SLOVENSKI STANDARD
SIST EN 12903:2000

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Proizvodi, ki se uporabljajo za pripravo pitne vode - Aktivno prašnato oglje

Products used for treatment of water intended for human consumption - Powdered activated carbon

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Pulver-Aktivkohle

Produits utilisés pour le traitement de l'eau destinée à la consommation humaine - Charbon actif en poudre

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13.060.20	Pitna voda	Drinking water
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EUROPEAN STANDARD
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EN 12903

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English version

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This European Standard was approved by CEN on 16 July 1999.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This European Standard 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of an identical text or by endorsement, at the latest by February 2000, and conflicting national standards shall be withdrawn at the latest by February 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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 :

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.

1 Scope

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

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 12901, *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.*

EN ISO 787-11, *General methods of test for pigments and extenders - Part 11 : Determination of tamped volume and apparent density after tamping (ISO 787-11:1981).*

3 Definitions and symbols

For the purpose of this standard, the definitions and symbols given in EN 12901 apply.

4 Description

4.1 Identification

4.1.1 Chemical name(s)

Carbon.

4.1.2 Synonym or common names

Activated coal, activated charcoal, active carbon.

4.1.3 Chemical formula

C (elementary).

4.1.4 CAS Registry Number [1)]

7440-44-0.

4.1.5 EINECS reference [2)]

231-153-3.

4.2 Commercial form

Powdered activated carbon is available in many grades, differing in adsorption characteristics, porosity, particle size and purity.

5 Physical properties

5.1 Appearance

Black powder.

5.2 Particle size distribution

5.2.1 Particle size

At least 95 percent by mass (% (*m/m*)) shall have a particle size less than 150 µm.

NOTE Other values can be necessary for certain applications. The particle size distribution is commonly specified as 95 % (*m/m*) less than a given particle size.

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

5.2.2 Oversize and undersize particles

The proportion of oversize and undersize particles shall be within the manufacturer's declared values.

5.3 Bulk density packed

The bulk density packed shall be within ± 10 % of the value specified by the manufacturer or supplier.

NOTE The bulk density packed of powdered activated carbon is typically in the range 200 kg/m^3 to 750 kg/m^3.

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1) Chemical Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

6 Chemical properties

6.1 General

Powdered activated carbon is manufactured by controlled oxidation, by means of steam or chemicals, from carbonaceous raw materials including coconut, wood, peat or coal. The raw materials shall be stated by the manufacturer.

High internal porosity results in adsorptive properties and, depending on the raw material and the manufacturing process, it can have acid or basic properties. It is a reducing agent with catalytic properties. Activated carbon can react with oxidants to form carbon dioxide.

The carbon content of the commercial product does not affect adsorption characteristics.

6.2 Purity criteria

Limits have been given for impurities and toxic substances where these are likely to be present in significant quantities from the current production process and raw materials. If a change in the production process or raw materials leads to significant quantities of other impurities or by-products being present, this shall be notified to the user.

6.2.1 Impurities and main by-products

The product shall conform to the requirements specified in table 1.

Table 1 - Main impurities and by-products

Impurity		Limit in %(m/m)[a]
Ash[b]	max.	15
Water[c] (at the time of packing)[d]	max.	5
Water-soluble material	max.	3
Zinc	max.	0,002

[a] Expressed on a dry basis except for water content.

[b] Some products incorporate minerals to reduce dust formation; for such products a higher limit for ash can be necessary.

[c] Certain applications require a higher water content to avoid dust formation; for such products a higher limit can be necessary.

[d] The water content can increase after packing ; e.g. during transportation.

6.2.2 Water-extractable toxic substances

NOTE For the purpose of this standard, "toxic substances" are those defined in the EU Directive 80/778/EEC, from July 15, 1980 (see [1]).

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

Table 2 - Water extractable toxic substances

Element		Limit in mg/kg of product (dry basis)
Arsenic (As)	max.	50
Cadmium (Cd)	max.	5
Chromium (Cr)	max.	50
Mercury (Hg)	max.	1
Nickel (Ni)	max.	50
Lead (Pb)	max.	50
Antimony (Sb)	max.	10
Selenium (Se)	max.	10
Cyanide (CN)	max.	50
PAH[a]	max.	0,2

[a] Polycyclic Aromatic Hydrocarbons : the sum of the detected concentrations of fluoranthene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene.

7 Specific properties

The iodine number of the powdered activated carbon shall be not less than 600 mg/g.

NOTE In certain applications lower values are acceptable.

8 Test methods

8.1 Sampling

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

8.2 Analysis

8.2.1 Particle size distribution

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

8.2.2 Bulk density packed

8.2.2.1 Apparatus

8.2.2.1.1 Drying oven capable of being controlled at (150 ± 5) °C.