BS EN 1018:2013+A1:2015

BSI Standards Publication

Chemicals used for treatment of water intended for human consumption — Calcium carbonate

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National foreword

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The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by [A1] 〈A1〉.

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English Version

Chemicals used for treatment of water intended for human consumption - Calcium carbonate

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Calciumcarbonat

This European Standard was approved by CEN on 28 March 2013 and includes Amendment 1 approved by CEN on 5 January 2015.

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Foreword

This document (EN 1018:2013+A1:2015) 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of an identical text or by endorsement, at the latest by September 2015, and conflicting national standards shall be withdrawn at the latest by September 2015.

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This document supersedes A1 EN 1018:2013 A1.

This document includes Amendment 1 approved by CEN on 2015-01-04.

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Significant differences between this edition and EN 1018:2006 are:

— deletion of the reference to EU Directive 80/778/EEC of July, 15 1980 in order to take into account of the latest Directive in force (see [1]);

— changes in designation of products.

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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 document 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 document is subject to regulation or control by National Authorities.

1 Scope

This European Standard is applicable to calcium carbonate used for treatment of water intended for human consumption. It describes the characteristics of calcium carbonate and specifies the requirements and the corresponding test methods for calcium carbonate. It gives information on its use in water treatment.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, half-burnt dolomite, magnesium oxide and calcium magnesium carbonate — Test methods*

ISO 3165, *Sampling of chemical products for industrial use — Safety in sampling*

ISO 6206, *Chemical products for industrial use — Sampling — Vocabulary*

ISO 9277, *Determination of the specific surface area of solids by gas adsorption — BET method*

3 Terms and definitions

To distinguish between non-porous and porous calcium carbonate, Annex B applies.

4 Description

4.1 Identification

4.1.1 Chemical name

Limestone.

Calcium carbonate.

4.1.2 Synonym or common name

Limestone.

Calcium carbonate.

4.1.3 Relative molecular mass

100,09.

4.1.4 Empirical formula

$CaCO_3$.

4.1.5 Chemical formula

$CaCO_3$.

4.1.6 CAS-Registry Number[1)]

1317-65-3 for limestone.

471-34-1 for calcium carbonate.

4.1.7 EINECS reference[2)]

215-279-6 for limestone.

207-439-9 for calcium carbonate.

4.2 Commercial form

Both types of calcium carbonate (limestone and chemically produced) are available in crushed and granular form of various particle size ranges, as a slurry and in a mixture of both substances.

4.3 Physical properties

4.3.1 Appearance

The product is a white or grey material in crushed and granular form.

4.3.2 Density

The density of the product is equal to 2,71 g/cm^3 at 20 °C.

The bulk density of the product is between 1,0 g/cm^3 to 1,5 g/cm^3.

4.3.3 Solubility

The solubility of product is equal to 0,014 g/l at 10 °C.

4.3.4 Vapour pressure

Not applicable.

4.3.5 Boiling point at 100 kPa[3)]

Not applicable.

4.3.6 Melting point

Not applicable.

4.3.7 Specific heat

Not known.

4.3.8 Viscosity, dynamic

Not applicable.

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1) Chemical Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

3) 100 kPa = 1 bar.

4.3.9 Critical temperature

Not applicable.

4.3.10 Critical pressure

Not applicable.

4.3.11 Physical hardness

Not relevant.

4.3.12 Particle size

It varies depending on the application (see A.2.3).

4.4 Chemical properties

Calcium carbonate reacts as an alkali when dissolved in water.

5 Purity criteria

5.1 General

[A1] This European Standard specifies the minimum purity requirements for calcium carbonate 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.

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 this European 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 leads to significant quantities of impurities, by-products or additives being present, this shall be notified to the user. [A1]

5.2 Composition of commercial product

The product shall conform to the requirements specified in Table 1:

Table 1 — Composition of commercial product

Parameter	Non-porous calcium carbonate			Porous calcium carbonate	
	[A1] Class [A1] 1	[A1] Class [A1] 2	[A1] Class [A1] 3	[A1] Class [A1] 1	[A1] Class [A1] 2
Content of calcium carbonate ($CaCO_3$), in mass fraction in %, in dry substance	> 98	> 94	> 80	> 97	> 85
Total content of calcium carbonate ($CaCO_3$) and magnesium carbonate ($MgCO_3$) expressed as $CaCO_3$ - $MgCO_3$, in mass fraction in %, in dry substance	> 98	> 94	> 90	> 99	> 95

NOTE Examples of non-porous calcium carbonate: fine crystalline calcium carbonate, modification calcite; e.g. jura or devon limestone; examples of porous calcium carbonate: amorphous deposits of calcium carbonate; e.g. shell-lime.

5.3 Impurities and main by-products

The product shall conform to the requirements specified in Table 2.

[A1]

Table 2 — Impurities

Impurity	Non-porous calcium carbonate			Porous calcium carbonate	
	Grade 1	Grade 2	Grade 3	Grade 1	Grade 2
Content of residue not soluble in hydrochloric acid, in mass fraction in %, in dry substance	≤ 2	≤ 6	≤ 12	≤ 1	≤ 5
NOTE The user may specify limits for iron or manganese, if the product is used in remineralisation process					

[A1]

5.4 [A1] Chemical parameters [A1]

[A1] *deleted text* [A1]

The [A1] product [A1] shall conform to the requirements specified in Table 3.

Table 3 — Chemical parameters

Parameter		Limit of product mg/kg, in dry substance	
		Type A	Type B
Antimony (Sb)	max.	3	5
Arsenic (As)	max.	3	5
Cadmium (Cd)	max.	2	2
Chromium (Cr)	max.	10	20
Lead (Pb)	max.	10	20
Mercury (Hg)	max.	0,5	1
Nickel (Ni)	max.	10	20
Selenium (Se)	max.	3	5
[A1] NOTE Other chemical parameters and indicator parameters are not relevant in calcium carbonate because the raw materials used in the manufacturing process are free of them. For parametric values of calcium carbonate on trace metal content in drinking water, see [1]. [A1]			

6 Test methods

6.1 Sampling

Observe the general recommendations of ISO 3165 and take account of ISO 6206.

Prepare the laboratory sample(s) required by the relevant procedure described in EN 12485.

6.2 Analyses

Use the relevant methods for analysis described in EN 12485.

7 Labelling - Transportation - Storage

7.1 Means of delivery

Calcium carbonate can be delivered in bags, containers and as a bulk material.

In order that the purity of the products 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.

7.2 Labelling according to the EU legislation [4)]

At the date of the publication of this document, no labelling requirements apply to calcium carbonate.

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.

7.3 Transportation regulations and labelling

Calcium carbonate products are not classified as dangerous goods.

7.4 Marking

The marking shall include the following:

— [A1] name "calcium carbonate", trade name, class, grade and type; [A1]

— net mass;

— name and address of supplier and/or manufacturer;

— [A1] the statement "this product conforms to EN 1018, class ….. grade…... type .....". [A1]

7.5 Storage

7.5.1 Long term stability

Product can be stored for unlimited period of time if kept dry.

7.5.2 Storage incompatibilities

Product shall be kept away from acids.

4) See [2].

Annex A
(informative)

General information on calcium carbonate

A.1 Origin

A.1.1 Raw materials

Natural limestone.

A.1.2 Manufacturing process

Calcium carbonate is manufactured by quarrying, crushing, cleaning and subsequent screening of natural limestone or manufactured by chemical production.

A.2 Use

A.2.1 Function

Calcium carbonate is used to adjust pH value and hardness in water. Calcium carbonate is also used for mineralisation of desalinised water together with carbon dioxide.

A.2.2 Form in which it is used

Calcium carbonate is used in the form of granular or crushed materials, and as a slurry.

Table A.1 — Usual particle size range

Dimensions in millimetres

Non-porous calcium carbonate	Porous calcium carbonate
0,71 to 1,25	1,0 to 3,0
1,0 to 2,0	3,0 to 5,0
1,6 to 2,8	

If the particle size range is quoted, the content of oversize ▌A1⟩ or ⟨A1▐ undersize should not exceed 10 % (*m/m*). ▌A1⟩ For the determination of the particle size range, see [3]. ⟨A1▐

A calcium carbonate slurry is used as a suspension normally containing of 50 % to 80 % of calcium carbonate in water.

A.2.3 Treatment dose

The quantities of calcium carbonate to be used depend on the application.

A.2.4 Means of application

Calcium carbonate is used in filters.

A.2.5 Secondary effects

Filtration of suspended solids and removal of metals.

A.2.6 Removal of excess product

Not applicable.

A.3 Rules for safe handling and use

Not relevant.

A.4 Emergency procedures

A.4.1 First aid

Not relevant.

A.4.2 Spillage

The spillage of product should be removed mechanically.

A.4.3 Fire

The product is not combustible.

Annex B
(normative)

Sample preparation and testing of specific surface of calcium carbonate

B.1 Sample preparation

Split the sample as received by means of a sample divider, until a portion for testing is achieved.

B.2 Testing

Use a test method as given in ISO 9277.

B.3 Criteria for non-porous and porous calcium carbonates

Non-porous calcium carbonates have a BET [A1] surface area [A1] of less than 1 m^2/g, porous calcium carbonates have a BET [A1] surface area [A1] of equal to or higher than 1 m^2/g.

Bibliography

[1] 98/83/EC: Council Directive 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 (REACH)

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

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