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SIST EN 12904:2005

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12904

March 2005

ICS 71.100.80

Supersedes EN 12904:1999

English version

Products used for treatment of water intended for human consumption - Silica sand and silica gravel

Produits utilisés pour le traitement de l'eau destinée à la consommation humaine - Sable et gravier de quartz

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Quarzsand und Quarzkies

This European Standard was approved by CEN on 3 February 2005.

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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents		Page
Foreword.....		3
Introduction		4
1	Scope	5
2	Normative references	5
3	Terms, definitions and symbols.....	5
4	Description	5
5	Physical properties.....	5
6	Chemical properties	6
7	Test methods.....	7
8	Labelling- Transportation -Storage.....	8
Annex A (informative) General information on silica sand and silica gravel.....		9
Bibliography		13

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(standards.iteh.ai)

SIST EN 12904:2005

<https://standards.iteh.ai/catalog/standards/sist/4b1f92cb-476a-4672-bd16-106fb4f23191/sist-en-12904-2005>

Foreword

This document (EN 12904:2005) 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 2005, and conflicting national standards shall be withdrawn at the latest by September 2005.

This document supersedes EN 12904:1999.

Significant technical differences between this edition and EN 12904:1999 are as follows:

- a) correction of the data on chemical composition in table A.1;
- b) use of the more appropriate terms "silica sand" and "silica gravel" throughout the standard;
- c) deletion of the reference to EU Directive 80/778/EEC of 15 July 1980 in order to take account of the last Directive in force (see[1]).

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.

SIST EN 12904:2005

<https://standards.iteh.ai/catalog/standards/sist/4b1f92cb-476a-4672-bd16-106fb4f23191/sist-en-12904-2005>

EN 12904:2005 (E)

Introduction

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by this document:

- a) This document 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 the 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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 12904:2005

<https://standards.iteh.ai/catalog/standards/sist/4b1f92cb-476a-4672-bd16-106fb4f23191/sist-en-12904-2005>

1 Scope

This document is applicable to silica sand and silica gravel used for treatment of water intended for human consumption. It describes the characteristics of silica sand and silica gravel and specifies the requirements and the corresponding test methods for silica sand and silica gravel. It gives information on their 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 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 purpose of this document, the terms, definitions and symbols given in EN 12901:1999 apply.

4 Description

4.1 Identification

<https://standards.iteh.ai/catalog/standards/sist/4b1f92cb-476a-4672-bd16-106fb4f23191/sist-en-12904-2005>

4.1.1 Chemical name(s)

Silica, silicon dioxide (SiO₂).

4.1.2 Synonym or common names

Silica sand and silica gravel.

4.2 Commercial forms

Silica sand and silica gravel according to this standard are available in different particle size ranges.

5 Physical properties

5.1 Appearance

The product is a grey/white, yellow or multicoloured granular material.

The structure is crystalline, with a smooth to rough texture. The particle shape is spherical or angular depending mainly on the origin and manufacturing procedure (quarrying or dredging, or crushing). The shape influences filtration performance, see A.3.

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

EN 12904:2005 (E)**5.2 Particle size distribution**

The particle size distribution shall be described by either:

a) effective size: (d_{10}), with a maximum deviation of $\pm 5\%$;

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

minimum size : (d_1), with a maximum deviation of $\pm 5\%$;

or:

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

The maximum contents of oversize and undersize shall be a mass fraction of 5 % for the application of the product in multi media filters and a mass fraction of 10 % for use in single media filters. For use as a support layer, maximum contents of oversize and undersize of mass fraction of 15 % are acceptable. See A.2.3 for examples of available particle sizes that are used.

NOTE 1 The particle size can decrease during transportation and handling.

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 1 400 kg/m³ to 1 700 kg/m³.

[SIST EN 12904:2005](https://standards.iteh.ai/catalog/standards/sist/4b1f92cb-476a-4672-bd16-106fb423191/sist-en-12904-2005)

5.3.2 Bulk density packed

The bulk density packed shall be in the range of 1 500 kg/m³ to 1 900 kg/m³.

6 Chemical properties

This document specifies the minimum purity requirements for silica sand and silica gravel used for the treatment of water intended for human consumption. Limits are given for impurities commonly present in the products. 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 these products 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 products not stated in this document.

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.

Silica sand and silica gravel shall conform to table 1.

Table 1 - Composition of silica sand and silica gravel

		Limit in mass fraction in % of the product			
		Type 1	Type 2	Type 3	
				$d_{10} < 2 \text{ mm}$	$d_{10} \geq 2 \text{ mm}$
SiO ₂	min.	96	80	80	80
Acid-soluble material	max.	2	2	5	10

NOTE 1 The contents of SiO₂ and acid-soluble material give information about the source of silica sand and silica gravel.

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

NOTE 3 After filling, washing and commissioning of a filter system producing drinking water the silica sand or silica gravel should not increase the concentrations of chemical parameters (see [1]).

NOTE 4 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.

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7 Test methods

7.1 Sampling

SIST EN 12904:2005

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 on samples taken at the point of manufacture using the method of test given in 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 silica

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

7.2.5 Acid-soluble material

The content of acid-soluble material shall be determined in accordance with EN 12902.