



SLOVENSKI STANDARD

SIST EN 1405:2009

01-december-2009

Nadomešča:
SIST EN 1405:1999

Kemikalije, ki se uporabljajo za pripravo pitne vode - Natrijev alginat

Chemicals used for treatment of water intended for human consumption - Sodium alginate

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natrium-Alginat

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Alginate de sodium

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EUROPEAN STANDARD

EN 1405

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 71.100.80

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English Version

Chemicals used for treatment of water intended for human consumption - Sodium alginate

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Alginates de sodium

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natrium-Alginat

This European Standard was approved by CEN on 24 July 2009.

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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 Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 1405:2009) 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of an identical text or by endorsement, at the latest by February 2010, and conflicting national standards shall be withdrawn at the latest by February 2010.

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 1405:1998.

Annex A is informative and gives some information on origin, use and handling of sodium alginate.

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

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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.

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.

WARNING — The use of this standard may involve hazardous substances, materials, operations and equipment. This standard does not purport to address all the safety aspects associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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1 Scope

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

2 Normative references

The following referenced documents are indispensable for the application 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 ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696:1987)*

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 **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

3.1 Identification

3.1.1 Chemical name

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Sodium alginate

NOTE Linear glycuronoglycan consisting mainly of (1-4) linked β -D-mannuronic acid units and (1-4) linked α -L-guluronic acid units in pyranose ring form.

3.1.2 Synonym or common name

Algin.

3.1.3 Relative molecular mass

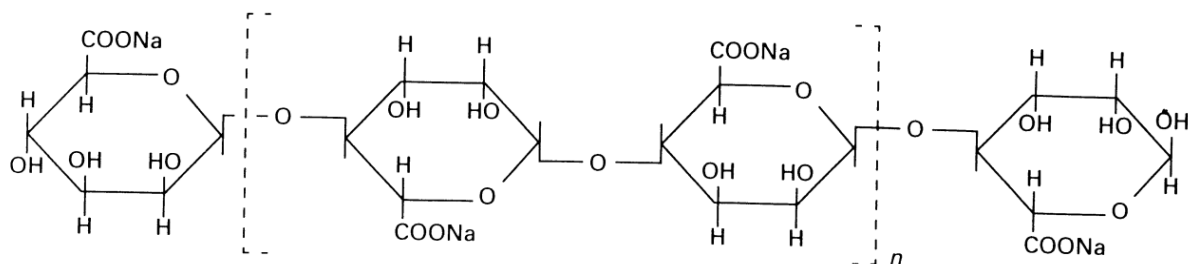
10 000 to 250 000 approximately.

3.1.4 Empirical formula

$(C_6O_6H_7Na)_n$.

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3.1.5 Chemical formula



Sodium alginate (with D-mannuronic acid units)

3.1.6 CAS Registry Number¹⁾

9005-38-3.

3.1.7 EINECS reference²⁾

The EINECS inventory lists alginic acid, but does not apply numbers to the salts of alginic acid. The EINECS number for alginic acid is 232-68-01.

3.2 Commercial form

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Sodium alginate as specified in this standard is available as a solid containing a small amount of residual moisture.

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3.3 Physical properties

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3.3.1 Appearance

The product is a white to pale yellowish-brown powder.

3.3.2 Density

The bulk density of the product is typically in the range 0,7 g/cm³ to 1,0 g/cm³.

3.3.3 Solubility

The product is soluble in hot or cold water. Its solubility is limited only by viscosity, with a paste being formed at concentrations of approximately 50 g/l and above.

3.3.4 Vapour pressure

Not applicable.

3.3.5 Boiling point at 100 kPa

Not applicable.

1) Chemical Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

3.3.6 Melting point

The product decomposes at approximately 200 °C.

3.3.7 Specific heat

Not applicable.

3.3.8 Viscosity, dynamic

Not applicable.

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

Sodium alginate is a non-hazardous material and not intrinsically reactive. However, in common with many other organic compounds, a strong exothermic reaction will occur if it is brought into contact in the dry state with a strong oxidizing agent or strong acid.

NOTE In dilute solution there can be a reaction with, or destruction by, some of the disinfection and oxidizing agents used in water treatment.

4 Purity criteria

4.1 General

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

NOTE Users of this 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.

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 leads to significant quantities of impurities, by-products or additives being present, this shall be notified to the user.

EN 1405:2009 (E)**4.2 Composition of commercial product**

The product consists of sodium alginate, moisture and minor levels of inorganic salts (i.e. sodium chloride and sodium sulfate).

The following requirements shall apply to sodium alginate:

- a) sodium alginate content: minimum 80 % mass fraction calculated with reference to the dried substance;
- b) moisture content: less than 15 % mass fraction;
- c) ash: 18 % mass fraction to 32 % mass fraction on a dry basis;
- d) pH: 4,8 to 8,8 as 1 % mass fraction solution at 20 °C;
- e) extraneous matter: there shall be no visible extraneous matter.

4.3 Impurities and main by-products

Based on the raw materials and manufacturing process (see A.1) there are no significant concentration of additional reactants or by-products which are relevant to the application of this product in drinking water treatment.

4.4 Chemical Parameters

NOTE For the purpose of this standard, "chemical parameters" are those defined in the EU Directive 98/83/EC of 3 November 1998 [1].

Chemical parameters as defined above are not relevant at a reference dose of 0,5 mg/l.

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5 Test methods**5.1 Sampling**

Sampling shall be in accordance with ISO 8213 and the recommendations given in ISO 3165 and ISO 6206 shall be followed.

A representative sample of the solid product, of sufficient mass, shall be obtained immediately after manufacture or from a newly opened package(s). The sample shall be clearly labelled with product name/code, batch number, type of container(s) sampled and date sampled. Reference samples shall be retained for the storage life of the product as claimed by the manufacturer/supplier.

5.2 Analyses**5.2.1 General**

Unless otherwise specified, all reagents shall be of recognised analytical grade. The water used shall conform to grade 2 specified in EN ISO 3696.

5.2.2 Main product

If additional requirements are agreed between the customer and manufacturer/ supplier, the latter shall provide the necessary methods if requested, so that the customer can carry out his own quality check.

A certificate of analysis shall be provided by the manufacturer/supplier if requested.

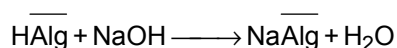
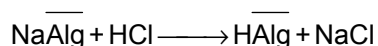
5.2.2.1 Sodium alginate content

5.2.2.1.1 General

This method is applicable to sodium alginates with alginate content in the range 50 % mass fraction to 100 % mass fraction.

5.2.2.1.2 Principle

The sodium alginate ($\overline{\text{NaAlg}}$) is converted to alginic acid by the action of dilute hydrochloric acid in the presence of propan-2-ol. The alginic acid formed is washed with a propan-2-ol/water mixture to remove excess hydrochloric acid. The alginic acid is then titrated with standard volumetric solution alkali. Propan-2-ol is present to prevent solubilisation of low molecular weight fractions of the sodium alginate.



5.2.2.1.3 Reagents

5.2.2.1.3.1 Propan-2-ol (isopropanol).

5.2.2.1.3.2 Hydrochloric acid, $c(\text{HCl}) = 2 \text{ mol/l}$.

5.2.2.1.3.3 Propan-2-ol diluted solution (50 + 50) ($V_1 + V_2$) of propan-2-ol with HCl (5.2.2.1.3.2).

5.2.2.1.3.4 Propan-2-ol diluted solution (75 + 25) ($V_1 + V_2$) of propan-2-ol with water.

5.2.2.1.3.5 Sodium hydroxide solution, $c(\text{NaOH}) = 0,5 \text{ mol/l}$.

5.2.2.1.3.6 Phenolphthalein indicator solution

5.2.2.1.4 Apparatus

5.2.2.1.4.1 Ordinary laboratory apparatus and glassware together with the following :

5.2.2.1.4.2 Filter crucible, pore size index P16 (diameter of pores 10 μm to 16 μm), 35 ml capacity, clean and dry.

5.2.2.1.4.3 Vacuum pump or water vacuum pump.

5.2.2.1.4.4 Filter flask, 250 ml, fitted with rubber cone.

5.2.2.1.4.5 Stirrer, variable speed, with propeller paddle.

5.2.2.1.4.6 Burette, 25 ml, graduated in 0,1 ml divisions.

5.2.2.1.5 Procedure

WARNING — Concentrated HCl: causes severe burns. Produces harmful vapours and irritates eyes, respiratory tract and skin. Avoid contact with skin, eyes and clothing. Wear rubber gloves and eye protection when handling.

Hydrochloric acid is not combustible, but can produce corrosive vapours when heated. Hydrochloric acid reacts with many metals to form hydrogen, which forms an explosive mixture with air.