



SLOVENSKI STANDARD
SIST EN 12566-1:2000
01-november-2000

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Small wastewater treatment systems for up to 50 PT - Part 1: Prefabricated septic tanks

Kleinkläranlagen für bis zu 50 Einwohnerwerte (EW) - Teil 1: Werkmäßig hergestellte Faulgruben

Petites installations de traitement des eaux usées jusqu'à 50 PTE - Partie 1: Fosses septiques préfabriquées

STANDARD PREVIEW
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Ta slovenski standard je istoveten z: **EN 12566-1:2000**
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ICS:

13.060.30 Odpadna voda Sewage water

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English version

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Kleinkläranlagen für bis zu 50 Einwohnerwerte (EW) - Teil
1: Werkmäßig hergestellte Faulgruben

This European Standard was approved by CEN on 25 November 1999.

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.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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FOREWORD

This European Standard has been prepared by Technical Committee CEN/TC 165 "Waste water engineering", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by July 2000, and conflicting national standards shall be withdrawn at the latest by July 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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.

This European Standard provides the general requirements for prefabricated septic tanks and ancillary equipment used for domestic wastewater treatment ≤ 50 PT (see clause 1).

This Standard is divided into 5 parts:

Part 1: Prefabricated septic tanks

Note: It specifies the requirements and test methods for prefabricated septic tank units. No treatment or structural requirements are specified.

Part 3: Packaged and/or site assembled domestic wastewater treatment plants

Note: It specifies the requirements and test methods used to evaluate packaged water treatment plants which are required to treat sewage to a predetermined standard.

The following parts are in preparation:

Part 2: Soil infiltration systems

Note: Code of Practice for in-situ constructed soil infiltration systems. No treatment requirements are specified.

Part 4: Septic tanks built in situ from prefabricated kits – Execution standard

Part 5: Filtration systems (including sand filters)

1. SCOPE

This part of this standard specifies the requirements for prefabricated septic tanks and ancillary equipment used for the partial treatment of domestic wastewater for a population ≤ 50 PT. Pipes sizes, loads, watertightness, marking and quality control are specified.

The following cases are excluded:

1. Septic tanks receiving grey water only;
2. In situ constructed septic tanks.

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 476

General requirements for components used in discharge pipes, drains and sewers for gravity systems.

3. DEFINITIONS

For the purposes of this Standard, the following definitions apply:

3.1 extension shaft: Component which, placed on the top of the septic tank, allows it to be fitted flush with the ground surface or slightly above ground surface, permits installations to be fitted below the frost line, allows accessibility and enables maintenance work to be carried out. Depending on the requirements, it may be vertical extension pieces of the installation housing, or components, which are fitted over maintenance access holes and manholes.

3.2 grey water: Domestic wastewater excluding toilet wastewater.

3.3 nominal capacity (NC): Numerical designation of the volume of a septic tank, expressed as an integer in cubic metres.

3.4 prefabricated septic tank: Single piece factory made unit, including inlet and outlet level openings which leaves the factory completed, controlled and ready for installation.

4. CLASSIFICATION

Septic tanks are classified by preferred sizes (NC) on the basis of a minimum nominal capacity of 2 m³ with nominal capacity differences of 1 m³ between two consecutive sizes.

5. SPECIFICATIONS

5.1 DIMENSIONS

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5.1.1 Inlets, outlets and connections

Minimum size of nominal diameter of inlet and outlet according to the nominal capacity of equipment is

$$100 \text{ ND} \leq 6 \text{ m}^3$$
$$150 \text{ ND} > 6 \text{ m}^3$$

For design of outlet devices, see some examples in Annex C (informative).

5.1.2 Ventilation

Adequate ventilation of the septic tank and the inlet pipework shall be provided to prevent the accumulation of fermentation gases.

5.1.3 Design Basis

Depending on the end use, one or more of the following design criteria may need to be stated.

- Population Total loading,
- Minimum sizing criteria including sludge storage capacity,
- Additional design criteria for domestic wastewater flows from sources such as hotels, restaurants or commercial premises.

5.2 STRUCTURAL BEHAVIOUR

The septic tanks shall resist the maximal loads and stresses resulting from handling, installation conditions and use including desludging, for their design life. Depending on the end use, safety factors shall be used to calculate the loadings for which the septic tanks are designed. The following loads shall be considered:

- backfill load;
- hydrostatic loads;
- dynamic loads.

Note: Depending on the end use, different test or calculation methods may be used to ensure compliance with the loads stated below.

For the determination of loads, the following parameters shall be used:

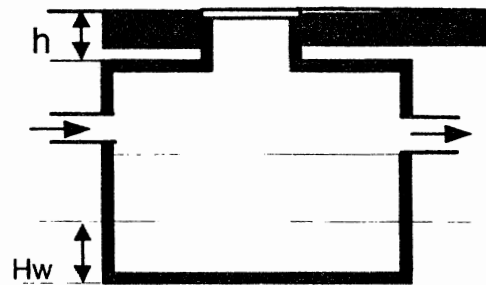


Figure 1 Definition of parameters

Key:

H_w = Height of exterior water level (groundwater);

H = Depth of the backfill from the top of the septic tank to ground level

5.2.1 Backfill load

Vertical component: $h \times 18$ [kN/m²].

18 kN/m³: specific weight of the soil.

Horizontal component: $K \times D \times 18$ [kN/m²].

Where:

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D is the distance from the ground level to the point where the load applies.

K = Coefficient of internal angle of friction of different types of soil;

Calculation of backfill load shall take account of the effect of ground conditions, backfill materials and septic tank shape factors.

For sand: $0,33 \times D \times 18$ [kN/m²];

For gravel: $0,27 \times D \times 18$ [kN/m²];

For other backfill materials: $0,5 \times D \times 18$ [kN/m²].

5.2.2 Hydrostatic loads

Vertical component: $H_w \times 10$ [kN/m²].
10 kN/m³: action resulting from the specific mass of water.

Max. horizontal component: $D \times 10$ [kN/m²].

In the presence of a groundwater table, the stability conditions of the product in relation to the water pressure shall be indicated in the manufacturer's selling instructions. In this case, the specific load of soil is 10 kN/m³ and shall be added to the water load.

5.2.3 Dynamic loads

a) Pedestrian loading

A value of 2,5 kN/m² shall be considered only when the height of the backfill is less than 1,00 m. Over 1,00 m pedestrian loading is assumed to be negligible against other loads.

b) Vehicle loading

Septic tanks subject to vehicle loadings shall be individually designed to take into account the intended end use requirements.

5.3 WATERTIGHTNESS

A septic tank shall be watertight up to the top of the septic tank. The top level depends on end use situations.

Depending on materials, (see Table A.1) one of the tests described below shall be done.

a) Water test:

After testing in accordance with Annex A (normative), for concrete septic tanks the loss of water measured after 30 min shall be $\leq 0,1$ litre per m² of the internal wet surface of external walls. For polyethylene and GRP septic tanks, no leakage shall be permitted.

b) Air permeability vacuum test:

The air permeability vacuum test as defined in Annex A (normative) may be used for the watertightness requirements of the products. The septic tank shall be deemed watertight when the requirements given in Annex A (normative) are met. The vacuum pressure chosen for the test shall not deviate more than 10 % from the pressure given in the table A.2.

c) Pneumatic pressure test:

The septic tank shall be deemed watertight when:

- tested in the conditions given in A.2.3.2.1., the pneumatic pressure chosen for the test does not decrease by more than 0,005 bar during the related test period or
- tested in the conditions given in A.2.3.2.2., the pneumatic pressure 0,3 bar is maintained during 180 seconds within limits of $\pm 10\%$.

5.4 NOMINAL CAPACITY

The volume of water filled up to the outlet level shall be at least of the nominal capacity claimed by the manufacturer, at a temperature of $15^\circ\text{C} \pm 5^\circ\text{C}$.

5.5 HYDRAULIC EFFICIENCY

The extent to which the septic tank retains settling and floating solids, is determined by the hydraulic efficiency of the septic tank. As soon as hydraulic efficiency requirements are defined, they shall be verified using the test methods described in Annex B (normative).

Septic tanks, which have already undergone testing according to methods which comply with Annex B and which fulfil hydraulic efficiency requirements when defined, do not need to be tested again.

5.6 DESIGN

The inlet and outlet pipes shall be arranged to ensure that no surcharging or back-flow in the inlet pipe occurs at maximum flow rate.

5.7 ACCESS

Septic tanks shall be securely covered to prevent unauthorized access and ensure operational safety.

Consideration shall be given by the design to provide an access to the inlet and/or outlet areas for routine maintenance sampling, the removal of sludge, and cleaning and maintenance.

Extension shafts and access covers shall be fit for purpose. For less than 6 m³, they shall have a minimum dimension of 400 mm for square sections or a nominal diameter of 400 for circular sections. A minimum of 600 mm is required for septic tanks with a volume greater or equal than 6 m³.

Provisions for man entry shall meet the requirements of EN 476.

Note: The requirements to provide facility for man entry may depend on the situation of end use.

5.8 DURABILITY

Septic tanks shall be constructed from materials with physical characteristics and corrosion resistant properties that make them suitable for use in a wastewater environment. Septic tanks shall be designed to have a service appropriate to their intended end use.

6. MARKING

The marking shall be durable, accessible and easily legible after installation.

The marking should be preferably on the inner wall of the shaft or when not possible, on the outer wall of the septic tank in the inlet area.

The marking shall contain at least the following information:

- a) Manufacturer and product identification;
- b) the number of this EN;
- c) Nominal capacity;
- d) Date of manufacture.

The inlet and outlet positions shall be clearly identified.

7. QUALITY CONTROL

7.1 EVALUATION OF CONFORMITY

7.1.1 General

Manufacturers shall demonstrate conformity of product with the requirements of this Standard by

- a) initial type test and quality control test (see 7.1.2.);
- b) factory production control (see 7.2).

In addition compliance with this EN may be assessed by a third party certification of the products or by customer acceptance testing.

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