



SLOVENSKI STANDARD

SIST EN 15031:2022

01-julij-2022

Nadomešča:
SIST EN 15031:2014

Kemikalije, ki se uporabljajo za pripravo bazenske vode - Strjevanje na osnovi aluminija

Chemicals used for treatment of swimming pool water - Aluminium based coagulants

Produkte zur Aufbereitung von Schwimm- und Badebeckenwasser - Flockungsmittel auf Aluminiumbasis

Produits chimiques utilisés pour le traitement de l'eau des piscines - Coagulants à base d'aluminium

Ta slovenski standard je istoveten z: EN 15031:2022

ICS:

13.060.25	Voda za industrijsko uporabo	Water for industrial use
71.100.80	Kemikalije za čiščenje vode	Chemicals for purification of water

SIST EN 15031:2022

en,fr,de

EUROPEAN STANDARD

EN 15031

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2022

ICS 71.100.80

Supersedes EN 15031:2013

English Version

Chemicals used for treatment of swimming pool water - Aluminium based coagulants

Produits chimiques utilisés pour le traitement de l'eau
des piscines - Coagulants à base d'aluminium

Produkte zur Aufbereitung von Schwimm- und
Badebeckenwasser - Flockungsmittel auf
Aluminiumbasis

This European Standard was approved by CEN on 20 April 2022.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

<https://standards.iteh.ai/catalog/standards/sist/8eac2bfb-bb03-422e-9cbe-69feaaadf2c4/sist-en-15031-2022>



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword	3
Introduction	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions.....	5
4 Description.....	5
4.1 Aluminium sulfate	5
4.2 Aluminium chloride (monomeric), aluminium chloride hydroxide (monomeric) and aluminium chloride hydroxide sulfate (monomeric).....	8
4.3 Sodium aluminate.....	11
4.4 Polyaluminium chloride hydroxide and polyaluminium chloride hydroxide sulfate.....	13
5 Purity criteria.....	16
5.1 General.....	16
5.2 Composition of commercial product	16
5.3 Impurities and main by-products	17
5.4 Chemical parameters.....	17
6 Test methods	18
6.1 Sampling.....	18
6.2 Analyses.....	19
7 Labelling - transportation - storage	19
7.1 Means of delivery	19
7.2 Risk and safety labelling in accordance with the EU Directives	19
7.3 Transportation regulations and labelling	23
7.4 Marking	25
7.5 Storage	25
Annex A (informative) General information on aluminium based coagulants	27
Annex B (normative) General rules relating to safety.....	29
Bibliography	30

European foreword

This document (EN 15031:2022) 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 2022, and conflicting national standards shall be withdrawn at the latest by December 2022.

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

This document supersedes EN 15031:2013.

In comparison with the previous edition, the following technical modifications have been made:

- modification of 7.3 on transportation regulations and labelling, adding the sentence “The user shall be aware of the incompatibilities between transported products.”;
- modification of 7.4 on marking. The requirements of marking are also applied to the accompanying documents.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 15031:2022 (E)**Introduction**

In respect of potential adverse effects on the quality of water for swimming pools, caused by the products covered by this document:

- a) this document provides no information as to whether the products 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 these products remain in force.

NOTE Conformity with this document does not confer or imply acceptance or approval of the products in any of the Member States of the EU or EFTA. The use of the products covered by this document is subject to regulation or control by National Authorities.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 15031:2022

<https://standards.iteh.ai/catalog/standards/sist/8eac2bfb-bb03-422e-9cbe-69feaaadf2c4/sist-en-15031-2022>

1 Scope

This document is applicable to aluminium based coagulants (aluminium sulfate, aluminium chloride (monomeric), aluminium chloride hydroxide (monomeric), aluminium chloride hydroxide sulfate (monomeric), sodium aluminate and polyaluminium chloride hydroxide and polyaluminium chloride hydroxide sulfate) used directly or for the production of formulations for treatment of water for swimming pools.

It describes the characteristics of aluminium based coagulants and specifies the requirements and the corresponding test methods for aluminium based coagulants. It gives information on their use in swimming pool water treatment. It also determines the rules relating to safe handling and use (see Annex B).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Description

4.1 Aluminium sulfate

4.1.1 Identification

4.1.1.1 Chemical name

Aluminium sulfate.

4.1.1.2 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.

EN 15031:2022 (E)

4.1.1.3 Relative molecular mass342,14 for $\text{Al}_2(\text{SO}_4)_3$.**4.1.1.4 Empirical formula** $\text{Al}_2(\text{SO}_4)_3$.**4.1.1.5 Chemical formula** $\text{Al}_2(\text{SO}_4)_3 \cdot n\text{H}_2\text{O}$.**4.1.1.6 CAS Registry Number ¹** $\text{Al}_2(\text{SO}_4)_3$: 10043-01-3. $\text{Al}_2(\text{SO}_4)_3 \cdot 16 \text{H}_2\text{O}$: 16828-11-8. $\text{Al}_2(\text{SO}_4)_3 \cdot 18 \text{H}_2\text{O}$: 7784-31-8.**4.1.1.7 EINECS reference ²** $\text{Al}_2(\text{SO}_4)_3$: 233-135-0.**4.1.2 Commercial forms**

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

4.1.3 Physical properties**4.1.3.1 Appearance**

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

4.1.3.2 Density

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

Table 1 — Density of solution

Aluminium concentration 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

¹ Chemical Abstracts Service Registry Number.

² European Inventory of Existing Commercial Chemical Substances.

4.1.3.3 Solubility

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

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 solubilisation 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

4.1.3.4 Vapour pressure at 20 °C

Not known.

4.1.3.5 Boiling point at 100 kPa ³

Not known.

4.1.3.6 Crystallization point

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

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

4.1.3.7 Specific heat

Not known.

4.1.3.8 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

4.1.3.9 Critical temperature

Not applicable.

4.1.3.10 Critical pressure

Not applicable.

4.1.3.11 Physical hardness

Not applicable.

4.1.4 Chemical properties

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

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.

4.2 Aluminium chloride (monomeric), aluminium chloride hydroxide (monomeric) and aluminium chloride hydroxide sulfate (monomeric)**4.2.1 Identification****4.2.1.1 Chemical name**

- a) aluminium chloride (monomeric);
- b) aluminium chloride hydroxide (monomeric);
- c) aluminium chloride hydroxide sulfate (monomeric).

4.2.1.2 Synonym or common names

- a) aluminium chloride;
- b) aluminium chloride hydroxide;
- c) aluminium chloride hydroxide sulfate.

4.2.1.3 Relative molecular mass

133,3 for AlCl_3 .

4.2.1.4 Empirical formula

- a) AlCl_3 ;
- b) $\text{Al(OH)}_a\text{Cl}_b$ with $(a + b) = 3$ and a less than or equal to 1,05;
- c) $\text{Al(OH)}_a\text{Cl}_b(\text{SO}_4)_c$ with $(a + b + 2c) = 3$ and a less than or equal to 1,05.

4.2.1.5 Chemical formula

Variable (see 4.1.4).

4.2.1.6 CAS Registry Number ⁴

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

4.2.1.7 EINECS reference ⁵

- a) 231-208-1;

b)

- 1) 215-477-2; <http://www.eh.ai/catalog/standards/sist/8eac2bfb-bb03-422e-9cbe-69feaaadf2c4/sist-en-15031-2022>
- 2) 238-071-7;

- c) 254-400-7.

4.2.2 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.

4.2.3 Physical properties**4.2.3.1 Appearance**

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

4.2.3.2 Density

The density depends on the particular composition, especially the aluminium ion content, expressed as mass fraction of aluminium (Al) in %.

⁴ Chemical Abstracts Service Registry Number.

⁵ European Inventory of Existing Commercial Chemical Substances.

EN 15031:2022 (E)

Typical values for solutions:

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

4.2.3.3 Solubility

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

NOTE Depending on the particular product, diluted solutions can hydrolyze and form a precipitate.

4.2.3.4 Vapour pressure

Not known.

4.2.3.5 Boiling point at 100 kPa ⁶

Not known.

4.2.3.6 Crystallization point

Typical values for solutions:

- a) aluminium chloride: - 20 °C for 5,8 % Al;
- b) aluminium chloride hydroxide:
 - $\leq - 20$ °C for 9,5 % Al;
 - approximately - 20 °C for 12,4 % Al;
- c) aluminium chloride hydroxide sulfate:
 - 10 °C to - 15 °C for 5,3 % Al;
 - 5 °C for 4,2 % Al.

4.2.3.7 Specific heat

Not known.

4.2.3.8 Viscosity (dynamic)

Typical values for solutions at 20 °C:

- a) aluminium chloride: approximately 10 mPa·s for 5,8 % Al;

⁶ 100 kPa = 1 bar.