SLOVENSKI STANDARD
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Male čistilne naprave do 50 PE - 6. del: Predizdelane enote za obdelavo grezničnih odplak

Small wastewater treatment systems for up to 50 PT - Part 6: Prefabricated treatment units for septic tank effluent

Kleinkläranlagen für bis zu 50 EW - Teil 6: Vorgefertigte Anlagen für die weitergehende Behandlung des aus Faulgruben ablaufenden Abwassers

Petites installations de traitement des eaux usées jusqu'à 50 PTE - Partie 6: Unités préfabriquées de traitement des effluents de fosses septiques

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ICS:

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 12566-6:2013) 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of an identical text or by endorsement, at the latest by August 2013, and conflicting national standards shall be withdrawn at the latest by August 2013.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 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 document.

The standard series EN 12566 "*Small wastewater treatment systems for up to 50 PT*" contains the following parts (see Figure 1):

— *Part 1: Prefabricated septic tanks*

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

— *Part 4: Septic tanks assembled in situ from prefabricated kits*

— *Part 6: Prefabricated treatment units for septic tank effluent* (the present document)

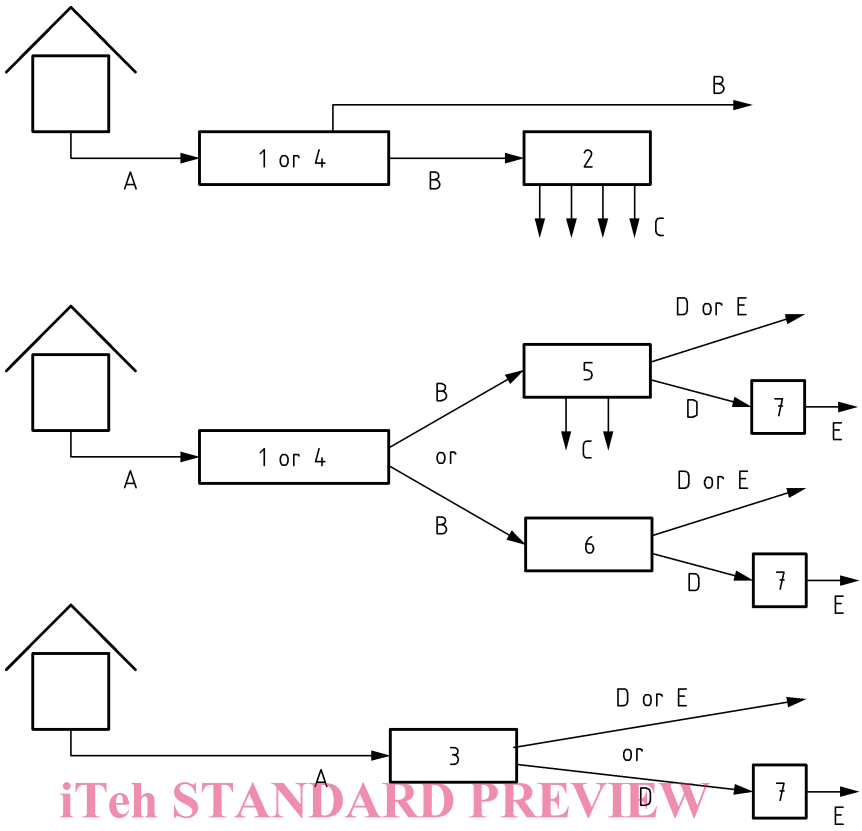
— *Part 7: Prefabricated tertiary treatment units* (in preparation)

For filtration and infiltration systems, CEN/TC 165 decided to publish the following CEN Technical Reports, which are considered as Code of Practices and do not specify treatment requirements:

— CEN/TR 12566-2, *Small wastewater treatment systems for up to 50 PT — Part 2: Soil infiltration systems*

— CEN/TR 12566-5, *Small wastewater treatment systems for up to 50 PT — Part 5: Pre-treated effluent filtration systems*

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	raw domestic wastewater	1	prefabricated septic tank
B	septic tank effluent	2	soil infiltration system
C	treated infiltrated effluent	3	packaged and/or site assembled domestic wastewater treatment plant
D	treated wastewater	4	septic tank assembled in situ from prefabricated kit
E	tertiary treated wastewater	5	pre-treated effluent filtration system
		6	prefabricated treatment unit used for septic tank effluent
		7	prefabricated tertiary treatment unit

Figure 1 — Scheme related to the arrangement of the parts of EN 12566 or CEN/TR 12566

NOTE National regulations may specify different arrangements between the products described in the series of EN 12566 and CEN/TR 12566.

1 Scope

This European Standard specifies requirements, test methods, evaluation of conformity and marking for prefabricated secondary treatment units used for the treatment of effluent from septic tanks according to EN 12566-1 or EN 12566-4 in small wastewater treatment systems for up to 50 PT.

NOTE Equivalent septic effluent may come from existing septic tanks.

It applies to the prefabricated secondary treatment unit, where all its components are packaged or site-assembled and placed on the market as a kit by one manufacturer.

The prefabricated secondary treatment unit consists of one or more tanks made of concrete, steel, unplasticised polyvinylchloride (PVC-U), polyethylene (PE), glass reinforced polyester (GRP-UP), polypropylene (PP), polydicyclopentadiene (PDCPD) or container made of flexible sheets (PEHD, PP, PVC, EPDM). Other components specified by the manufacturer, such as pipes, pumps and filter material will be considered as part of the unit.

This standard establishes the performance of the prefabricated secondary treatment units needed to verify their suitability for the end use conditions for which the test methods are specified.

This standard applies for the packaged and/or site assembled secondary treatment units for use on the top of the ground (outside the building) or buried in the ground where no vehicle loads are applied to the unit.

This standard does not cover:

— non watertight secondary treatment units with direct infiltration into the ground;

— retrofit kits (see definition in 3.7).

2 Normative references

The following referenced documents, in whole or in part, are normatively referenced in this document and are indispensable for its 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 1085:2007, *Wastewater treatment — Vocabulary*

EN 12566-1, *Small wastewater treatment systems for up to 50 PT — Part 1: Prefabricated septic tanks*

EN 12566-3:2005+A1:2009, *Small wastewater treatment systems for up to 50 PT — Part 3: Packaged and/or site assembled domestic wastewater treatment plants*

EN 12566-4, *Small wastewater treatment systems for up to 50 PT — Part 4: Septic tanks assembled in situ from prefabricated kits*

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

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

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

EN ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles (ISO 527-1)*

EN ISO 2555, *Plastics — Resins in the liquid state or as emulsions or dispersions — Determination of apparent viscosity by the Brookfield Test method (ISO 2555)*

EN ISO 7899-1, *Water quality — Detection and enumeration of intestinal enterococci in surface and wastewater — Part 1: Miniaturized method (Most Probable Number) by inoculation in liquid medium (ISO 7899-1)*

EN ISO 7899-2, *Water quality — Detection and enumeration of intestinal enterococci — Part 2: Membrane filtration method (ISO 7899-2)*

EN ISO 9308-1, *Water quality — Detection and enumeration of Escherichia coli and coliform bacteria — Part 1: Membrane filtration method (ISO 9308-1)*

EN ISO 9308-3, *Water quality — Detection and enumeration of Escherichia coli and coliform bacteria in surface and wastewater — Part 3: Miniaturized method (Most Probable Number) by inoculation in liquid medium (ISO 9308-3)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12566-3:2005+A1:2009 and EN 1085:2007 and the following apply.

3.1
packaged secondary treatment unit
prefabricated factory-built unit which treats septic tank effluent to a declared quality

3.2
site assembled secondary treatment unit
unit supplied by one manufacturer composed of prefabricated components, assembled on site, which treats septic tank effluent to a declared quality

3.3
open unit
prefabricated unit where there is no cover

3.4
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 septic tank effluent per day (Q_N)

3.5
unit family
group of units produced by one manufacturer for which the test results for one or more characteristics from any one unit within the family are valid for all other units within this family

3.6
waste water treatment system
combination of units (e.g. septic tank) and/or products (e.g. pipes, pumps) required for the construction of waste water treatment plant according to Figure 1

3.7
retrofit kit
set of components that are provided by a single manufacturer for installation within an existing septic tank

3.8
flexible sheet
flexible impermeable liner

4 Symbols and abbreviations

The following symbols and abbreviations are used in this standard:

BOD_5 (or BOD_7)	Biochemical oxygen demand at 5 d or 7 d
COD	Chemical oxygen demand
KN	Kjeldahl nitrogen
NH_4-N	Ammonium nitrogen
SS	Suspended solids
TOC	Total organic carbon

5 Nominal designation

Each prefabricated secondary treatment unit shall be designated according to

— the nominal organic daily load of septic tank effluent, expressed in kg of BOD_5 (or BOD_7) per day, and

— the nominal hydraulic daily flow Q_N, expressed in cubic metres of septic tank effluent per day,

and declared with appropriate values.

NOTE Selection of nominal designated product. Depending on the type of end use condition of the prefabricated secondary treatment unit (i.e. domestic installations, guest houses, businesses, etc.) and the regulations in the place of intended use, one or more of the following design criteria may need to be taken into consideration to select the nominal designation of the unit into the product family:

— sizing of the septic tank (according to EN 12566-1 or EN 12566-4) in relation with the total population loading;

— declared value of SS settlement (grams of beads).

6 Requirements

6.1 Design

6.1.1 General

Prefabricated secondary treatment units for septic tank effluent shall be designed to be structurally stable with the expected loads for the intended use. In addition, the units shall be durable, watertight and corrosion resistant. Scaling rules, which ensure that the test results for one or more characteristics from any one unit within the family are valid for all other units within this family, shall be defined.

Where applicable, units shall be provided with an alarm to indicate operational failure (e.g. electrical, mechanical or hydraulic failure). The type of failure detected by the alarm shall be indicated.

Design of the unit should take into consideration appropriate safety requirements for construction, installation, operation and maintenance.

6.1.2 Overall dimensions

The overall dimensions of the prefabricated secondary treatment unit (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.

6.1.3 Inlets, outlets, internal pipework and connections

The nominal diameters for inlet and outlet pipework of the prefabricated secondary treatment unit shall be declared. The hydraulic design of the unit, the internal pipework and the connections shall ensure that no back-flows, blockage or surcharging occur during normal operation of the unit.

Inlet and outlet pipes shall be compatible with standardized pipe systems.

Assessment of inlets, outlets, internal pipework and connections shall be done by measurement with accuracy of ± 0,5 % of the dimension.

6.1.4 Access

The prefabricated secondary treatment unit shall be designed to restrict unauthorised access (e.g. locking mechanism).

The design of the unit shall provide access to allow routine maintenance sampling, removal of sludge (where applicable), cleaning and maintenance. An opening with a dimension (i.e. width for rectangular section or diameter for circular section) of a minimum 400 mm shall be required. For an open unit, access is not required.

NOTE 1 For installation purposes of open units, there may be local regulations for maintenance access.

NOTE 2 The requirements to provide facility for the access of a person into the prefabricated secondary treatment unit 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.

Extension shafts, where applicable, and access covers of the prefabricated secondary treatment unit shall be designed to be fit for purpose.

The access dimensions shall be declared. Assessment of access dimension shall be carried out by a measurement with accuracy of 0,5 % of the dimension.

6.2 Load bearing capacity

6.2.1 General

For units not including a tank, load bearing capacity assessment is not required.

Test methods and values for mechanical characteristics of the materials of the tank, used for calculation of the load bearing capacity of the tank, shall be in accordance with EN 12566-3:2005+A1:2009, Annex C.

The prefabricated secondary treatment units shall be able to withstand the loads resulting from handling, installation and use including desludging and maintenance, for its design life.

For buried installation, the load bearing capacity of the prefabricated secondary treatment unit (i.e. of the tank of this unit) 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 component of the unit (see 6.2.3).

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

The load bearing capacity is declared as:

— maximum allowed height of backfill (m);

— possibility to install the unit in water table or not, expressed as WET or DRY, respectively.

The load bearing capacity of prefabricated secondary treatment units that are intended to be used only in non-buried conditions shall be assessed only by calculation.

For a unit with the container made of flexible sheets, the pit test 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:

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

   1) Geometrical data of the unit: e.g. wall thickness, distance of ribs, shape,

   2) Properties of the materials and components: All parameters given in chapter durability (6.6).

The manufacturer shall provide in the installation instructions the height of backfill and the possibility to install the unit in a water table or not (WET or DRY), respectively.

NOTE If required, the manufacturer may provide the calculation results according to the calculation method valid in the place of use.

b) Method 2: Directly declaring the performance using the applicable Eurocode:

   1) Eurocode 2 for concrete (where applicable),

   2) Eurocode 3 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 unit in a water table or not (WET or DRY), respectively.

6.2.2.2 Backfill loads

Calculation of backfill loads shall be carried out according to EN 12566-3:2005+A1:2009, 6.2.1.2.

6.2.2.3 Hydrostatic loads

A vertical and a horizontal component of the hydrostatic loads shall be calculated according to EN 12566-3:2005+A1:2009, 6.2.1.3.

6.2.2.4 Pedestrian loads

For pedestrian loads, a value of 2,5 kN/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 prefabricated secondary treatment unit shall be established by the crushing resistance or maximum load deformation according to EN 12566-3:2005+A1:2009, Annex C.

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

— Crushing resistance test (EN 12566-3:2005+A1:2009, C.2 and C.3): the declared load shall be lower or equal to the failure load divided by a factor of minimum 1,6.

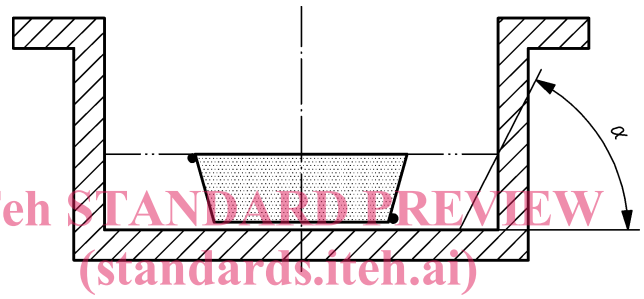
— Vacuum test for GPR unit (EN 12566-3:2005+A1:2009, C.5): the unit shall withstand the external pressure for the declared load multiplied by a factor of minimum 1,5.

NOTE In the Formula (C.2) of EN 12566-3:2005+A1:2009, *L* is the load in kPa (the greater of the vertical or horizontal load due to backfill and hydrostatic load).

— Pit test (EN 12566-3:2005+A1:2009, C.6): the unit shall be installed according to the manufacturer indication for the maximum declared load.

For open prefabricated secondary treatment unit, only the pit test shall be used (see example in Figure 2).

For the load bearing capacity of a unit made of PDCPD, the pit test shall be used according to EN 12566-3:2005+A1:2009, C.6.



Key

α friction angle: $\alpha \leq 63°$

Figure 2 — Pit test for open unit

6.3 Secondary treatment efficiency

6.3.1 General

For the purpose of determination of the secondary treatment efficiency, the prefabricated secondary treatment unit shall be tested according to Annex A.

6.3.2 Secondary treatment efficiency ratio

The prefabricated secondary treatment unit shall demonstrate compliance with the declared performance. This performance shall be expressed and declared in terms of secondary treatment efficiency ratios on COD, BOD and SS concentration together with:

— the tested COD, BOD and SS influent daily load;

— or characteristics (hydraulic efficiency, nominal capacity, etc.) of the septic tank used during the test expressed according to EN 12566-1 or EN 12566-4.

The tested daily load shall be the mean value of the 20 daily loads measured during the nominal sequences of the test as described in Annex A. The secondary treatment efficiency ratios on COD, BOD and SS shall be given in the documentation.

When requested, nitrogen parameters and total phosphorus shall be analysed during the test. In this case related secondary treatment efficiency ratios shall also be declared.