SLOVENSKI STANDARD
SIST EN 12566-3:2005+A2:2013

01-september-2013

Male čistilne naprave do 50 PE - 3. del: Predizdelane in/ali na mestu postavitve sestavljene čistilne naprave za gospodinjske odplake

Small wastewater treatment systems for up to 50 PT - Part 3: Packaged and/or site assembled domestic wastewater treatment plants

Kleinkläranlagen für bis zu 50 EW - Teil 3: Vorgefertigte und/oder vor Ort montierte Anlagen zur Behandlung von häuslichem Schmutzwasser

Petites installations de traitement des eaux usées jusqu'à 50 PTE - Partie 3: Stations d'épuration des eaux usées domestiques prêtes à l'emploi et/ou assemblées sur site

Ta slovenski standard je istoveten z: **EN 12566-3:2005+A2:2013**

ICS:

13.060.30	Odpadna voda	Sewage water

SIST EN 12566-3:2005+A2:2013 **en,fr,de**

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English Version

Small wastewater treatment systems for up to 50 PT - Part 3: Packaged and/or site assembled domestic wastewater treatment plants

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This European Standard was approved by CEN on 20 June 2005 and includes Amendment 1 approved by CEN on 15 December 2008 and Amendment 2 approved by CEN on 21 April 2013.

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Foreword

This document (EN 12566-3:2005+A2:2013) has been prepared by Technical Committee CEN/TC 165 “Wastewater 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of an identical text or by endorsement, at the latest by December 2013 and conflicting national standards shall be withdrawn at the latest by December 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1 approved by CEN on 2008-12-15 and Amendment 2, approved by CEN on 2013-04-21.

This document supersedes ▌A2⟩ EN 12566-3:2005+A1:2009 ⟨A2▌.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ▌A1⟩ ⟨A1▌ and ▌A2⟩ ⟨A2▌.

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).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this European Standard.

This European Standard provides the general requirements for packaged and/or site assembled treatment plants used for domestic wastewater treatment up to 50 PT (see Clause 1 "Scope").

The standard EN 12566 "Small wastewater treatment systems up to 50 PT" contains the following Parts:

— Part 1: Prefabricated septic tanks;

NOTE 1 This part specifies the requirements and test methods for prefabricated septic tank units.

— Part 2: Soil infiltration systems

NOTE 2 This CEN/TS is a Code of Practice for in-situ constructed soil infiltration systems. No treatment requirements are specified.

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

NOTE 3 This part specifies the requirements and test methods used to evaluate packaged wastewater treatment plants which are required to treat sewage to a predetermined standard.

The following Parts are in preparation:

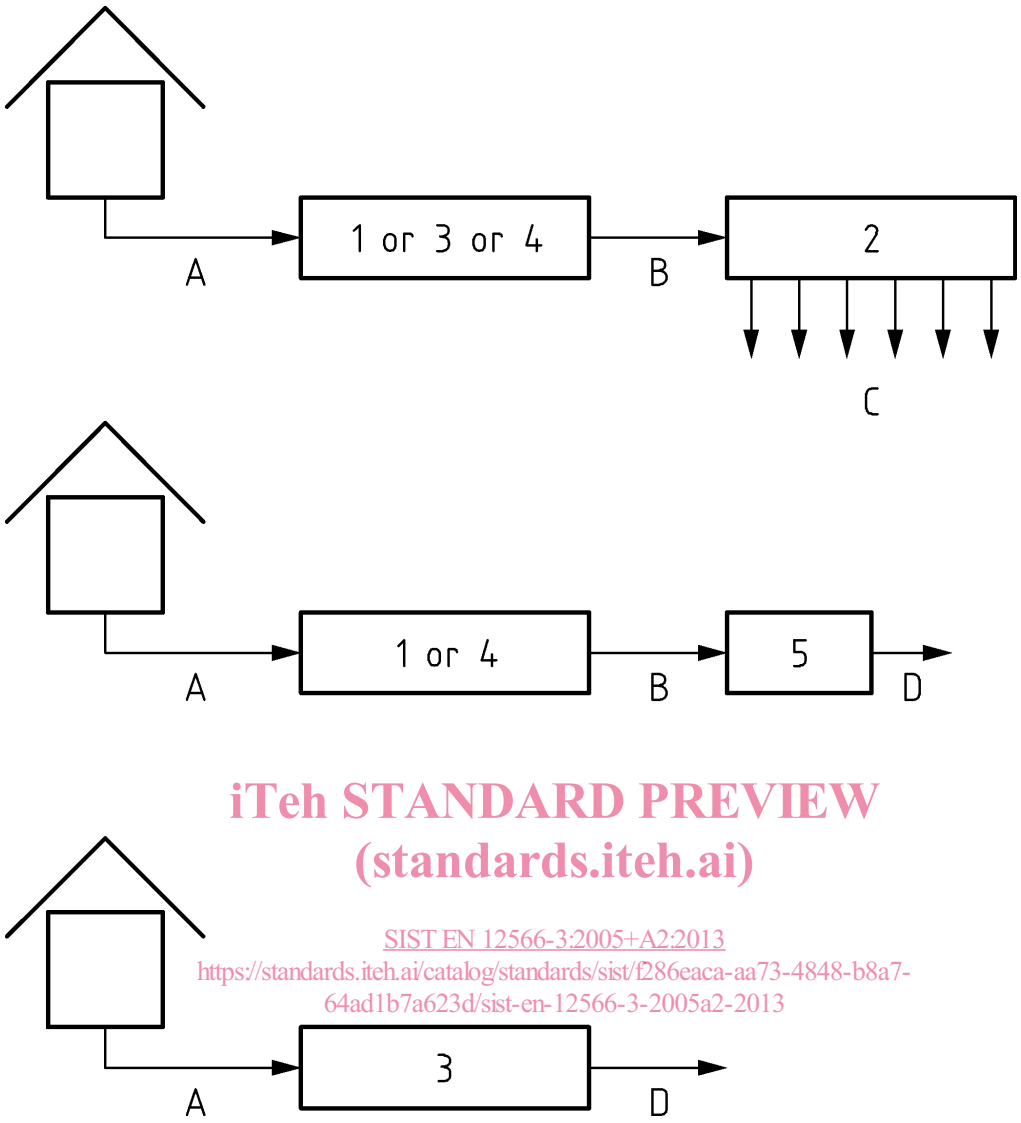
— Part 4: Septic tanks built in situ from prefabricated kits – Execution standard;

— Part 5: Pre-treated Effluent Filtration systems.

Figure 1 shows the relationship between the parts of EN 12566.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech

Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



Key

A	Domestic waste water (influent)	2	Infiltration system (into the ground) (see Part 2;)
B	Pre-treated waste water	3	Waste water treatment plant (see Part 3)
C	Infiltration into the ground	4	Septic tank built in situ (see Part 4; in preparation)
D	Outlet of treated waste water (effluent)	5	Filtration systems (see Part 5; in preparation)
1	Prefabricated septic tank (see Part 1)		

National regulations may specify different arrangements between the products described in the standards series EN 12566.

Figure 1 – Scheme related to the arrangement of the parts of EN 12566

1 Scope

This European Standard specifies requirements, test methods, the marking and evaluation of conformity for packaged and/or site assembled domestic wastewater treatment plants (including guest houses and businesses) used for populations up to 50 inhabitants. Small wastewater treatment plants according to this European Standard are used for the treatment of raw domestic wastewater.

〉A2〈 It covers plants with tanks made of concrete, steel, PVC-U, Polyethylene (PE), Polypropylene (PP), Glass Reinforced Polyester (GRP-UP), Polydicyclopentadiene (PDCPD) and container made of flexible sheets (PEHD, PP, PVC, EPDM). 〉A2〈

The test methods specified in this European Standard establish the performance of the plant, needed to verify its suitability for the end use (see 3.1).

This European Standard applies for small wastewater treatment plants for use buried in the ground where no vehicle loads are applied to the product.

This European Standard applies to plants where all prefabricated components are factory or site-assembled by one manufacturer and which are tested as a whole.

NOTE In some countries, domestic wastewater treatment plants are followed by other systems to conform to national regulations.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 206-1, *Concrete – Part 1: Specification, performance, production and conformity*

EN 580, *Plastics piping systems – Unplasticized poly(vinyl chloride) (PVC-U) pipes – Test method for the resistance to dichloromethane at a specified temperature (DCMT)*

EN 727, *Plastics piping and ducting systems – Thermoplastics pipes and fittings – Determination of Vicat softening temperature (VST)*

EN 858-1, *Separator systems for light liquids (e.g. oil and petrol) – Part 1: Principles of product design, performance and testing, marking and quality control*

EN 872, *Water quality – Determination of suspended solids – Method by filtration through glass fibre filters*

EN 922, *Plastics piping and ducting systems – Pipes and fittings of unplasticized poly(vinyl chloride) (PVC-U) – Specimen preparation for determination of the viscosity number and calculation of the K–value*

EN 976-1:1997, *Underground tanks of glass–reinforced plastics (GRP) – Horizontal cylindrical tanks for the non-pressure storage of liquid petroleum based fuels – Part 1: Requirements and test methods for single wall tanks*

EN 978:1997, *Underground tanks of glass-reinforced plastics (GRP) – Determination of factor α and factor β*

〉A1〈 EN 1085:2007 〉A1〈, *Wastewater treatment – Vocabulary*

EN 1905, *Plastics piping systems – Unplasticized poly(vinyl chloride) (PVC-U) pipes fittings and material – Method for assessment of the PVC content based on total chlorine content*

EN 12255-1, *Wastewater treatment plants – Part 1: General construction principles*

EN 12255-4, *Wastewater treatment plants – Part 4: Primary settlement*

EN 12255-6, *Wastewater treatment plants – Part 6: Activated sludge process*

EN 12255-7, *Wastewater treatment plants – Part 7: Biological fixed-film reactors*

EN 12255-10, *Wastewater treatment plants – Part 10: Safety principles*

EN 12255-11, *Wastewater treatment plants – Part 11: General data required*

EN 13369, *Common rules for precast concrete products*

EN 12260, *Water quality – Determination of nitrogen – Determination of bound nitrogen (TN_b), following oxidation to nitrogen oxides*

[A2] EN 12311-2, *Flexible sheets for waterproofing — Determination of tensile properties — Part 2: Plastic and rubber sheets for roof waterproofing*

EN 14150, *Geosynthetic barriers — Determination of permeability to liquids*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests* [A2]

EN ISO 178, *Plastics – Determination of flexural properties (ISO 178:2001)*

EN ISO 179 (all parts), *Plastics - Determination of Charpy impact properties*

EN ISO 527-2, *Plastics – Determination of tensile properties – Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2:1993, including Corr 1:1994)*

EN ISO 899-2, *Plastics – Determination of creep behaviour – Part 2: Flexural creep by three-point loading (ISO 899-2:2003)*

[A1] EN ISO 1133:2005 [A1], *Plastics – Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics* [A1] *(ISO 1133:2005)* [A1]

EN ISO 1183, *(all parts) Plastics – Methods for determining the density and relative density of non-cellular plastics (ISO 1183)*

[A1] EN ISO 2505:2005, *Thermoplastics pipes - Longitudinal reversion - Test method and parameters (ISO 2505:2005)* [A1]

EN ISO 6878:2004, *Water quality - Determination of phosphorus - Ammonium molybdate spectrometric method (ISO 6878:2004)*

EN ISO 9967, [A1] *Thermoplastics pipes - Determination of creep ratio (ISO 9967:2007)* [A1]

EN ISO 9969, [A1] *Thermoplastics pipes - Determination of ring stiffness (ISO 9969:2007)* [A1]

EN ISO 11732, [A1] *Water quality - Determination of ammonium nitrogen - Method by flow analysis (CFA and FIA) and spectrometric detection (ISO 11732:2005)* [A1]

EN ISO 11905-1, *Water quality – Determination of nitrogen – Part 1: Method using oxidative digestion with peroxodisulfate (ISO 11905-1:1997)*

EN ISO 14125:1998, *Fibre-reinforced plastics composites – Determination of flexural properties (ISO 14125:1998)*

ISO 5664, *Water quality – Determination of ammonium – Distillation and titration method*

ISO 5815, *(all parts) Water quality – Determination of biochemical oxygen demand after n days (BOD_n)*

ISO 6060, *Water quality – Determination of the chemical oxygen demand*

ISO 6778, *Water quality – Determination of ammonium – Potentiometric method*

ISO 7150-1, *Water quality –Determination of ammonium – Part 1: Manual spectrometric method*

〚A1〛 *deleted text* 〚A1〛

ISO 7890-3, *Water quality – Determination of nitrate – Part 3: Spectrometric method using sulphosalicylic acid*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in 〚A1〛 EN 1085:2007 〚A1〛 and the following apply.

3.1
end use
condition in which a plant is normally installed

NOTE The use of "buried in the ground without vehicles loads" is the only condition of use available according to this European Standard.

3.2
laboratory
body capable of testing a domestic wastewater treatment plant under controlled conditions

3.3
packaged domestic wastewater treatment plant
prefabricated factory-built wastewater treatment installation which accepts domestic wastewater and treats it to a declared quality

3.4
range
group of products in which, for the purpose of evaluation, the selected property(s) is/are similar for all products within the group

NOTE 1 The definition of range takes into account at least similar shape, equipment, materials and conditions of end use and ensures the minimum hydraulic efficiency and minimum structural behaviour for all the products in the range.

NOTE 2 The minimum level of performance (hydraulic efficiency and structural behaviour) are given by the test carried out on one model of the range.

3.5
site assembled domestic wastewater treatment plant
unit composed of prefabricated components assembled on one site by one manufacturer, which accepts domestic wastewater and treats it to a declared quality

3.6
extension shaft
component(s) which, when placed on the top of the plant, allow access from or slightly above the ground surface

NOTE 1 It permits accessibility and maintenance work.

NOTE 2 It may be either a vertical extension piece of the tank, or components, which are fitted only over certain points for example to allow maintenance or observation.

[A2]
3.7
nominal designation
appropriate values for declared organic daily load expressed in kilogram of BOD_5 (or BOD_7) per day and for declared hydraulic daily flow expressed in cubic metres of influent per day (Q_N) [A2]

4 Symbols and abbreviations

BOD_5 (or BOD_7)	Biochemical oxygen demand at 5 or 7 days (definition 3110 in [A1] EN 1085:2007 [A1])
SS	Suspended solids (definition 3160 in [A1] EN 1085:2007 [A1])
KN	Kjeldahl Nitrogen (definition 3210 in [A1] EN 1085:2007 [A1])
NH_4-N	Ammonium nitrogen
COD	Chemical oxygen demand (definition 3120 in [A1] EN 1085:2007 [A1])
PE	Polyethylene
PVC-U	Unplasticized Poly-vinyl Chloride
GRP	Glass reinforced plastic

5 [A2] Declaration of the nominal designation [A2]

[A1] The nominal organic daily load expressed in kg of BOD_5 (or BOD_7) per day and the nominal hydraulic daily flow (Q_N) expressed in cubic metres per day shall be declared. [A1]

6 Requirements

6.1 Design

6.1.1 General

Plants shall be structurally stable, durable, watertight and corrosion resistant.

Plants shall be provided with an alarm to indicate operational failure (for example electrical, mechanical or hydraulic failure). The manufacturer shall indicate which kind of failure is detected with the alarm.

6.1.2 Inlets, outlets, internal pipework and connections

The minimum internal diameter of inlet and outlet pipes for gravity flow is specified below:

— 100 mm for nominal hydraulic daily flow ≤ 4 m^3/d;

— 150 mm for nominal hydraulic daily flow > 4 m^3/d.

The hydraulic design of the equipment, the internal pipework and connections shall ensure that no back-flows, blockage or surcharging occur during normal operation.

6.1.3 Access

Plants shall be designed to prevent unauthorised access and ensure operational safety.

The design shall provide access to the inlet and outlet areas; this access may allow routine maintenance sampling, removal of sludge, cleaning and maintenance.

Extension shafts and access covers shall be fit for purpose. For a product with a capacity of less than 6 m^3, they shall have a minimum dimension of 400 mm for square sections or a minimum diameter of 400 mm for circular sections. A minimum of 600 mm is required for plants with a volume $\geq$ 6 m^3.

[A2) NOTE The requirements to provide facility for the access of a person into the plant may depend on applicable regulations, valid in the member state for the intended end use conditions. For example, the minimum dimension of the opening for the access of a person in EN 476 is 600 mm. (A2]

6.1.4 Sizing basis

Rules and units (per inhabitant, BOD, SS…) to be used for the determination of the population pollution load are given by national regulations.

Depending on the end use, one or more of the following design criteria shall be taken into consideration:

a) total population loading;

b) minimum and the maximum daily loading that a plant can accept;

c) minimum volume criteria;

d) additional design criteria for domestic wastewater flows from sources such as hotels, restaurants or commercial premises. These additional design criteria are chosen according to the national codes of practice and/or regulations valid in the country of use of the plant.

The manufacturer shall declare the desludging frequency. Special consideration shall be given to the peak flows received by small plants according to EN 12255-1, EN 12255-4, EN 12255-6, EN 12255-7, EN 12255-10 and EN 12255-11.

[A2)

6.1.5 Overall dimensions

The overall dimensions of the plant (i.e. height, width, length, diameters, etc.) shall be measured and declared together with a tolerance.

Assessment of overall dimensions shall be done by measurement with accuracy of ± 0,5 % of the dimension. (A2]

6.2 Load bearing capacity

[A2)

6.2.1 General

The small waste water treatment plant shall resist the loads resulting from handling, installation and use including desludging and maintenance, for their design life.

The load bearing capacity of the small waste water treatment plant is declared as:

— maximum allowed height of backfill (in meters);

— possibility to install the plant in wet or dry site, expressed as WET with the indication of the maximum height of the water table measured from the base of the plant or DRY.

The load bearing capacity of the small waste water treatment plant (i.e. of the tank of this plant) shall be established:

— either by calculation with the knowledge of basic data for material and loads (see 6.2.2);

— or by test directly on the tank of the plant (see 6.2.3).

Where the small waste water treatment plant includes watertight extension shaft, and/or the unit is installed in a wet site, the relevant loads at the maximum installed depth of the plant and the declared height of the water table shall be taken into account and appropriate tests or calculations made to prove the load bearing capacity of the plant.

For a plant made of flexible sheets, the pit test (see C.6) only shall be used.

6.2.2 Load bearing capacity determined by calculation

6.2.2.1 General

One of the following two methods may apply:

— Method 1: Indirect method usable for all materials by declaring the following parameters:

  — Geometrical data of the plant: e.g. wall thickness, distance of ribs, shape,

  — Properties of the materials and components: All parameters given in chapter durability (see 6.5).

The manufacturer shall provide the calculation results according to the calculation method valid in the place of use in the installation instructions in terms of height of backfill and possibility to install the plant in a wet or dry site with the indication of the height of the water table measured from the base of the plant.

— Method 2: Directly declaring the performance using the applicable Eurocode:

  — Eurocode 2 (EN 1992-1-1) for concrete (where applicable);

  — Eurocode 3 (EN 1993-1-1) for steel (where applicable).

The manufacturer shall provide the calculation results according to the relevant Eurocode in terms of height of backfill and possibility to install the plant in a wet or dry site with the indication of the height of the water table measured from the base of the plant.

6.2.2.2 Backfill loads

Calculation of backfill loads shall take account of the effect of ground conditions, backfill materials and tank shape factors. A vertical and a horizontal component shall be calculated as follows:

— vertical component: H x 18 (expressed in kN/m^2), where 18 (kN/m^3) is the specific weight of the soil and H is the height (in meter) of backfill;

— horizontal component: K x D x 18 (expressed in kN/m^2), where D (in meter) is the distance from the ground level to the point where the load applies:

— Following K coefficient applies depending on the backfill type:

  — sand: K = 0,33;

  — gravel: K = 0,27;

  — other backfill materials: K = 0,5.

6.2.2.3 Hydrostatic loads

A vertical and a horizontal component shall be calculated as follows:

— vertical component: H_W x 10 (expressed in kN/m^2), where 10 (kN/m^3) is the action resulting from the specific weight of water and H_W is the declared water table level (in meter) from the base of the plant;

— horizontal component: D x 10 (expressed in kN/m^2) where D is the distance (in meter) from the ground level to the point where the load applies.

On sites where the groundwater table is significant (the highest level of the groundwater table is above the bottom of the tank), the stability conditions of the product in relation to the water pressure shall be indicated in the manufacturer's instructions. In this case, the specific load of soil is 10 kN/m^3 and shall be added to the water load.

6.2.2.4 Pedestrian loads

For pedestrian loads a value of 2,5 N/ m^2 shall be considered in calculation only when the height of the backfill (H) is less than or equal to 1 m. Over 1 m, the pedestrian loads do not need to be taken into account for calculation, as it is assumed to be negligible against other loads.

6.2.3 Load bearing capacity determined by testing

The load bearing capacity of the small waste water treatment plant shall be established by testing according to Annex C.

The test results shall ensure that the load bearing capacity under the declared height of backfill is ensured.

— Crushing resistance test (C.2.1 and C.2.2): the height of backfill shall be the minimum H_1 and H_2 calculated according to the two following formulae:

— For vertical load:

$$H_1 = \frac{\frac{F}{1{,}6 \times S_1} - 10 \times H_w - 2{,}5}{18}$$

where

F is the crushing load (kN);

S_1 is the horizontal surface of the plant (m^2);

H_W is the height of the water table measured from the bottom of the plant (m);

H_1 is the height of backfill (m).