



SLOVENSKI STANDARD
oSIST prEN 17978:2023
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Proizvodi za pripravo pitne in bazenske vode - Steklene kroglice in steklen granulat

Products used for treatment of water intended for human consumption and swimming pool water - Glass beads and glass granulate

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Glasperlen und Glasgranulat

Produits utilisés pour le traitement de l'eau destinée à la consommation humaine et de l'eau de piscine - Billes de verre et granulés de verre

Ta slovenski standard je istoveten z: prEN 17978

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Products used for treatment of water intended for human consumption and swimming pool water - Glass beads and glass granulate

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Glasperlen und Glasgranulat

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

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Contents	Page
European foreword	4
Introduction	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions.....	6
4 Description.....	7
4.1 Identification.....	7
4.1.1 Chemical name.....	7
4.1.2 Synonyms or common names.....	7
4.1.3 Chemical composition.....	7
4.1.4 CAS registration number.....	7
4.1.5 EINECS number.....	7
4.2 Commercial forms	7
5 Physical properties	7
5.1 General.....	7
5.2 Appearance	7
5.2.1 Glass beads.....	7
5.2.2 Glass granulate	7
5.3 Mechanical stability.....	8
5.4 Particle size distribution.....	8
5.4.1 General.....	8
5.4.2 Glass beads.....	8
5.4.3 Glass granulate	8
5.5 Grain size groups	8
5.6 Density.....	9
5.6.1 Bulk density (loose).....	9
5.6.2 Bulk density (packed).....	9
5.6.3 Absolute density.....	9
6 Chemical properties.....	10
7 Test methods	11
7.1 Sampling.....	11
7.2 Analyses.....	11
7.2.1 Particle size distribution.....	11
7.2.2 Bulk density (loose and packed).....	11
7.2.3 Water-extractable chemical components.....	11
7.2.4 Analyses of the contaminants.....	11
8 Labelling - transportation and storage	14
8.1 Means of delivery.....	14
8.2 Risk and safety labelling according to the EU Regulations and Directives ²⁾	14
8.3 Transportation regulations and labelling	14
8.4 Marking	14
8.5 Storage	14
8.5.1 Long term chemical stability	14

Annex A (informative) General information on glass beads and glass granulate.....	15
A.1 Origin	15
A.1.1 Raw material	15
A.1.2 Manufacturing process	15
A.2 Typical properties	15
A.2.1 Typical heavy metal content.....	15
A.2.2 Mechanical Stability.....	16
A.3 Application.....	16
A.3.1 Function	16
A.3.2 Specific amount.....	16
A.3.3 Means of application.....	16
A.3.4 Secondary effects.....	16
A.4 Hydraulic characteristics.....	17
A.4.1 Interstitial volume	17
A.4.2 Head loss in filtration.....	17
A.4.3 Expansion during backwashing.....	17
Annex B (normative) General rules relating to safety.....	18
B.1 Rules for safe handling and use.....	18
B.2 Emergency procedures.....	18
B.2.1 First aid	18
B.2.2 Spillage	18
B.2.3 Fire protection.....	18
Bibliography	19

prEN 17978:2023 (E)

European foreword

This document (prEN 17978:2023) has been prepared by Technical Committee CEN/TC 164 “Water Supply”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

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Introduction

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

- a) this document provides no information as to whether the products may be used without restrictions 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 these products remain in force.

NOTE Conformity with this document does not confer or imply acceptance or approval of the products in any of the Member States of the EU or EFTA. The use of the products covered by this document is subject to regulation or control by National Authorities.

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prEN 17978:2023 (E)**1 Scope**

This document is applicable to glass beads and glass granulate intended for treatment of water for human consumption, swimming pool and/or spa water. It solely describes the characteristics of glass beads and glass granulate and specifies the requirements and the corresponding test methods for glass beads and glass granulate.

General information on glass beads and glass granulate is provided in Annex A. General rules relating to safety are provided in Annex B.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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, *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 12677, *Chemical analysis of refractory products by X-ray fluorescence (XRF) - Fused cast-bead method (ISO 12677)*

ISO 695, *Glass — Resistance to attack by a boiling aqueous solution of mixed alkali — Method of test and classification*

ISO 13322-2, *Particle size analysis — Image analysis methods — Part 2: Dynamic image analysis methods*

ISO 22309, *Microbeam analysis — Quantitative analysis using energy-dispersive spectrometry (EDS) for elements with an atomic number of 11 (Na) or above*

ISO 8039, *Microscopes — Values, tolerances and symbols for magnification*

EN ISO 19743, *Solid biofuels - Determination of content of heavy extraneous materials larger than 3,15 mm (ISO 19743)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12901 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1**glass granulate**

granulated filter material made of glass free from any other extraneous matter

3.2**glass beads**

round (spherical) filter material made of glass free from any other extraneous matter

4 Description

4.1 Identification

4.1.1 Chemical name

Glass beads and glass granulate predominantly consist of amorphous silicon dioxide (SiO₂).

More detailed information on the composition of filter materials made from glass is found in Table 3 and in Table A.1.

4.1.2 Synonyms or common names

Glass beads are also called glass pearls, glass balls, filter beads or filter glass.

Glass granulate is also called crushed glass, glass sand, glass cullet or filter glass.

4.1.3 Chemical composition

See Table 3.

4.1.4 CAS registration number

CAS 65997-17-3

4.1.5 EINECS number

EINECS 266-046-0

4.2 Commercial forms

Glass beads and glass granulate conforming to this document are available in various sieve fractions.

5 Physical properties

5.1 General

Glass beads and glass granulate differ markedly in their geometrical shapes as well as their composition, the physical and chemical properties. The structure of their surface has an influence on the microbiological potential to grow.

5.2 Appearance

5.2.1 Glass beads

Glass beads are round and mostly of a white to greenish colour, an amorphous structure and a smooth surface. The round shape has a major influence on the filtering properties. Glass beads shall be generally homogeneous and visibly free of extraneous matter at the moment of delivery, to avoid clogging of the filter.

5.2.2 Glass granulate

Glass granulate is usually a green-brown granular material. The structure is amorphous with a smooth to slightly rough surface. The shape is similar to that of a grain of crushed sand. However, no sharp edges are allowed in order to prevent injury during maintenance or servicing. Glass granulate shall be generally homogeneous and visibly free of extraneous matter at the moment of delivery, to avoid clogging of the filter.

prEN 17978:2023 (E)**5.3 Mechanical stability**

The mechanical stability of glass beads and granulate is high. The hardness of glass is given as 5,5 to 6,5 on the Mohs scale of hardness.

High mechanical stress (e.g. during transport and filling) can lead to abrasion of glass beads and glass granulate, which consists of dust. Glass beads show less abrasion during transport, filling and normal rinsing than glass grain.

5.4 Particle size distribution**5.4.1 General**

The particle size distribution of the glass beads or glass granulate shall be determined for a sample, which is collected at the place of production.

5.4.2 Glass beads

The particle size distribution shall be defined either by:

- a) The effective grain size (d_{50}) with maximum deviations of $\pm 5\%$; the roundness $b/l_3 > 92\%$; the minimum particle size (d_{10}) with maximum deviations of $\pm 5\%$

where

$b = x_c$, min; width, breadth - the particle diameter which is the shortest chord of the measured set of maximum chords of a particle;

$l_3 = x_{Fe}$, max - the maximum distance for all pairs of tangents, which are placed in parallel oppositely at the particles edges);

or

- b) the particle group with a proportion of oversized and undersized particles corresponding to the application,

NOTE Other grain size groups can be required for specific applications.

5.4.3 Glass granulate

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.

NOTE Other grain size groups can be required for specific applications.

5.5 Grain size groups

Examples of particle size distributions described by different particle size ranges and the permissible mass fractions of oversize and undersized product are given in Tables 1 and 2. Other particle size ranges can be agreed. Typically, particle sizes up to 2 mm are used as filtering material and particles sizes greater than 2mm are used as supporting material.

Table 1 — Examples of particle size ranges of glass beads

Particle size range d/mm	Permissible mass fraction in %	
	Undersize	Oversize
0,25 - 0,50	5	5
0,40 - 0,60		
0,60 - 0,90		
0,80 - 1,00		
1,00 - 1,30		
1,25 - 1,65		
1,55 - 1,85		
1,70 - 2,10		
2,00 - 2,40		
2,40 - 2,90		
2,85 - 3,45		
3,40 - 4,00		
3,80 - 4,40		
4,50 - 5,50		
5,00 - 6,00		

Table 2 — Examples of particle size ranges of glass granulate

Particle size range d/mm	Permissible mass fraction in %	
	Undersize	Oversize
0,25 - 0,50	5	5
0,40 - 0,80		
0,70 - 2,00	10	10
2,00 - 4,00		

5.6 Density

5.6.1 Bulk density (loose)

The loose bulk density for glass beads and glass granulate is in the range of 1,20 kg/dm³ to 1,55 kg/dm³.

5.6.2 Bulk density (packed)

The packed bulk density for glass beads and glass granulate is in the range of 1,40 kg/dm³ to 1,90 kg/dm³.

5.6.3 Absolute density

The absolute density is generally in the range of 2,40 kg/dm³ to 2,52 kg/dm³.