BRITISH STANDARD

BS EN 13754:2009

# Products used for treatment of water intended for human consumption — Bentonite

ICS 13.060.20; 71.100.80



BSI
British Standards

# National foreword

This British Standard is the UK implementation of EN 13754:2009. It supersedes BS EN 13754:2003 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CII/59, Chemicals for drinking water treatment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 13754

March 2009

ICS 71.100.80

Supersedes EN 13754:2003

English Version

# Products used for treatment of water intended for human consumption - Bentonite

Produits utilisés pour le traitement de l'eau destinée à la consommation humaine - Bentonite

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Bentonit

This European Standard was approved by CEN on 1 February 2009.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

**Management Centre: Avenue Marnix 17, B-1000 Brussels**



Ref. No. EN 13754:2009: E

# Contents

## Foreword

This document (EN 13754:2009) 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of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

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 13754:2003.

Differences between this edition and EN 13754:2003 are editorial to harmonize the text with other standards in this series.

Annex A is informative.

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.

# 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 bentonite used for treatment of water intended for human consumption. It describes the characteristics of bentonite and specifies the requirements and the corresponding test methods for bentonite. It gives information on its 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 12485, *Chemicals used for treatment of water intended for human consumption- Calcium carbonate, high-calcium lime and half-burnt dolomite - Test methods*

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

# 4 Description

## 4.1 Identification

### 4.1.1 Chemical name

Not applicable.

### 4.1.2 Synonym or common names

Montmorillonite, Bentonite, Amargosite, Ardmorite, Askanite, Confolensite, Erinite, Galapectite, Malthacite, Samoïte, Steargilite, Stolpenite, Wilkonite.

Montmorillonite and bentonite are the most commonly used names.

### 4.1.3 Chemical formula

$Si_4Al_{2-x}\,M(II)_x\;M(I)_x^{+}\,O_{10}\,(OH)_2\,.\,nH_2O$, where $x$ varies from 0 to 2.

The divalent metal M(II) can be replaced completely or partly by monovalent metal M(I) so as to maintain electrical charge equilibrium.

### 4.1.4 CAS Registry Number [1)]

1302-78-9.

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1) Chemical Abstracts Service Registry Number.

#### 4.1.5 EINECS Reference [2)]

215-108-5.

### 4.2 Commercial form

The product is available in powder form in many grades differing in purity and monovalent ion ($Na^+$) concentration.

## 5 Physical properties

### 5.1 Appearance

The product is a white to light brown or green powder.

### 5.2 Particle size distribution

At least a mass fraction of 95 % of the product shall have a particle size less than 500 µm.

NOTE The particle size distribution is commonly specified as a given mass fraction less than a given particle size.

The particle size distribution shall be within the manufacturer's declared values.

### 5.3 Bulk density packed

The bulk density packed shall be in the range 800 kg/$m^3$ to 1 000 kg/$m^3$.

## 6 Chemical properties

### 6.1 General

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

Limits have been given for impurities 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.

### 6.2 Impurities and main by-products

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

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[2)] European Inventory of Existing Commercial Chemical Substances.

**Table 1 — Composition of commercial product**

| Limit as a mass fraction in % of the product | | |
|---|---|---|
| Parameter | Minimum | Maximum |
| $SiO_2$ | 50 | 70 |
| $Al_2O_3$ | 10 | 20 |
| MgO | 1 | 4,5 |
| CaO | 0,5 | 4 |
| $Na_2O$ | 0,5 | 3 |
| Mass loss at 105 °C | 0 | 15 |

NOTE 1 When used in treatment to produce drinking water, bentonite should not increase the concentrations of chemical parameters above the regulated values (see [1]).

NOTE 2 Water extractable substances, determined in accordance with the method for powders 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 packed

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

### 7.2.3 Chemical analysis

The content of $SiO_2$ shall be determined in accordance with EN 12902.

The content of $Al_2O_3$, CaO, $Na_2O$ and MgO shall be determined in accordance with EN 12485.

### 7.2.4 Mass loss at 105 °C

The mass loss shall be determined by the method for water content, heating to 105 °C, in accordance with EN 12902.

# 8 Labelling, transportation and storage

## 8.1 Means of delivery

Bentonite shall be delivered in bags, big bags and 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 EU directives [3)]

Bentonite is not listed as a dangerous substance.

NOTE Annex I of the Directive 67/548/EEC on Classification, packaging and labelling of dangerous substances and its amendments and adaptations in the European Union contains a list of substances classified by the EU. Substances not in this Annex I should be classified on the basis of their intrinsic properties according to the criteria in the Directive by the person responsible for the marketing of the substance.

## 8.3 Transportation regulations and labelling

Bentonite is not classified as dangerous for transportation by road, rail, sea or air. Bentonite is not listed under a UN number [4)] .

No special labelling is required.

## 8.4 Marking

The marking shall include the following:

— the name "bentonite", trade name and grade;

— the net mass;

— the name and the address of the supplier and/or manufacturer;

— the statement "This product conforms to EN 13754".

## 8.5 Storage

### 8.5.1 Long-term stability

The product is stable but hygroscopic.

The product can be stored for one or two years if kept dry and away from volatile materials which can adsorb on the bentonite.

### 8.5.2 Storage incompatibilities

Keep away from volatile solvents, odorous products and moisture.

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3) See [2].

4) United Nations number.

# Annex A
(informative)

# General information on bentonite

## A.1 Origin

### A.1.1 Raw material

Bentonite exists in nature as a clay deposit. It is generally contaminated by sand and rocks.

### A.1.2 Manufacturing process

Bentonite is produced by mining and crushing in the quarry and then treating in a plant where it is crushed to the end use size and dried. By mixing powdered sodium carbonate during crushing it is possible to exchange the divalent metal (generally $Ca^{2+}$) partly by $Na^{+}$; this increases the swelling properties of the bentonite.

## A.2 Physical properties

The absolute density is in the range 2 g/cm$^3$ to 2,4 g/cm$^3$.

## A.3 Use

### A.3.1 Function

Bentonite is used to weigh down a flock when there is a low amount of suspended solids in the water.

### A.3.2 Treatment dose

The treatment dose depends on raw water quality, process plant and treatment objectives and is generally up to 20 mg/l.

## A.4 Rules for safe handling and use

Bentonite is not a hazardous product. It is recommended to avoid exposure to the dust which is irritating to the nose and throat.

## A.5 Emergency procedure

### A.5.1 First aid.

In case of contact with skin, there is no danger - it is recommended to wash with soap and 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.5.2 Spillage

It is recommended to sweep up and to discard in a refuse container.

### A.5.3 Fire

No special requirements apply.

# Bibliography

[1] 98/83/EC, *Council Directive of 3 November 1998 on the quality of water intended for human consumption*

[2] 67/548/EEC, *Council Directive of 27th June 1967 on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances and its amendments and adaptations*

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BSI Group
Headquarters 389
Chiswick High Road,
London, W4 4AL, UK
Tel +44 (0)20 8996 9001
Fax +44 (0)20 8996 7001
www.bsigroup.com/
standards