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Products used for treatment of water intended for human consumption — Anthracite

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National foreword

This British Standard is the UK implementation of EN 12909:2012. It supersedes BS EN 12909:2005 which is withdrawn.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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Products used for treatment of water intended for human consumption - Anthracite

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Anthrazit

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Foreword

This document (EN 12909:2012) 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of an identical text or by endorsement, at the latest by May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.

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This document supersedes EN 12909:2005.

The significant technical difference between this edition and EN 12909:2005 is as follows:

— Updating of clause 8.2 in line with current legislation.

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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 European Standard:

a) this European 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 European 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 anthracite used for treatment of water intended for human consumption. It describes the characteristics of anthracite and specifies the requirements and the corresponding test methods for anthracite. 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 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

Carbon.

4.1.2 Synonym or common name

Natural anthracite.

4.2 Commercial forms

Anthracite according to this European Standard is available in different particle size ranges.

5 Physical properties

5.1 Appearance

The product is a black coloured lustrous granular material.

The product has a granular or angular shape, amorphous structure and smooth texture.

The product shall be generally homogeneous and shall be visibly free of extraneous matter.

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) effective size: (d_{10}) with a maximum deviation of ± 5 %;

uniformity coefficient: (U) which shall be less than 1,5;

minimum size: (d_1) with a maximum deviation of ± 5 %;

or

b) by particle size range and by mass of oversize and undersize particles according to application.

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 650 kg/m^3 to 800 kg/m^3.

5.3.2 Bulk density packed

The bulk density packed shall be in the range of 670 kg/m^3 to 820 kg/m^3.

6 Chemical properties

This European Standard specifies the minimum purity requirements for anthracite 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, contents of other impurities and additives used in the products not stated in this 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 Table 1.

Table 1 — Composition of commercial product

Parameter		Mass fraction %
C (water and ash free basis)	min	90
Ash	max	7
Volatile matter	max	10

NOTE 1 These parameters do not influence filtration properties but give information about the source of anthracite.

NOTE 2 Other potential components are given in A.2.1.

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

NOTE 3 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 Content of carbon

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

7.2.5 Ash

The ash shall be determined in accordance with EN 12902.

7.2.6 Content of volatile material

The content of volatile material shall be determined in accordance with EN 12902.

8 Labelling, transportation and storage

8.1 Means of delivery

Anthracite 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 Labelling in accordance with the EU legislation [1)]

Anthracite is not listed within Annex VI of Regulation (EC) No 1272/2008 at the date of publication of this European Standard.

The legislation [2], and its amendments for the purposes of its adaptation to technical and scientific progress 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

Anthracite is not a dangerous cargo.

8.4 Marking

The marking shall include the following:

— name "Anthracite", trade name and particle size range;

— net mass or the volume;

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

— statement "this product conforms to EN 12909".

8.5 Storage (long term stability)

Anthracite can be stored for an unlimited period of time.

1) See [2].

Annex A
(informative)

General information on anthracite

A.1 Origin

A.1.1 Raw material

Natural anthracite coal.

A.1.2 Manufacturing process

Anthracite is produced by mining, crushing, cleaning, drying and sieving.

A.2 Typical properties

A.2.1 Chemical composition

The composition depends on the origin. Typical limits are given as an example in Table A.1 (the main components are given in Clause 6).

Table A.1 — Chemical composition

Parameter		Mass fraction %
SiO_2	max	3
Fe_2O_3	max	1
Al_2O_3	max	2
CaO	max	1
K_2O	max	1
Na_2O	max	1

Mineralogical and petrological analyses give additional information.

A.2.2 Mechanical strength

The mechanical strength of anthracite 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 be used only 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 fraction of oversize and undersize product are given in Table A.2.

Table A.2 — Examples of particle size range

Particle size range mm	**Permissible mass fraction** % [a]	
	Undersize	**Oversize**
0,6 to 1,18 0,6 to 1,6 0,8 to 1,6	5	5
1,18 to 2,5 1,4 to 2,5 1,6 to 2,5 2,0 to 4,0 2,5 to 4,0 2,5 to 5,0	10	10
[a] Generally the maximum permitted mass fractions of undersize and oversize are 5 % for application of the product as a filtration layer in multi media filters and 10 % for use in single media filters.		

Other particle size ranges can be specified.

A.2.4 Density

A.2.4.1 Absolute density

The absolute density is generally in the range of 1,35 g/cm^3 to 1,6 g/cm^3.

A.2.4.2 Particle density dry

The particle density dry is generally in the range of 1,35 g/cm^3 to 1,6 g/cm^3.

A.2.4.3 Particle density wet

The particle density wet is generally in the range of 1,35 g/cm^3 to 1,6 g/cm^3.

A.3 Use

A.3.1 Function

Anthracite is used as a filtering material.

A.3.2 Specific amount

The amount of anthracite used depends on the 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

Anthracite is used in open or closed single or multi media filters.

A.3.4 Secondary effects

The product has no secondary effects.

A.4 Hydraulic characteristics

A.4.1 Interstitial volume

The interstitial volume is approximately 0,4 (*V/V*). If used for calculations the interstitial volume should be measured.

A.4.2 Head loss during filtration

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

A.4.3 Expansion during 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 safety handling and use

Anthracite is not a hazardous product.

It is recommended to avoid dust formation.

When handling dry product the use of a dust mask is recommended.

A.6 Emergency procedures

A.6.1 First aid

In case of contact with skin there is no danger, 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.

A.6.3 Fire

Extinguishing media: it is recommended to use foam extinguishers.

Breathing apparatus should be worn because carbon dioxide and carbon monoxide can be produced during combustion.

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).

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