2c) = 3$ and a less than or equal to 1,05.

3.1.5 Chemical formula

Variable (see 3.1.4).

3.1.6 CAS Registry Number ¹⁾

- a) 7446-70-0.
- b1) a and b variable : 1327-41-9 with a less than or equal to 1,05.
- b2) $a = 1$, $b = 2$: 14215-15-7.
- c) a , b and c variable : 39290-78-3 with a less than or equal to 1,05.

¹⁾ Chemical Abstracts Service Registry Number.

3.1.7 EINECS reference ²⁾

- a) 231-208-1.
- b1) 215-477-2.
- b2) 238-071-7.
- c) 254-400-7.

3.2 Commercial forms

Aluminium chloride in the form of hexahydrate is available as crystals.

Liquid forms of aluminium chloride, aluminium chloride hydroxide and aluminium chloride hydroxide sulfate (monomeric) are available as solutions or suspensions.

3.3 Physical properties

3.3.1 Appearance

Colourless to yellow.

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3.3.2 Density

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The density depends on the particular composition, especially the aluminium ion content, expressed as aluminium percent by mass of the product (Al % (m/m)).

Typical values for solutions :

- a) aluminium chloride : 1,3 g/ml for 5,8 Al % (m/m) ;
- b) aluminium chloride hydroxide : 1,35 g/ml to 1,40 g/ml for 9,5 Al % (m/m) ;
- c) aluminium chloride hydroxide sulfate :
 - 1,18 g/ml to 1,22 g/ml for 5,3 Al % (m/m) ;
 - 1,18 g/ml for 4,2 Al % (m/m).

3.3.3 Solubility

Aluminium chloride, aluminium chloride hydroxide and aluminium chloride hydroxide sulfate (monomeric) are fully miscible with water.

NOTE : Depending on the particular product, dilute solutions can hydrolyse and form a precipitate.

²⁾ European Inventory of Existing Commercial Chemical Substances.

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3.3.4 Vapour pressure

Not known.

3.3.5 Boiling point at 100 kPa ³⁾

Not known.

3.3.6 Crystallization point

Typical values for solutions :

a) aluminium chloride : - 20 °C for 5,8 Al % (m/m) ;

b) aluminium chloride hydroxide :

≤ - 20 °C for 9,5 Al % (m/m) ;

- 20 °C for 12,4 Al % (m/m) ;

c) aluminium chloride hydroxide sulfate :

- 10 °C to - 15 °C for 5,3 Al % (m/m) ;

- 5 °C for 4,2 Al % (m/m).

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3.3.7 Specific heat

Not known.

3.3.8 Viscosity, dynamic

Typical values for solutions at 20 °C :

a) aluminium chloride solution : 10 mPa·s for 5,8 Al % (m/m) ;

b) aluminium chloride hydroxide :

10 mPa·s to 50 mPa·s for 9,5 Al % (m/m) ;

c) Aluminium chloride hydroxide sulfate :

3 mPa·s to 10 mPa·s for 5,3 % Al (m/m).

3.3.9 Critical temperature

Not applicable.

³⁾ 100 kPa = 1 bar.

3.3.10 Critical pressure

Not applicable.

3.3.11 Physical hardness

Not applicable.

3.4 Chemical properties

Aluminium chloride, aluminium chloride hydroxide and aluminium chloride hydroxide sulfate (monomeric) are acidic liquids which hydrolyse and form a precipitate of aluminium hydroxide when diluted beyond a particular level. Since aluminium compounds are amphoteric in nature, the solubility of aluminium depends on the pH value.

4 Purity criteria

4.1 General

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.

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4.2 Composition of commercial product

Aluminium chloride, aluminium chloride hydroxide and aluminium chloride hydroxide sulfate (monomeric) are the results of a complex manufacturing process from producers and shall not be, in any case, the result of a mixture of available commercial products.

The concentration of active matter is expressed in grams of aluminium per kilogram of product (Al g/kg).

The content of water soluble aluminium varies.

NOTE : Typical values can be between 42 g and 124 g of aluminium per kilogram of product.

The commercial products vary in the proportions of chloride and sulfate ions. Their structure is monomeric to oligomeric.

Basicity : The relative basicity of these products expressed as the mole ratio $\text{OH}/3\text{Al}$ shall be less than or equal to 0,35.

4.3 Impurities and main by-products

Impurities derived from the manufacturing or extraction process include insoluble matter, trace metals and organic compounds. If iron is present, it will usually be removed in the treatment process.