SLOVENSKI STANDARD
SIST EN 12902:2005

01-marec-2005

Nadomešča:

SIST EN 12902:2000

Proizvodi, ki se uporabljajo za pripravo pitne vode – Anorganski nosilni in filtrski materiali - Metode preskušanja

Products used for treatment of water intended for human consumption - Inorganic supporting and filtering materials - Methods of test

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Anorganische Filterhilfs- und Filtermaterialien - Prüfverfahren

Produits chimiques utilisés pour le traitement de l'eau destinée a la consommation humaine - Matériaux inorganiques de filtration et de support - Méthodes d'essai

Ta slovenski standard je istoveten z: **EN 12902:2004**

ICS:

13.060.20	Pitna voda	Drinking water
71.100.80	Kemikalije za čiščenje vode	Chemicals for purification of water

SIST EN 12902:2005 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12902

November 2004

ICS 71.100.80

Supersedes EN 12902:1999

English version

Products used for treatment of water intended for human consumption - Inorganic supporting and filtering materials - Methods of test

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Matériaux inorganiques de filtration et de support - Méthodes d'essai

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Anorganische Filterhilfs- und Filtermaterialien - Prüfverfahren

This European Standard was approved by CEN on 30 September 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Foreword

This document (EN 12902:2004) 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 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

This document supersedes EN 12902:1999.

Significant technical differences between this edition and EN 12902:1999 are as follows:

a) Addition in 5.2.6 of a requirement to round results to the nearest 10 kg/m^3.

b) Modification of Table 4 to specify analytical performance characteristics instead of specific methods.

c) Modification of 6.5 to allow the use of a larger test sample.

d) Deletion of clause 7 (Determination of polynuclear aromatic hydrocarbons (PAH) in aqueous extracts).

e) Correction of figure A.2.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This document specifies methods of test to determine physical and chemical properties of Inorganic Supporting and Filtering Materials (ISFM).

NOTE The applicability of the methods is specified in the relevant product standard.

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 ISO 3696, *Water for analytical laboratory use – Specification and test methods* (ISO 3696:1987).

ISO 562, *Hard coal and coke – Determination of volatile matter.*

ISO 565, *Test sieves – Metal wire cloth, perforated metal plate and electroformed sheet – Nominal sizes of openings.*

ISO 609, *Solid mineral fuels – Determination of carbon and hydrogen – High temperature combustion method.*

ISO 2395, *Test sieves and test sieving – Vocabulary.*

ISO 2591-1, *Test sieving – Part 1: Methods using test sieves of woven wire cloth and perforated metal plate.*

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

ISO 6206, *Chemical products for industrial use – Sampling – Vocabulary.*

ISO 8213, *Chemical products for industrial use – Sampling techniques – Solid chemical products in the form of particles varying from powders to coarse lumps.*

ISO 9276-1, *Representation of results of particle size analysis – Part 1: Graphical representation.*

ISO 13320-1, *Particle size analysis – Laser diffraction methods – Part 1: General principles.*

3 Terms and definitions

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

4 Sampling

Observe the recommendations of ISO 3165 and see ISO 6206. Sample in accordance with ISO 8213 and obtain the laboratory sample from the bulk sample by using a divider.

5 Physical properties

5.1 Particle size distribution

5.1.1 General

The particle size distribution of granular materials shall be determined by sieving; this is applicable to distributions measured using sieves of nominal aperture size of 0,025 mm and above (see ISO 2591-1).

For powders, the particle size shall be determined according to the laser optical method (see 5.1.4).

NOTE Alternative methods for particle size determination include:

— water sieving for powders;

— size measurement with magnification: microscopic counting;

— particle fall in a fluid without acceleration: settling;

— particle fall in a fluid with acceleration: cycloning;

— electromagnetic wave diffraction: turbidity;

— dielectric properties: Coulter counter.

5.1.2 Principle

Measurement of particle size distribution by sieving for granular materials or laser diffraction for powders.

5.1.3 Particle size distribution for granular material

The particle size distribution for granular material shall be determined in accordance with ISO 2591-1; see also ISO 2395 and ISO 565.

5.1.4 Particle size distribution for powders

5.1.4.1 General

The laser diffraction method described applies to powders in suspension in a liquid or gaseous fluid as well as to aerosols or emulsions. Measurable particle sizes are between 0,5 μm and an upper limit linked to the optical configuration of the laser equipment used which can range up to 3 600 μm. The principle of the method and guidance on measurement are given in ISO 13320-1.

5.1.4.2 Reagents

All reagents shall be of a recognized analytical grade and the water used shall conform to grade 3 in accordance with EN ISO 3696.

5.1.4.3 Apparatus

Ordinary laboratory apparatus together with the following.

5.1.4.3.1 Laser diffraction instrument (see ISO 13320-1).

5.1.4.4 Measurement

Disperse the sample in a suitable fluid (e.g. water, see ISO 13320-1) and introduce it into the analyzer in accordance with the manufacturer's recommendations. Adjust the measurement conditions by carrying out repetitive analyses to optimize reproducibility. Measure the scattering pattern and convert the results to particle size distribution following the recommendations in ISO 13320-1.

5.1.5 Expression of results

The results shall be presented as a cumulative particle size distribution curve in accordance with ISO 9276-1.

5.1.6 Processing of results

From the cumulative particle size distribution curve, determine the value of the following parameters:

— effective size d_{10};

— uniformity coefficient U;

— minimum size d_1;

— oversize percentage;

— undersize percentage.

5.2 Bulk density (loose and packed)

5.2.1 General

This method of measurement is not routinely used for materials with particle size greater than 4 mm.

5.2.2 Principle

The volume of dried ISFM, loose or packed, is determined in a measuring cylinder; dividing the mass of dried ISFM by its volume gives the bulk density.

5.2.3 Apparatus

Ordinary laboratory apparatus and glassware together with the following.

5.2.3.1 Balance with a capacity of 500 g or 2 000 g depending on volume of sample (see Table 1), with an accuracy of ± 1 g.

5.2.3.2 Desiccator.

5.2.3.3 Oven capable of being controlled at (105 ± 2) °C.

5.2.3.4 Graduated measuring cylinder of (250 ± 2) ml or (1 000 ± 10) ml according to Table 1.

5.2.4 Preparation of the sample

Dry a sufficient quantity of ISFM at (105 ± 2) °C to constant mass. Return to ambient temperature in the desiccator.

NOTE Porous material should be dried at (150 ± 2) °C.

The volume of sample is determined according to the particle size of ISFM (Table 1).

Table 1 – Minimum ISFM sample volume according to particle size

ISFM	Maximum particle size mm	Measuring cylinder volume ml	Minimum sample volume ml
Powder	< 0,4	250 ± 2	100
Granular material	0,4 to 4	1 000 ± 10	500

5.2.5 Procedure

5.2.5.1 Loose material

Weigh the empty measuring cylinder and note its mass m_0 to the nearest 1 g. With the measuring cylinder (5.2.3.4) positioned vertically, pour the sample of ISFM into the measuring cylinder. Measure the volume of the loose material V_1 to the nearest 10 ml. Weigh the measuring cylinder full and note its mass m_1 to the nearest 1 g.

5.2.5.2 Packed material

Weigh the empty measuring cylinder (5.2.3.4) and note its mass m_0 to the nearest 1 g. With the measuring cylinder positioned vertically, pour the minimum volume of ISFM according to Table 1 into the measuring cylinder. Tap the walls of the measuring cylinder with a glass rod covered with a rubber sleeve until the volume of ISFM remains constant. Measure the volume V_1. Weigh the measuring cylinder full and note its mass m_1 to the nearest 1 g.

5.2.6 Expression of result

The bulk density (ρ) of the material expressed in kilograms per cubic metre is calculated from the following equation:

$$\rho = \frac{m_1 - m_0}{V_1} \times 1000 \qquad (1)$$

where

m_0 is the mass of the measuring cylinder, in grams;

m_1 is the mass of the sample of ISFM and the measuring cylinder, in grams;

V_1 is the volume of the ISFM in the measuring cylinder, in millilitres.

Express the result to the nearest 10 kg/m^3.

5.3 Permeability of powders

5.3.1 General

The method is applicable to ISFM with median diameter (d_{50}) between 5 μm and 200 μm.

5.3.2 Principle

Measurement of the time needed for a fixed volume of water to flow across a cake of ISFM of precise dimensions under specified conditions of temperature and pressure.

5.3.3 Reagent

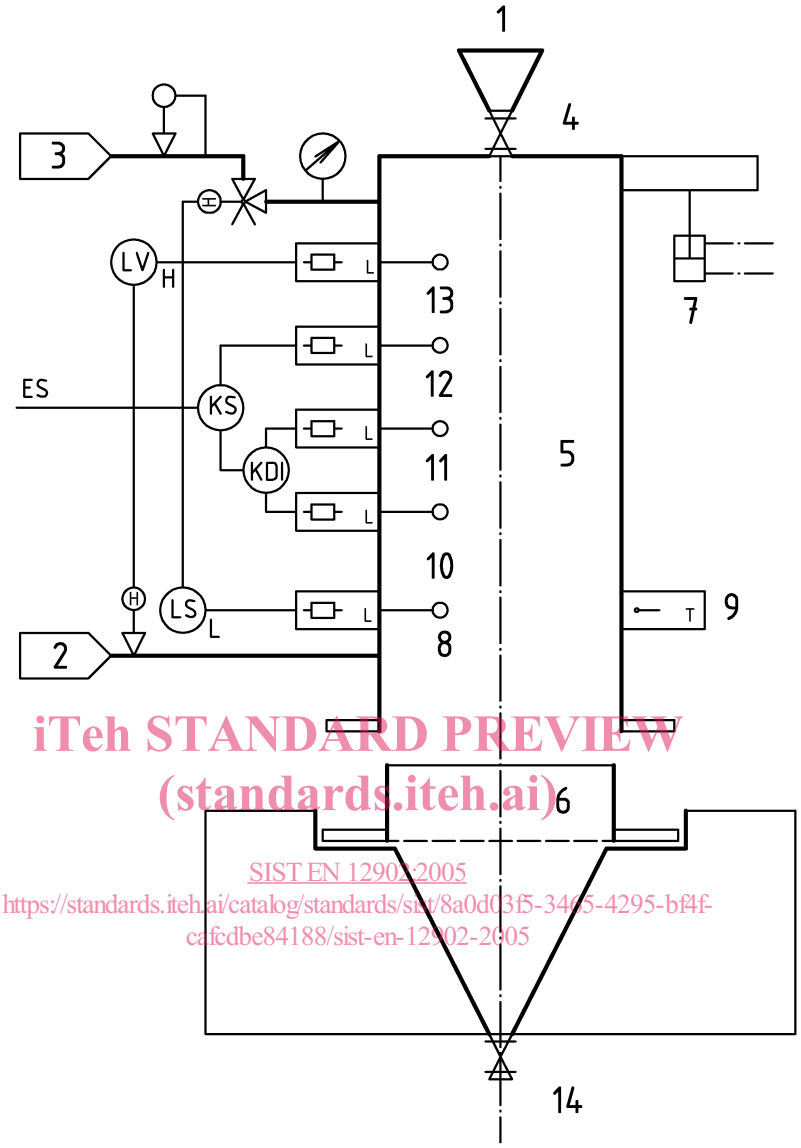
The fluid used for the test shall be water conforming to grade 3 in accordance with EN ISO 3696.

5.3.4 Apparatus

Ordinary laboratory apparatus and glassware together with the following

5.3.4.1 Permeameter

Figure 1 gives an example of a permeameter.



Key

1 funnel
2 test fluid
3 compressed air
4 valve
5 measurement chamber
6 cylindrical cake carrier
7 pneumatic jack
8 electric shut down
9 thermometer
10-13 electrodes
14 drain valve

Figure 1 – Example of permeameter

5.3.4.2 Beaker 600 ml.

5.3.4.3 Flat ruler.

5.3.4.4 Fluid reservoir.

5.3.4.5 Reducing valve with a manometer 0 kPa to 220 kPa, readable to ± 2 kPa.

5.3.4.6 Thermometer 15 °C to 30 °C readable to ± 0,1 °C.

5.3.4.7 Compressed air under 500 kPa.

5.3.4.8 Analytical balance capable of weighing up to 500 g with an accuracy of ± 0,01 g.

5.3.4.9 Desiccator.

5.3.4.10 Oven capable of being controlled at (105 ± 2) °C.

5.3.5 Preparation of sample

Dry a sufficient quantity of ISFM at 105 °C in the beaker (5.3.4.2) to constant mass, return to ambient temperature in the desiccator (5.3.4.9). The mass of test sample (m) required depends on the dimensions of the filter cake holder (see 5.3.6) and is given by the following equation:

$$m = S \times h \times \rho_G \times 1{,}1 \qquad (2)$$

where

ρ_G is the cake density of the ISFM, in kilograms per cubic metre;

S is the surface of the cake, in square centimetres;

h is the height of the cake, in centimetres;

1,1 is a factor to ensure that a sufficiently large test sample is taken.