



BSI Standards Publication

Products used for treatment of water intended for human consumption — Natural unexpanded aluminosilicates

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National foreword

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English Version

Products used for treatment of water intended for human consumption - Natural unexpanded aluminosilicates

Produits utilisés pour le traitement de l'eau destinée à la consommation humaine - Aluminosilicates naturels non expansés

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natürliche, nicht expandierte Aluminiumsilikate

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Contents

Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms, definitions and symbols.....	5
4 Description	5
4.1 Identification.....	5
4.1.1 Chemical name.....	5
4.1.2 Synonym and common names.....	5
4.1.3 Chemical formula.....	5
4.2 Commercial form	5
5 Physical properties.....	5
5.1 Appearance	5
5.2 Particle size distribution	6
5.3 Density	6
5.3.1 Bulk density loose	6
5.3.2 Bulk density packed	6
6 Chemical properties	6
7 Test methods.....	7
7.1 Sampling.....	7
7.2 Analysis	7
7.2.1 Particle size distribution	7
7.2.2 Bulk density loose	7
7.2.3 Bulk density packed	7
7.2.4 Acid-soluble material	7
8 Labelling, transportation and storage	7
8.1 Means of delivery.....	7
8.2 Risk and safety labelling according to the EU directives	8
8.3 Transportation regulations and labelling.....	8
8.4 Marking	8
8.5 Storage.....	8
Annex A (informative) General information on natural unexpanded aluminosilicates.....	9
A.1 Origin	9
A.2 Typical properties	9
A.3 Use	10
A.4 Hydraulic characteristics	11
A.5 Rules for safe handling and use	11
A.6 Emergency procedures.....	11
Bibliography.....	12

Foreword

This document (EN 15795:2010) 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of an identical text or by endorsement, at the latest by March 2011, and conflicting national standards shall be withdrawn at the latest by March 2011.

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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 the 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 natural unexpanded aluminosilicates used for treatment of water intended for human consumption. It describes the characteristics of natural unexpanded aluminosilicates and specifies the requirements and the corresponding test methods for natural unexpanded aluminosilicates and gives information on their use in water treatment.

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 12901:1999, *Products used for treatment of water intended for human consumption — Inorganic supporting and filtering materials — Definitions*

EN 12902, *Products used for treatment of water intended for human consumption — Inorganic supporting and filtering materials — Methods of test*

3 Terms, definitions and symbols

For the purpose of this document, the terms, definitions and symbols given in EN 12901:1999 apply.

4 Description

4.1 Identification

4.1.1 Chemical name

Aluminium silicate.

4.1.2 Synonym and common names

Basalt, Volcanic sand, Phonolith.

4.1.3 Chemical formula

$Al_xSi_yO_z$.

4.2 Commercial form

Natural unexpanded aluminosilicates according to this standard are available in different particle size ranges.

5 Physical properties

5.1 Appearance

The product is a hard, light grey to dark grey granular material.

The structure is crystalline with a rough surface. The particle shape is spherical or cubic depending mainly on the origin and manufacturing procedure (quarrying or dredging, or crushing). The shape influences filtration performance, see A.4.

The product shall be generally homogeneous and shall be visibly free from impurities and contamination.

5.2 Particle size distribution

The particle size distribution shall be determined on samples taken at the point of manufacture using the method of test given in EN 12902.

NOTE 1 The particle size can decrease during transportation and handling.

The particle size distribution shall be described by either:

- a) 1) effective size: (d_{10}) with a permitted tolerance of $\pm 5\%$;
- 2) uniformity coefficient: (U) shall be less than 1,5;
- 3) minimum size: (d_1) with a permitted tolerance of $\pm 5\%$;

or:

- b) 1) by particle size range and by mass fraction of oversize and undersize particles according to application.
- 2) The maximum contents of oversize and undersize shall be a mass fraction of 5 % for application of the product as a filtration layer in multi media filters and a mass fraction of 10 % for use in single media filters. For use as a support layer, maximum mass fractions of oversize and undersize of 15 % are acceptable. See A.2.3 for examples of available particle sizes that are used.

NOTE 2 Other values can be necessary for certain applications.

5.3 Density

5.3.1 Bulk density loose

The bulk density loose shall be in the range of 1 250 kg/m³ to 1 550 kg/m³.

5.3.2 Bulk density packed

The bulk density packed shall be in the range of 1 400 kg/m³ to 1 750 kg/m³.

6 Chemical properties

This European Standard specifies the minimum purity requirements for natural unexpanded aluminosilicates 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 1 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, contents of other impurities and additives used in the products not stated in the product standard.

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 the production process or raw materials lead to significant quantities of impurities, by-products or additives being present, this shall be notified to the user.

The composition of the commercial product shall conform to the requirements specified in Table 1.

Table 1 — Composition of commercial product

Parameter	Limit in mass fraction %
Acid-soluble material max.	10

NOTE 2 The exact composition does not influence filtration properties, but is given in A.2.1.

NOTE 3 After filling, washing and commissioning of a filter system producing drinking water, natural unexpanded aluminosilicates should not increase the concentrations of chemical parameters (see [1]).

NOTE 4 Water extractable substances, determined in accordance with the method for granular materials given in EN 12902, can be used to estimate the leaching of the chemicals specified in EN 12902.

7 Test methods

7.1 Sampling

Prepare the laboratory sample(s) required by the relevant procedures described in EN 12902.

7.2 Analysis

7.2.1 Particle size distribution

The particle size distribution shall be determined in accordance with EN 12902.

7.2.2 Bulk density loose

The bulk density loose shall be determined in accordance with EN 12902.

7.2.3 Bulk density packed

The bulk density packed shall be determined in accordance with EN 12902.

7.2.4 Acid-soluble material

The content of acid-soluble material shall be determined in accordance with EN 12902.

8 Labelling, transportation and storage

8.1 Means of delivery

Natural unexpanded aluminosilicates shall be delivered in bags, semi-bulk containers or bulk.

In order that the purity of the product is not affected, the means of delivery shall not have been used previously for any different product or it shall have been specially cleaned and prepared before use.

8.2 Risk and safety labelling according to the EU directives ¹⁾

Natural unexpanded aluminosilicates are not listed in the Reach regulation at the date of publication of this European Standard.

NOTE The regulation [2] contains a list of substances classified by the EU. Substances not listed in this regulation should be classified on the basis of their intrinsic properties according to the criteria in the regulation by the person responsible for the marketing of the substance.

8.3 Transportation regulations and labelling

Natural unexpanded aluminosilicates are not listed under a UN Number ²⁾; they are not dangerous cargos.

8.4 Marking

The marking shall include the following:

- "Natural unexpanded aluminosilicate" or "Aluminium silicate", trade name;
- net mass or net volume;
- name and address of supplier and/or manufacturer;
- the statement "This product conforms to EN 15795".

8.5 Storage

Natural unexpanded aluminosilicates can be stored for an unlimited period of time.

1) See [2].

2) United Nations number.

Annex A (informative)

General information on natural unexpanded aluminosilicates

A.1 Origin

A.1.1 Raw materials

Natural igneous rock.

A.1.2 Manufacturing process

Natural, unexpanded aluminium silicates are produced by mining from natural deposits. They are crushed, cleaned, dried and sieved.

A.2 Typical properties

A.2.1 Chemical composition

The composition depends on the origin. Typical values are given as an example in Table A.1. Mineralogical and petrological analyses give additional information.

Table A.1 — Chemical composition

Parameter	Typical values in mass fraction %
SiO ₂	45 - 55
Al ₂ O ₃	12 - 25
Fe ₂ O ₃ (*)	3 - 10
CaO	7 - 10
K ₂ O	2 - 6
Na ₂ O	3 - 7
* Total Fe(II) and Fe(III) oxides expressed as Fe ₂ O ₃	

A.2.2 Mechanical strength

The mechanical strength of natural unexpanded aluminosilicates is high.

Abrasion products consist of dust and small particles of material. They are formed during transportation, filling, and washing. Abrasion products are not completely removed by washing.

The existing methods for determination of abrasion do not lead to exact results regarding behaviour of filter media during operation. They can only be used for comparison of different filter media.

A.2.3 Examples of particle size distribution

Examples of particle size distribution described by different particle size ranges and a permissible mass percentage of oversize and undersized product, are given in Table A.2.

Table A.2 — Examples of particle size range

Particle size range in mm	Permissible mass fraction % ^a	
	Undersize	Oversize
0,4 to 0,8 0,71 to 1,25	5	5
1,0 to 2,0 2,0 to 3,15 3,15 to 5,6	10	10
^a The maximum permitted content of undersize and oversize is 5 % of the mass fraction for use of the product as a filtration layer in multi media filters, a mass fraction of 10 % for use in single media filters and a mass fraction of 15 % for application as a support layer.		

Other particle size ranges can be specified.

A.2.4 Physical properties

A.2.4.1 Absolute density

The absolute density is generally in the range of 2,4 g/cm³ to 3,1 g/cm³.

A.2.4.2 Particle density dry

The particle density dry is generally in the range of 2 400 kg/m³ to 3 100 kg/m³.

A.2.4.3 Particle density wet

The particle density wet is generally in the range of 2 400 kg/m³ to 3 100 kg/m³.

A.3 Use

A.3.1 Function

Natural unexpanded aluminosilicates are used as filtering materials or as supporting material in multilayer filters.

A.3.2 Specific amount

The amount of natural unexpanded aluminosilicates used depends on application. Filtration rate and filter media depth vary with the suspended matter content of the water to be filtered.

A.3.3 Means of application

Natural unexpanded aluminosilicates are used in open or closed single- or multi-layer filters.

A.3.4 Secondary effects

The products have no secondary effects.

A.4 Hydraulic characteristics

A.4.1 Interstitial volume

The interstitial volume is approximately 0,4 to 0,5 V/V (40 % to 50 % by volume). If used for calculations the interstitial volume should be measured.

A.4.2 Head loss in filtration

Head loss depends on size, shape and roughness of particles, filtration rate, filter bed depth, and water temperature.

A.4.3 Expansion in up-flow washing

The expansion during washing depends on flow rate, effective size, density, shape and roughness of particles, and water temperature.

A.5 Rules for safe handling and use

Natural unexpanded aluminosilicates are not hazardous products but the following precautions should be taken:

- it is recommended to avoid dust formation;
- when handling dry product the use of a dust mask is recommended, especially when using air conveying.

A.6 Emergency procedures

A.6.1 First aid

In case of contact with skin, it is recommended to wash with water.

In case of contact with eyes, it is recommended to flush with plenty of water.

In case of inhalation, it is recommended to move to fresh air.

A.6.2 Spillage

It is recommended to sweep up and to discard in a refuse container or repackage. It is recommended to dispose of in accordance with local regulations.

A.6.3 Fire

No special requirements are necessary.

Bibliography

- [1] Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption
- [2] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

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