SLOVENSKI STANDARD
oSIST prEN 12566-7:2018

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Male čistilne naprave do 50 PE - 7. del: Predizdelane čistilne enote za terciarno čiščenje

Small wastewater treatment systems for up to 50 PT - Part 7: Prefabricated tertiary treatment units

Kleinkläranlagen für bis zu 50 EW - Teil 7: Vorgefertigte Anlagen für eine dritte Reinigungsstufe

Petites installations de traitement des eaux usées pour une population totale équivalente (PTE) jusqu'à 50 habitants - Partie 7 : Unités préfabriquées de traitement tertiaire

Ta slovenski standard je istoveten z: **prEN 12566-7**

ICS:

13.060.30	Odpadna voda	Sewage water

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EUROPEAN STANDARD

NORME EUROPÉENNE

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ICS 13.060.30

Will supersede EN 12566-7:2016

English Version

Small wastewater treatment systems for up to 50 PT - Part 7: Prefabricated tertiary treatment units

Petites installations de traitement des eaux usées pour une population totale équivalente (PTE) jusqu'à 50 habitants - Partie 7 : Unités préfabriquées de traitement tertiaire

Kleinkläranlagen für bis zu 50 EW - Teil 7: Vorgefertigte Anlagen für eine dritte Reinigungsstufe

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 165.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 12566-7:2018) has been prepared by Technical Committee CEN/TC 165 “Waste water engineering”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document supersedes EN 12566-7:2016.

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 for construction works of Regulation (EU) No. 305/2011.

For relationship with Regulation (EU) No. 305/2011, see informative Annex ZA, which is an integral part of this document.

In comparison with the previous edition, the following technical modifications have been made:

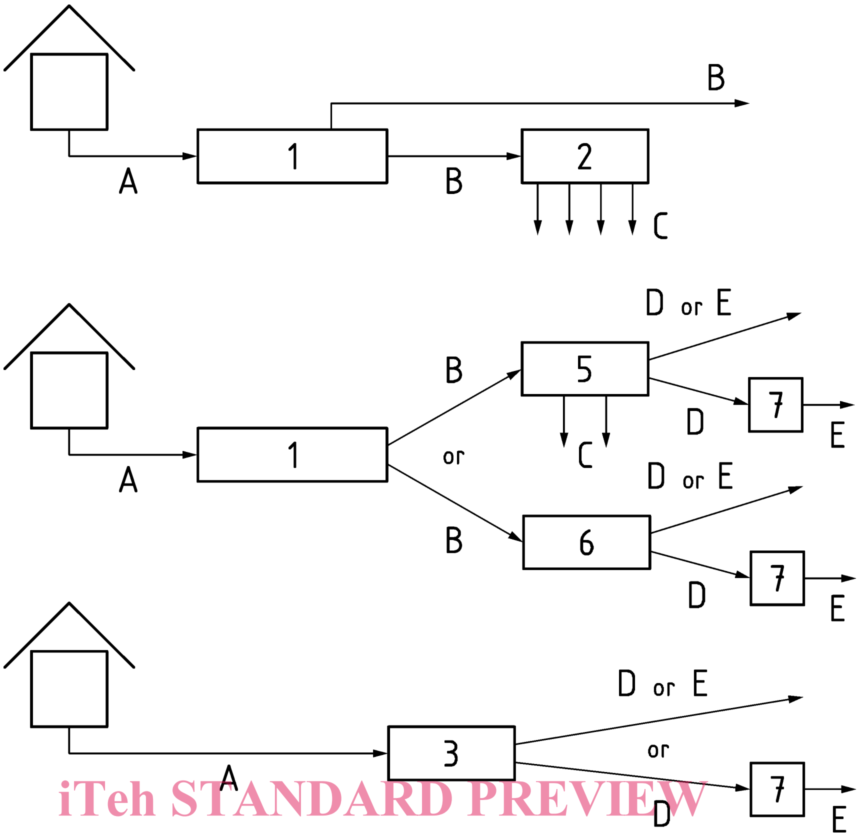
- mainly changes in AVCP clause and Annex ZA in accordance with the Construction Product Regulation (CPR) but also changes in accordance with the CEN Rules.

The series of standards 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 6: Prefabricated secondary treatment unit;*
- *Part 7: Prefabricated tertiary treatment unit (this document);*

For filtration 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:

- *Part 2: Soil infiltration systems*
- *Part 5: Pre-treated Effluent Filtration systems*



Key

A	domestic wastewater	1	packaged and/or site assembled 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	5	pre-treated effluent filtration system
E	tertiary treated wastewater	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

National regulations can specify different arrangements between the products described in the standard series EN 12566.

1 Scope

This document specifies characteristics and related requirements, assessment methods, the marking and assessment and verification of constancy of performance (AVCP) procedures for prefabricated tertiary treatment units used for populations up to 50 inhabitants.

Prefabricated tertiary treatment units in accordance with this document are:

- used for the tertiary treatment of domestic wastewater coming from:

  a) products in accordance with EN 12566-3 or EN 12566-6 or;

  b) installation designed and constructed in accordance with CEN/TR 12566-5.

Equivalent secondary treated effluent may come from existing systems.

- made of concrete, steel, Unplasticized Polyvinylchloride (PVC-U), Polyethylene (PE), Polypropylene (PP), Glass Reinforced Polyester (GRP-UP), Polydicyclopentadiene (PDCPD), PVC and/or EPDM.
- used buried in the ground;
- with or without extension shaft;
- made of prefabricated components that are factory or site-assembled by one manufacturer and which are tested as a whole.

This document does not cover prefabricated tertiary treatment units:

- where vehicle loads apply to it;
- with direct infiltration into the ground (non-watertight);
- made of retrofit kits (see definition in 3.1.9);
- forming part of products covered by EN 12566-3 and EN 12566-6;
- for microorganism reduction.

The assessment methods specified in this document establish the performance of the prefabricated tertiary treatment unit, needed to verify its suitability for the condition in which it is normally installed.

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 206, *Concrete — 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 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 alpha and factor beta*

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 1992-1-1, *Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings*

EN 1993-1-1, *Eurocode 3: Design of steel structures - Part 1-1: General rules and rules for buildings*

EN 10088-1, *Stainless steels - Part 1: List of stainless steels*

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

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

EN 12566-6, *Small wastewater treatment systems for up to 50 PT - Part 6: Prefabricated treatment units for septic tank effluent*

CEN/TR 12566-5, *Small wastewater treatment systems up to 50 PT - Part 5: Pre-treated Effluent Filtration systems*

EN 13369, *Common rules for precast concrete products*

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 16323:2014, *Glossary of wastewater engineering terms*

EN ISO 178, *Plastics - Determination of flexural properties (ISO 178)*

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

EN ISO 527-2, *Plastics - Determination of tensile properties - Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2)*

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

EN ISO 1133-1:2011, *Plastics - Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics - Part 1: Standard method (ISO 1133-1:2011)*

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

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

EN ISO 2555, *Plastics - Resins in the liquid state or as emulsions or dispersions - Determination of apparent viscosity using a single cylinder type rotational viscometer method (ISO 2555)*

EN ISO 9967, *Thermoplastics pipes - Determination of creep ratio (ISO 9967)*

EN ISO 9969, *Thermoplastics pipes - Determination of ring stiffness (ISO 9969)*

EN ISO 13229, *Thermoplastics piping systems for non-pressure applications - Unplasticized poly(vinyl chloride) (PVC-U) pipes and fittings - Determination of the viscosity number and K-value (ISO 13229)*

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

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16323:2014 and the following apply.

3.1.1
biological processes
processes in which the treatment is mainly carried out by micro-organism activity (i.e. sand, gravel, peat, activated carbon, other media filtration). These processes are mostly used for the reduction of COD, BOD, SS and nitrogen parameters

3.1.2
chemical processes
processes in which the treatment is mainly carried out by the addition of chemical agents (i.e. dosing with ozone or with iron or aluminium derivatives for flocculation). These processes are mostly used for the reduction of SS, phosphorus

3.1.3
electrical processes
processes in which the treatment is mainly carried out using electricity (i.e. ultraviolet, electrolysis). These processes are mostly used for the reduction of microorganisms

3.1.4
end use
condition in which a prefabricated tertiary treatment unit is normally installed

3.1.5
extension shaft
component(s) which is part of the prefabricated tertiary treatment unit, and allow access from or slightly above the ground surface

3.1.6
flexible sheet
flexible impermeable liner

3.1.7
physical processes
processes in which the treatment is mainly carried out by using the physical properties of a media (i.e. sand, gravel, peat, activated carbon, cartridge and drum membranes, reverse osmosis, ultra-filtration). These processes are mostly used for the reduction of SS and phosphorus

3.1.8
product family
group of products in which, for evaluation, the selected property(s) is/are similar for all products within the group considering 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

3.1.9
retrofit kit
kit installed within an existing product in accordance with EN 12566-3 or with EN 12566-6 or with CEN/TR 12566-5

Note 1 to entry: Not covered by this standard but Where such a retrofit kit affects the declared performance of is installed in a EN 12566-3 or EN 12566-6 unit in which it is installed, then the overall product shall be tested in full for its conformity with the relevant standard.

3.1.10
tertiary treatment
additional treatment process which results in further purification than that obtained by applying primary followed by a secondary treatment

Note 1 to entry: It is recommended that the expression for the treatment, e.g. nitrogen removal, phosphorus removal, polishing effects, suspended solid removal, is used.

3.2 Symbols and abbreviated terms

AVCP	Assessment and Verification of Constancy of Performance
BOD5 (or BOD7)	Biochemical oxygen demand at 5 or 7 days
COD	Chemical oxygen demand
CPR	Construction Products Regulation No 305/2011
CWFT	Classified Without Further Testing
DoP	Declaration of Performance
EPDM	Ethylene Propylene Diene Monomer
FPC	Factory Production Control
GRP	Glass reinforced plastic
KN	Kjeldahl Nitrogen
MFR	Melt mass-Flow Rate
NH4-N	Ammonium nitrogen
P	Phosphorus
PDCPD	Polydicyclopentadiene
PE	Polyethylene
PP	Polypropylene
PT	Population total
PVC	Polyvinyl Chloride
PVC-U	Unplasticized Polyvinyl Chloride
QN	Nominal hydraulic flow
SS	Suspended solids

4 Product characteristics

4.1 Design

4.1.1 General

Prefabricated tertiary treatment units shall be:

- structurally stable, durable, watertight and corrosion resistant, and
- provided with an alarm to indicate electrical, mechanical or hydraulic malfunction of the system.

4.1.2 Inlets, outlets, internal pipework and connections

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

Inlet and outlet pipes shall be compatible with pipe systems in accordance with European Standards.

4.1.3 Ventilation

The prefabricated tertiary treatment unit and the inlet pipework shall be ventilated to prevent the accumulation of fermentation gases.

4.1.4 Access

The prefabricated tertiary treatment unit shall be designed to provide access to the inlet and outlet areas; for routine maintenance sampling, removal of sludge, cleaning and/or maintenance.

Access covers shall be fit for purpose.

The access opening shall be a minimum of 400 mm (i.e. width for rectangular section or diameter for circular section). Where the access is for a person, the minimum dimension of the opening shall be 600 mm.

The prefabricated tertiary treatment unit shall be designed to restrict unauthorized access by one of the following means:

a) mass of the individual covers;

b) securing feature; or

c) locking accessory.

Where a locking accessory or securing feature is used, it shall be designed so that the cover cannot be easily opened with objects readily accessible by children.

4.1.5 Extension shaft

Extension shaft may be part of the prefabricated tertiary treatment unit and shall be fit for purpose.

It may be an extension piece of the prefabricated tertiary treatment unit, which is fitted only over certain points for example to allow maintenance or observation.

The extension shaft shall be constructed to avoid any surface water entering the prefabricated tertiary treatment unit. This can be achieved by overlapping the access or fixed to the product or using a gasket.

The extension shaft shall be constructed to ensure accessibility, access for maintenance work and the opening / closing of the cover.

4.1.6 Overall dimensions

The overall dimensions of the prefabricated tertiary treatment unit (i.e. height, width, length, diameters, etc.) shall be measured and recorded.

The measurements shall be within ± 0,5 % of the design dimensions.

4.2 Load bearing capacity

4.2.1 General

4.2.1.1 Characteristics

Performance of the load bearing capacity of the prefabricated tertiary treatment unit (i.e. of the tank of it) with or without extension shaft, shall be established either by testing or by calculations for one of the following characteristics, as:

a) pit test resistance, as specified in 4.2.3.5, or

NOTE Considered as the referenced one.

Alternatively, this may be as:

b) crushing test resistance, as specified in 4.2.3.2,

c) vertical load test resistance, as specified in 4.2.3.3,

d) vacuum test resistance, as specified in 4.2.3.4,

e) load bearing capacity determined by calculation, as specified in 4.2.2.

4.2.1.2 Performance expression

The performance of load bearing capacity for any of the characteristics referred in 4.2.1.1 shall be expressed as:

- value of the maximum allowed height of backfill expressed in meters (see Hb of Figure 6);
- possibility to install the prefabricated tertiary treatment unit either in wet or dry site, i.e. expressed as indication either WET together with a value of the maximum height of the water table measured from the base of the prefabricated tertiary treatment unit or DRY.

4.2.1.3 Tank selection

Performance of the load bearing capacity of prefabricated tertiary treatment unit shall be established for the tank which represent the lowest performance within the product family.

NOTE Usually the biggest prefabricated tertiary treatment unit is generally considered with the lowest performance.

4.2.2 Load bearing capacity determined by calculation (see 4.2.1.1, e)).

4.2.2.1 General

For determination of performance of load bearing capacity of the prefabricated tertiary treatment unit, calculation method shall apply, either indirectly (see 4.2.2.2) or directly (4.2.2.3), based on an empty prefabricated tertiary treatment unit buried underground with the loads defined in 4.2.2.4 to 4.2.2.6.

The performance shall be expressed as defined in 4.2.1.2.

4.2.2.2 Indirect method

This indirect calculation method shall be used when:

- geometrical data of the prefabricated tertiary treatment unit (e.g. wall thickness, distance of ribs, shape) are provided;
- properties of the materials and components of the prefabricated tertiary treatment unit are in accordance with provisions of 4.5.2 to 4.5.9, as relevant for the respective material;
- mechanical characteristics of test samples used for calculation are in accordance with Annex B.

NOTE For materials not covered in Annex B (i.e. PDPCD and flexible sheets), this calculation method is not applicable.

4.2.2.3 Direct method

The direct calculation method shall apply, when the prefabricated tertiary treatment unit is made of

- reinforced concrete, based on EN 1992-1-1 (Eurocode 2) or

- steel, based on EN 1993-1-1 (Eurocode 3) shall apply.

NOTE For the other materials, this calculation method is not applicable.

4.2.2.4 Loads applied in calculation

4.2.2.5 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:

  $H \times 18$ (expressed in kN/m²), where 18 (kN/m³) is the specific weight of the soil and H (m) is the height of backfill.

- horizontal component:

  $K \times D \times 18$ (expressed in kN/m²), where 18 (kN/m³) is the specific weight of the soil, D (m) is the distance from the ground level to the point where the load applies, and K is the coefficient depending on the backfill material.

- The following K coefficient can be used:

  - sand, K = 0,33;
  - gravel, K = 0,27,
  - for other backfill materials, K = 0,5.

4.2.2.6 Hydrostatic loads

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

- vertical component:

  $H_w \times 10$ (expressed in kN/m²), where 10 (kN/m³) is the action resulting from the specific weight of water and H_w (m) is the declared water table level from the base of the prefabricated tertiary treatment unit;

- horizontal component:

  $D \times 10$ (expressed in kN/m²) where D (m) is the distance from the ground level to the point where the load applies.

On sites, where highest level of the groundwater table is above the bottom of the prefabricated tertiary treatment unit, the stability conditions in relation to the water pressure shall be indicated in the installation's instructions.

4.2.2.7 Pedestrian loads

For pedestrian loads a value of 2,5 kN/m² shall be considered in calculation only when the height of the backfill (H) is less than or equal to 1 m.

When the height of backfill (H) is over 1 m, the pedestrian loads do not need to be considered for calculation, as it is assumed to be negligible against other loads.