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EN 12566-3

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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

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

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

This European Standard was approved by CEN on 20 June 2005.

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.

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Foreword

This European Standard (EN 12566-3:2005) 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of an identical text or by endorsement, at the latest by January 2006, and conflicting national standards shall be withdrawn at the latest by July 2008.

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.

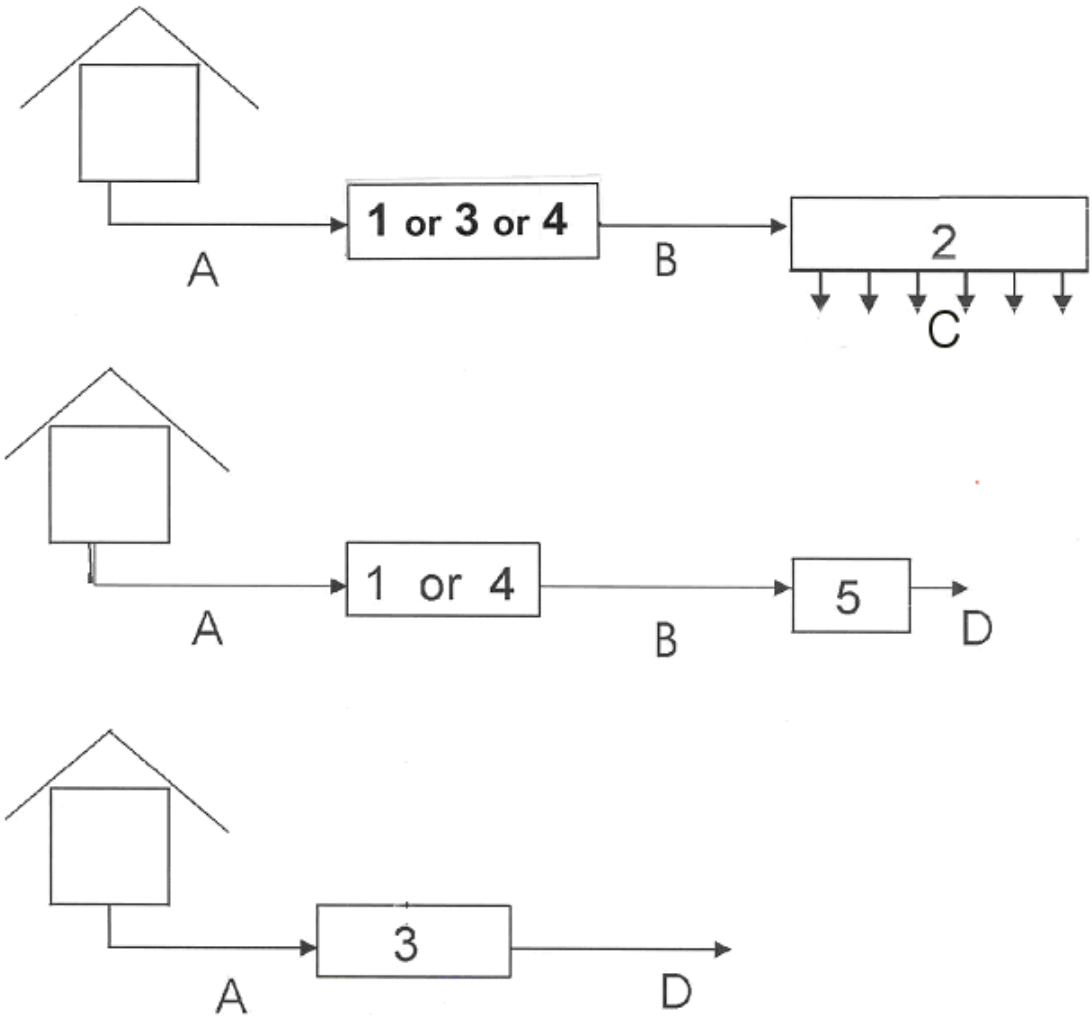
The following Parts are in preparation:

— 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 organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and 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.

It covers plants with tanks made of concrete, steel, PVC-U, Polyethylene (PE), Polypropylene (PP) and Glass Reinforced Polyester (GRP-UP).

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 the Vicat softening temperature (VST)*

EN 743:1994, *Plastics piping and ducting systems – Thermoplastics pipes – Determination of the longitudinal reversion*

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 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*

EN 1085:1997, *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*

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)*

EN ISO 1133:1999, *Plastics – Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics (ISO 1133:1997)*

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

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

EN ISO 9967, *Plastics pipes – Determination of the creep ratio (ISO 9967:1994)*

EN ISO 9969, *Thermoplastics pipes – Determination of the ring stiffness (ISO 9969:1994)*

EN ISO 11732, *Water quality – Determination of ammonium nitrogen by flow analysis (CFA and FIA) and spectrometric detection (ISO 11732:1997)*

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*

ISO 7150-2, *Water quality – Determination of ammonium – Part 2: Automated spectrometric method*

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 EN 1085:1997 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.

4 Symbols and abbreviations

BOD_5 (or BOD_7)	Biochemical oxygen demand at 5 or 7 days (definition 3110 in EN 1085:1997)
SS	Suspended solids (definition 3160 in EN 1085:1997)
KN	Kjeldahl Nitrogen (definition 3210 in EN 1085:1997)
NH_4-N	Ammonium nitrogen
COD	Chemical oxygen demand (definition 3120 in EN 1085:1997)
PE	Polyethylene
PVC-U	Unplasticized Poly-vinyl Chloride
GRP	Glass reinforced plastic

5 Nominal designation

The manufacturer shall state the nominal hydraulic daily flow Q_N expressed in cubic metres per day or the nominal organic daily load expressed in kg of BOD_5 (or BOD_7) per day.

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 $\leq$ 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.

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

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.

6.2 Load bearing capacity

6.2.1 Data for calculation

6.2.1.1 General

The plants shall resist the loads and stresses resulting from handling, installation and use, including desludging and maintenance, for their design life. Depending on the end use, safety factors (given by national regulations or codes of practice valid in the country of use) shall be used to calculate the loads for which the plants are designed.

Calculation shall be made according to calculation methods accepted in the place of use.

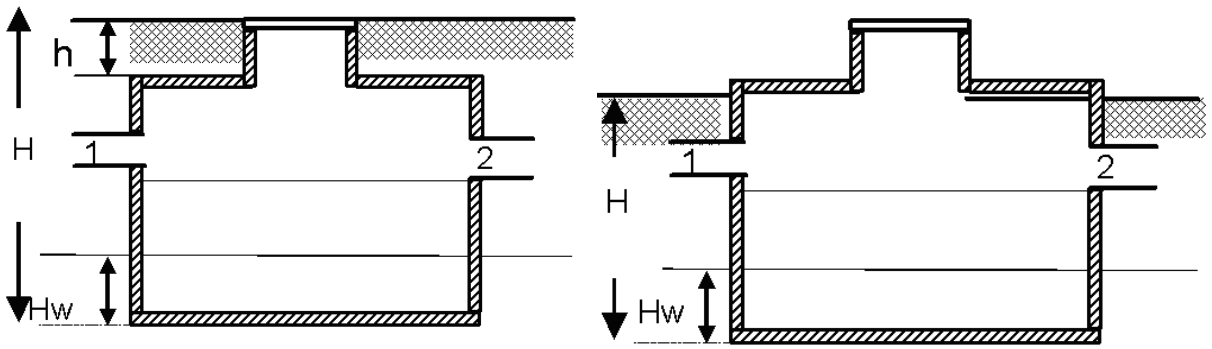
Depending on the end use, the following loads for the complete equipped plant shall be considered:

a) backfill load;

b) hydrostatic loads;

c) pedestrian loads.

For the determination of loads, the parameters shown in Figure 2 shall be used.



Key

H total depth of the plant

H_w height of exterior water level (groundwater)

K coefficient of horizontal soil pressure

h depth of the backfill from the top of the tank to ground level

1 inlet

2 outlet

Figure 2 – Definition of parameters

6.2.1.2 Backfill load

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;

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

  — sand: K = 0,33;

  — gravel: K = 0,27;

  — other backfill materials: K = 0,5.

6.2.1.3 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;

— horizontal component: D x 10 (expressed in kN/m^2).

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.

6.2.1.4 Pedestrian loads

A figure of 2,5 kN/m² shall be considered only when the height of the backfill is less than 1,0 m. Over 1,0 m, pedestrian loading is assumed to be negligible against other actions.

6.2.2 Testing of crushing resistance/maximum load deformation

The structural behaviour of the plant shall be determined by the crushing resistance/maximum load deformation.

6.3 Treatment efficiency declaration

The plant shall demonstrate compliance with the wastewater treatment efficiency performances and the related operational data declared by the manufacturer, when tested according to Annex B.

The manufacturer's declaration shall be expressed in terms of efficiency ratio on COD, BOD and suspended solid. Each efficiency ratio is calculated using the following formula:

$$R = \frac{P_{\mathrm{i}} - P_{\mathrm{o}}}{P_{\mathrm{i}}} \tag{1}$$

where

R is the efficiency ratio for a given parameter (COD, BOD, SS…);

P_{i} is the value of the given parameter at the inlet;

P_{o} is the value of the same given parameter at the outlet.

The ratio declared by the manufacturer shall not be greater than those obtained by the test made according to Annex B. In addition, another way of expression of the efficiency may be used for BOD, COD and suspended solid.

EXAMPLE Minimum and maximum concentrations of the effluent and/or the influent.

NOTE The ratios obtained do not automatically mean that the regulatory requirements on effluent qualities in a given country are met. A calculation should be made to indicate the final effluent qualities which should be compared to the requirements valid in the place of use.

These ratios may not always be obtained when the plant is operating in practice.

In addition, the following parameters shall be declared by the manufacturer: hydraulic daily flow and total power consumption if applicable.

Where required, i.e. by national regulations, parameters described in B.2.4 shall be declared.

6.4 Watertightness

6.4.1 General

The plant shall be watertight up to the height declared by the manufacturer; the minimum declared height shall be the top of the tank (see Figure A.1).

The plant shall be tested according to at least one of the requirements given in 6.4.2 to 6.4.4 when tested according to the methods described in Annex A.

6.4.2 Water test

When tested according to A.2, the water loss for plants shall be measured after 30 min. For tanks made of concrete it shall be ≤ 0,1 l/m^2 of the internal wet surface of the external walls. For tanks made from plastics or other material, no leakage shall occur.

6.4.3 Vacuum test

When tested according to A.3, the plant shall be deemed watertight when the vacuum pressure selected for the test does not deviate by more than 10 % of the selected pressure.

6.4.4 Pneumatic pressure test

The plant is considered to be watertight when:

— tested in the conditions given in A.4.2 a), the pneumatic pressure selected for the test does not deviate by more than 0,5 kPa (0,005 bar) during the related test period; or

— tested in the conditions given in A.4.2 b), the variation of the initial pneumatic pressure (equal to 0,3 bar) is less than 3 kPa (0,03 bar) during 180 s.

6.5 Durability

6.5.1 General

Plants including all internal components shall be manufactured from materials that make them suitable for use in a wastewater environment.

The material(s) used shall comply with 6.5.2 to 6.5.7 as appropriate.

6.5.2 Concrete

The compressive strength shall be class C 35/45 in accordance with EN 206-1. EN 13369, Table A.2 and A.2 shall apply for concrete cover of septic tanks made of steel reinforced concrete.

6.5.3 Steel

The grade of steel and type of coatings (where applicable) shall be in accordance with those specified in EN 858-1.

6.5.4 Unplasticized polyvinyl chloride (PVC-U)

The characteristics of the PVC-U used for the plant shall be:

— PVC content: at least 80 % of mass determined according to EN 1905;

— K-value: 57 ≤ K-value ≤ 70, determined according to EN 922;

— Vicat softening temperature (VST): VST ≥ 79 °C, determined according to EN 727;

— density (D): 1 390 kg/m^3 ≤ D ≤ 1 500 kg/m^3, determined according to EN ISO 1183;

— gelation: expressed as resistance to dichloromethane. Determination according to EN 580, light attack at the chamfered wall up to 50 % at a temperature of 15 °C for 30 min;

— longitudinal reversion: ≤ 4,0 %. Determination in accordance with method A of EN 743:1994.

6.5.5 Polyethylene (PE)

6.5.5.1 Rotational moulding

The characteristics of the PE-rotational moulding used for the plant shall be:

— MFR = (4,0 ± 3,0) g/10 min according to EN ISO 1133:1999, condition D;

— density ≥ 930 kg/m^3 according to EN ISO 1183;

— tensile properties, determined according to EN ISO 527-2, test piece type 1B, test temperature (23 ± 2) °C and test speed 100 mm/min on test pieces taken from the tank:

  — tensile stress at yield: ≥ 14 MPa;

  — tensile strain at yield: ≤ 25 %;

  — tensile strain at break: ≥ 80 %.

6.5.5.2 Blow moulding

The characteristics of the PE-blow moulding used for the plant shall be:

— 2,0 g/10 min ≤ MFR ≤ 12,0 g/10 min according to EN ISO 1133:1999 (condition G);

— density ≥ 940 kg/m^3 according to EN ISO 1183;

— tensile properties, determined according EN ISO 527-2, test piece type 1B, test temperature (23 ± 2) °C and test speed 100 mm/min on test pieces taken from the tank:

  — tensile stress at yield: ≥ 19 MPa;

  — tensile strain at yield: ≤ 25 %;

  — tensile strain at break: ≥ 200 %.

6.5.5.3 Extrusion

The characteristics of the PE-extrusion used for the plant shall be:

— 0,15 g/10 min ≤ MFR ≤1,0 g/10 min according to EN ISO 1133:1999 (condition T);

— density ≥ 930 kg/m^3 according to EN ISO 1183;

— tensile properties, determined according to EN ISO 527-2, test piece type 1B, test temperature (23 ± 2) °C and test speed 100 mm/min on test pieces taken from the tank:

  — tensile stress at yield: ≥ 21 MPa;

  — tensile strain at yield: ≤ 25 %;

  — tensile strain at break: ≥ 200 %.

6.5.6 Glass reinforced plastic (GRP)

The characteristics of the GRP used for the plant shall be:

— material shall be constructed using resins, reinforcement materials, processing agents and other materials in accordance with EN 976-1:1997, Clause 3;

— creep factor ($\alpha_{material}$) shall be ≥ 0,3. It is determined by using the following equation:

$$\alpha_{material} = \frac{Et}{Ef,i} \quad (2)$$

where

initial flexural modulus (Ef,i) is determined at (23 ± 5) °C according to EN ISO 14125:1998, method A and corrigendum 1;

long term flexural modulus (Et) is determined according to EN ISO 899-2 (temperature (23 ± 5)°C; extrapolation procedure according to EN ISO 9967);

— ageing factor (β) shall be ≥ 0,3. It is determined by using the following formula:

$$\beta = \frac{Ef,_{\text{aged}}}{Ef,i} \quad (3)$$

where

$Ef,_{\text{aged}}$ and Ef,i are determined according to the following procedure:

a) specimen samples of laminate from the plant shall be prepared. The exposed edges shall be coated with the resin used in the manufacture of the plant. The samples shall be post-cured in air at (50 ± 2) °C for a minimum of 72 h;

b) half of the specimen samples shall be immersed in water for (1 000 ± 16) h at (50 ± 1) °C or alternatively for (3 000 ± 16) h at (40 ± 1) °C. The flexural modulus ($Ef,_{\text{aged}}$) shall be determined according to method A of EN ISO 14125:1998 at (23 ± 5) °C;

c) half of the specimen samples shall be stored for the time as above at (23 ± 5) °C. The flexural modulus (Ef,i) shall be determined according to method A of EN ISO 14125:1998 at (23 ± 5) °C.

6.5.7 Polypropylene (PP)

6.5.7.1 Injection moulding

The characteristics of the PP-injection moulding used for the plant shall be:

— MFR (230/2,16) = (5,0 ± 3,0 g)/10 min according to EN ISO 1133;

— density ≥ 905 kg/m^3 according to EN ISO 1133;

— yield stress ≥ 30 MPa according to EN ISO 527-2, test temperature (23 ± 2) °C.

6.5.7.2 Extrusion

The characteristics of the PP-extrusion used for the plant shall be:

— MFR (230/2,16) = (0,5 ± 0,1) g/10 min according to EN ISO 1133;

— density ≥ 908 kg/m^3 according to EN ISO 1133;

— yield stress ≥ 30 MPa according to EN ISO 527-2, test temperature (23 ± 2) °C.

6.5.7.3 Injection moulding with foam

The characteristics of Injection moulding with foam shall be:

— MFR (230/2,16) = (5,0 ± 3,0) g/10 min according to EN ISO 1133;

— density ≥ 720 kg/m^3 according to EN ISO 1133;

— yield stress ≥ 24 MPa according to EN ISO 527, flexural strength ≥ 30 MPa according to EN ISO 178, compressive strength ≥ 450 MPa according to EN ISO 179, test temperature (23 ± 2) °C.

7 Calculation and test methods

7.1 Watertightness

Plants shall be tested to at least one of the tests described in Annex A.

7.2 Treatment efficiency testing procedure

The treatment efficiency of a plant shall be tested according to the method described in Annex B.

7.3 Calculation and test methods for structural behaviour

Plants shall be subjected to a test or to a calculation taking into account the loads given in 6.2.1.

Test methods for plants or mechanical characteristics used for calculation are given in Annex C.

Where plants include watertight extension shafts, the loads at the maximum installed depth shall be taken into account and appropriate tests or calculations made to prove the structural adequacy.

8 Technical information

The manufacturer shall provide the following information for each product:

a) manufacturer and product identification;

b) number of this European Standard, EN 12566-3;

c) nominal hydraulic daily flow (m^3/d) or nominal organic daily load BOD_5 or BOD_7 (kg/d);

d) conditions of use;

e) date of manufacture;

f) name of laboratory (where appropriate);

g) test report number (where appropriate);

h) electrical supply (if required).

Where ZA.3 requires the same information, the requirements of this clause are met.

9 Evaluation of conformity

9.1 General

The conformity of the products with the requirements of this European Standard shall be demonstrated by:

a) initial type tests (see 9.2);

b) factory production control (see 9.3), including finished product test (see 9.3.4).

NOTE For CE marking, Annex ZA applies.

For the purposes of testing, products may be grouped into ranges.

9.2 Initial type tests

Initial type tests shall be performed to demonstrate conformity with this European Standard. Tests previously performed in accordance with provision of this European Standard (same product, same characteristics, test methods, sampling procedure and system of attestation of conformity) may be taken into account.

In addition, when a new product (outside an existing range) or product range is developed, appropriate initial type tests shall be carried out in accordance with the Table 1 to confirm that its final properties conform to the requirements of this European Standard.

If a modification, likely to alter the functional properties of the finished product, takes place, the initial type tests shall be repeated.

The results of the initial type tests shall be recorded and available for inspection, and shall be kept for at least 10 years after the date of last production of the plants to which they relate.

Table 1 – Requirements for initial type tests

Nr	Requirements	Models to be tested	
		Each model in a range	A representative model from a range
1	Overall dimensions	X	—
	Inlets, outlets and connections	X	—
	Accessibility	X	—
2	Watertightness	X	—
3	Structural behaviour	—	X[a]
4	Treatment efficiency	—	X[b]
5	Durability	—	X[c]

a The biggest size will normally be selected assuming this size represents the worst structural behaviour.

b The smallest size will normally be selected assuming this size represents the worst treatment efficiency.

c Where the manufacturer uses materials for which the properties are already known (e.g. from the supplier), no durability testing is necessary.

9.3 Factory production control

9.3.1 General

A factory production control system shall be established and documented. The factory production control system shall consist of procedures for the internal control of production to ensure that products placed on the market conform to this European Standard.

9.3.2 Raw materials and components

The specifications of incoming raw materials and components shall be verified.

9.3.3 Production process

The relevant features of the plant and production process shall be defined giving the frequency of the inspection checks and tests, together with the criteria required for controlling the manufacturing process. The action to be taken when control values or criteria are not met shall be given.

Measuring equipment shall be calibrated and the procedure, frequency and criteria documented.

9.3.4 Finished product testing

A sampling plan shall be provided to demonstrate that the finished products are watertight. The results of tests shall be recorded and available. All test equipment shall be verified and the procedure, frequency and criteria documented.

9.3.5 Stock control

The stock control of finished products, together with procedures for dealing with non-conforming products, shall be documented.

10 Installation instructions

The manufacturer shall supply installation instructions with each plant, written in the language accepted in the country in which the plant is to be installed. These instructions shall contain comprehensive data for the installation of plants and all operating conditions including pipes connections, electrical connections and commissioning and start-up procedures. These instructions shall cover all installation conditions, including any limitation due to the effect of ambient temperature.

These instructions shall give the maximum backfill height, the bottom depth of the plant (H) and the maximum acceptable pedestrian load, and where applicable instructions to prevent floatation.

NOTE Products covered by this European Standard are not intended to be subject to vehicle loads. If products are to be used in such areas, measures should be taken to ensure that the vehicle load is not transferred directly to the plant.

The installation instructions shall contain details of sitting, requiring that the plant when installed has ready access for maintenance, particularly desludging equipment.

The manufacturer shall describe any ventilation requirements where applicable.

11 Operation and maintenance instructions

The manufacturer shall provide, with each plant, clear and comprehensive operation and maintenance instructions written in the language accepted in the country in which the plant is to be installed.

Annex A
(normative)

Watertightness test

A.1 Selection of test

One of the watertightness tests in Table A.1 shall be carried out on a complete plant whether factory manufactured or assembled from prefabricated components.

Table A.1 – Feasible tests

Tests	Tank material			
	Concrete	GRP	PE, PP and PVC-U	Steel
Water test	X	X	X	X
Vacuum test	—	X	X	X
Pneumatic pressure test	—	X	X	X

A.2 Water test

A.2.1 Sample

The test is carried out on the plant.

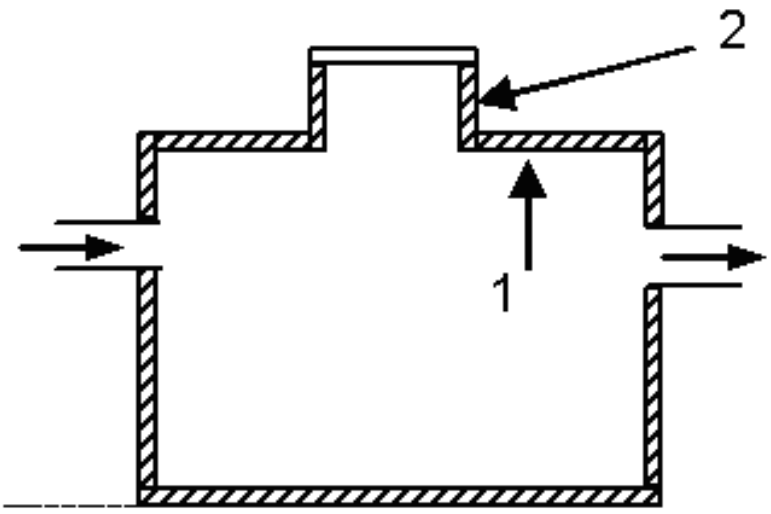
A.2.2 Procedure

The plant shall be placed and secured in place so as to enable inspection of the base of the plant.

The plant (with or without extension shaft) shall be filled with clean water to the declared height of water tightness (minimum height equal to top of the plant) (see Figure A.1) after sealing the connections.

In order to take into account the effective conditions of use and the possible saturation of the material, concrete plants shall be filled with water during a period of at least 24 h. After this saturation period, it may be necessary to refill the plant before the test starts. Then the volume of water required to refill the plant after the test period of 30 min shall be measured.

For plants made from other material, no saturation period is necessary before the test starts. After 30 min, plants shall be inspected for leaks and the observation shall be recorded.



Key

1 top of the plant

2 extension shaft

Figure A.1 – Height for filling

A.2.3 Expression of results

For concrete plants, at the end of the test period, the additional amount of clean water required to raise the water level up to the top of the plant shall be measured in litres. This additional amount shall be expressed in litres per m² of the internal wet surface of the external walls.

For plants made of other material, any water leakage shall be recorded.

A.3 Air permeability vacuum test

A.3.1 Sample

The test shall be carried out on an empty plant (with or without extension shaft).

A.3.2 Procedure

The plant shall be placed on a level surface and laterally supported. One of the three pressures given in Table A.2 shall be selected for the test.

The selected vacuum pressure shall be gradually imposed on the plant and held for 3 min to allow the plant to absorb the deformation.

After this, the variation of the pressure in the plant shall be measured during the related test period defined in Table A.2.

Table A.2 – Test parameters

Gauge test pressure kPa	Test period s
-10 ± 2 %	60 ± 1
-20 ± 2 %	30 ± 1
-30 ± 2 %	15 ± 1

A.3.3 Expression of results

The value of the variation of the pressure shall be expressed in kPa.

A.4 Pneumatic pressure test

A.4.1 Sample

The test shall be carried out on an empty plant (with or without extension shaft).

A.4.2 Procedure

The test shall be carried out according to one of the two following methods:

a) The plant shall be placed on a level surface and laterally supported. One of the three pressures given in Table A.3 shall be selected for the test. The selected pneumatic pressure shall be gradually imposed on the plant and held for 3 min to allow the plant to absorb the deformation. After this, the variation of the pressure in the plant shall be measured during the related test period defined in Table A.3.

b) The plant shall be placed on a level surface and laterally supported. The plant shall be subjected to an initial pneumatic pressure of 30 kPa (0,3 bar) for at least 3 min; after this period, the variation of the pressure is measured.

Table A.3 – Test parameters

Gauge test pressure kPa	Test period s
+ 10 ± 2 %	60 ± 1
+ 20 ± 2 %	30 ± 1
+ 30 ± 2 %	15 ± 1

A.4.3 Expression of results

The value of the variation of the pressure shall be expressed in kPa.

Annex B
(normative)

Treatment efficiency test procedure

B.1 Responsibility and testing location

The plant shall be tested by a laboratory.

The test shall be performed either in the test house of the laboratory or on a user site under the control of the laboratory.

The selection of the test location is the manufacturer's choice but with the agreement of the laboratory.

The test conditions at the location are the responsibility of the laboratory and shall comply with the following conditions.

B.2 Plant selection and preliminary evaluation

B.2.1 General

Before testing starts, the manufacturer shall provide the laboratory with plant and process design specifications including a complete set of drawings and supporting calculations. Full information concerning the installation and operation and maintenance requirements of the plant shall also be provided.

The manufacturer shall provide the laboratory with information detailing the mechanical, electrical and structural safety of the plant installation to be tested.

B.2.2 Installation and commissioning

The plant shall be installed in a way that is representative of the normal conditions of use.

Test conditions, including environment and wastewater temperatures, and compliance with the manufacturer's manual, shall be monitored and recorded and agreed upon by the laboratory. The plant shall be installed and commissioned in accordance with the manufacturer's instructions. The manufacturer shall install and commission all items of the plant prior to testing.

B.2.3 Operation and maintenance procedures during testing

The plant shall be operated in accordance with the manufacturer's operating instructions. Routine maintenance shall be carried out in strict accordance with the manufacturer's maintenance instructions. Sludge shall only be removed from the plant when specified by the manufacturer in his operating and maintenance instructions. All maintenance work shall be recorded by the laboratory.

During the test period no unauthorised access shall be permitted to the test site. Authorised access shall be supervised by the laboratory.

B.2.4 Data to be monitored

The following core parameters shall be monitored in all plants to be tested for both the influent and the effluent:

a) total chemical oxygen demand (COD)[1] and total biochemical oxygen demand (BOD)[2]; after a certain period, BOD of the influent only can be calculated from COD value;

b) suspended solids (SS);

c) temperature (liquid phase);

d) total power consumption of the product if applicable;

e) daily hydraulic flow.

The following parameters may also be measured if required:

f) pH;

g) conductivity;

h) nitrogen parameters;

i) total phosphorus;

j) hourly hydraulic flow;

k) dissolved oxygen concentration;

l) sludge production;

m) ambient air temperature.

B.3 Test procedure

B.3.1 Time for establishment

The manufacturer shall indicate to the laboratory the X-value defined in Table B.2.

B.3.2 Influent characteristics

Raw domestic wastewater shall be used. The laboratory shall not use grinding equipment on the raw waste water supply. It is acceptable to coarse screen and remove grit prior to use as long as the influent is of the following quality:

a) BOD_5 or BOD_7(ATU): 150 mg O_2/l to 500 mg O_2/l or COD 300 mg O_2/l to 1000 mg O_2/l;

b) SS: 200 mg/l to 700 mg/l;

c) KN: 25 mg/l to 100 mg/l or NH4 - N: 22 mg/l to 80 mg/l;

d) total phosphorus: 5 mg/l to 20 mg/l.

---

[1] TOC is an acceptable alternative method for COD.

[2] BOD may be expressed in BOD_5 or BOD_7.

B.3.3 Daily flow pattern for testing

The daily flow used for testing purposes shall be measured by the laboratory. The daily flow pattern shall comply with Table B.1 with a tolerance of ± 5 %.

Table B.1 – Daily flow pattern

Period h	Percentage of daily volume %
3	30
3	15
6	0
2	40
3	15
7	0

Where influent is introduced, it shall be done regularly throughout the entire period.

B.3.4 Test procedure

B.3.4.1 General

Routine monitoring shall take place throughout the period of the test procedure. The test schedules listed in Table B.2 shall apply.

Measurements shall be regularly made during each sequence avoiding the day when stress takes place.

The full test shall be carried out during a period of (38 + X) weeks.

After desludging, a period of 1 d shall be allowed for recovery before the programme of tests and sampling is continued.

Table B.2 – Test schedules

Sequence	Characteristic		Time elapsed weeks
1	Sequence name: Hydraulic daily flow: Sampling:	BIOMASS ESTABLISHMENT nominal no	X [a]
2	Sequence name: Hydraulic daily flow: Sampling:	NOMINAL nominal 4 measurements	6
3	Sequence name: Hydraulic daily flow: Sampling:	UNDERLOADING 50 % nominal 2 measurements	2
4	Sequence name: Hydraulic daily flow: Sampling:	NOMINAL – POWER BREAKDOWN [b] nominal 5 measurements	6
5	Sequence name: Hydraulic daily flow: Sampling:	LOW OCCUPATION STRESS no no	2
6	Sequence name: Hydraulic daily flow: Sampling:	NOMINAL nominal 3 measurements	6
7	Sequence name: Hydraulic daily flow: Sampling:	OVERLOADING [c] nominal and overload (see Table B.3) 2 measurements	2
8	Sequence name: Hydraulic daily flow: Sampling:	NOMINAL – POWER BREAKDOWN [b] nominal 5 measurements	6
9	Sequence name: Hydraulic daily flow: Sampling:	UNDERLOADING 50 % nominal 2 measurements	2
10	Sequence name: Hydraulic daily flow: Sampling:	NOMINAL nominal 3 measurements	6

a X is the time indicated by the manufacturer to obtain normal operating performance.

b A 24 h power breakdown is organised 2 weeks after the beginning of the sequence.

c An overload is organised for a duration of 48 h at the beginning of the sequence.

B.3.4.2 Overload

The laboratory shall adjust the hydraulic daily flow in order to establish the extra load during 48 h, as shown in Table B.3, at the start of the 2 weeks overloading phase.

Table B.3 – Definitions of overloads

Nominal hydraulic flow Q_N	Total flow %
$Q_N \leq 1{,}2$ m^3/d	150
$Q_N > 1{,}2$ m^3/d	125

B.3.4.3 Peak flow discharge

A peak flow discharge shall be executed once a week only during the NOMINAL sequences according to the conditions given in Table B.4. This peak flow discharge shall not be done during the day used for power breakdown.

One peak flow discharge consists of a volume of 200 l of test influent which shall be discharged, in addition to the daily flow, over a period of 3 min, at the beginning of the period with a flow equal to 40 % of the daily flow.

Table B.4 – Number of peak flow discharge

Nominal hydraulic flow Q_N	Number of peak flow discharge
$Q_N \leq 0{,}6$ m^3/d	1
$0{,}6 < Q_N \leq 1{,}2$ m^3/d	2
$1{,}2 < Q_N \leq 1{,}8$ m^3/d	3
$Q_N > 1{,}8$ m^3/d	4

B.3.4.4 Power breakdown / machine breakdown

Where applicable, a power breakdown test shall simulate loss of electric power/mechanical breakdown for 24 h for the plant equipment. During this power breakdown, influent input shall be maintained according to the daily flow pattern.

This test shall not be done during the day used for peak flow.

When there is optional electrical discharge equipment, the test shall be done with this equipment.

B.3.5 Influent and effluent samplings

The laboratory shall collect and analyse influent samples to determine compliance with the influent characteristics (see B.3.2). Effluent sample shall be analysed to determine efficiency ratio.

Inlet and outlet samples shall be flow-based composites over 24 h taken according Table B.2. Samples shall be taken regularly.

B.4 Sample analysis

The determinants specified in B.2.4 shall be analysed using the standard methods specified in the standards listed in Table B.5.

Table B.5 – Analysis methods

Parameter	Measurement method
BOD	ISO 5815
COD	ISO 6060
SS	EN 872
Ammonium nitrogen	ISO 5664 or ISO 6778 or ISO 7150-1 or ISO 7150-2 or EN ISO 11732
Kjeldahl nitrogen	EN ISO 11905-1 or EN 12260
Nitrate	ISO 7890-3
Phosphorus	EN ISO 6878

Concentrations shall be determined for each load and each parameter.

The mean value of the 20 efficiency ratios obtained during the NOMINAL sequences (with and without power breakdown) shall be calculated for each parameter.

The individual values for UNDERLOADING sequences (4 efficiency ratios), OVERLOADING sequence (2 efficiency ratios) shall be stated in the report.

B.5 Test report

The report shall contain at least the information specified below:

a) details of the plant tested including information regarding the nominal daily load;

b) information on the conformity of the plant tested with the information provided prior to testing;

c) data obtained during testing (see B.2.4), in particular: the mean value of efficiency ratios for nominal loading and individual values of efficiency ratios for non-nominal loading (see B.4);

d) information on all maintenance and repairs carried out during the test period, including details of desludging frequency, quantity and the volume removed;

e) information on the electrical energy absorbed during the test period;

f) information on any problems, physical or environmental, occurring during the test period. Deviations from the manufacturer’s maintenance instructions shall be reported in this section;

g) information detailing any physical deterioration of the plant that has occurred during the test period; e.g. the clogging behaviour of the plant where applicable;

h) information concerning deviations from the test procedure;

i) scaling rules used by the manufacturer to assess the same treatment efficiency and structural behaviour for all the products in the range.

Annex C
(normative)

Calculation and test methods for structural behaviour

C.1 General

This annex gives the way to test the structural behaviour of plants which are installed buried in the ground.

To determine the structural behaviour of a plant, one or more methods described below and mentioned in Table C.1 shall be used.

Table C.1 – Methods for the determination of the structural behaviour

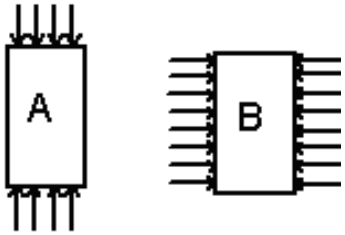
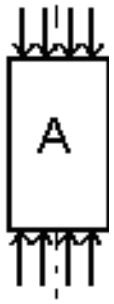
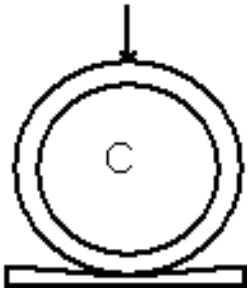
Condition	Concrete	GRP	PE and PP	Steel	PVC-U
Dry	C.2 or C.4.1 or C.6	C.4.2 or C.5 or C.6	C.3 or C.4.4 or C.6	C.4.5 or C.6	C.4.3 or C.6
Wet			C.4.4 or C.6		

C.2 Concrete plant

C.2.1 Crushing test methods

Table C.2 indicates the crushing test method to be performed according to the shape of the plant being tested.

Table C.2 – Crushing test methods

Rectangular or trapezoidal shape	Vertical cylinder shape	Horizontal cylinder shape
		
NOTE Letters A, B and C correspond to the test method.		

C.2.2 Test procedures

C.2.2.1 Type A test (vertical load)

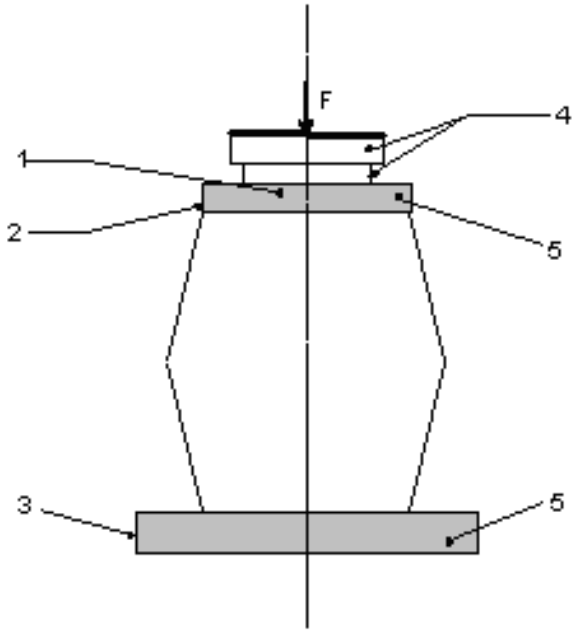
C.2.2.1.1 Sample

The test shall be carried out on an empty plant equipped with its cover(s) without any extension and/or maintenance shaft.

C.2.2.1.2 Procedure

The plant shall be placed on a sand bed of granulometry 0 to 5 mm, water content approximately 7 % and thickness of (6 ± 1) cm. This sand bed shall be levelled before the installation of the plant.

A similar sand bed shall be placed on the upper part in order to compensate for the thickness of the cover(s) and the geometry of the inner sides of the plant. The stress shall be equally distributed on the upper part of the plant using a loading plate (see the scheme of the principle in Figure C.1). The stress shall be applied at a uniform rate and the maximum loading time shall not be less than 5 min. The tolerance on the load shall be ± 3 %. The stress shall be applied up to failure.



Key

1	loading plate	4	stiff load beam
2	plywood plate	5	sand bed
3	plywood retaining ring	F	load

Figure C.1 – Scheme of the principle of type A test

C.2.2.1.3 Expression of results

The load F corresponding to failure shall be noted and expressed in kN.

C.2.2.2 Type B test (horizontal load)

C.2.2.2.1 Sample

The test shall be carried out on an empty plant without its cover(s) and any extension and/or maintenance shaft.

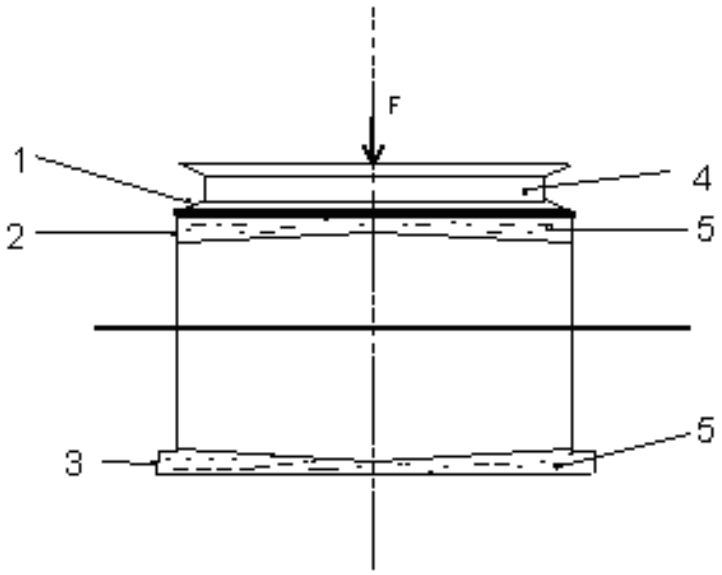
C.2.2.2.2 Procedure

The plant shall be placed so that the upper surface (which would support the cover(s)) is in a vertical position.

The plant shall be placed on a sand bed as defined in C.2.2.1.2.

The load shall be equally distributed on the plant using a loading plate or applied via a sand bed with the same characteristics as in C.2.2.1.2. The sand bed shall be levelled to take into account the geometry of the sides of the plant (see the scheme of the principle in Figure C.2).

The load shall be applied at a uniform rate and the maximum loading time shall not be less than 5 min. The tolerance on the load shall be ± 3 %. The load shall be applied up to failure.



Key

1	loading plate	4	stiff loading beam
2	plywood plate	5	sand bed
3	plywood retaining ring	F	load

Figure C.2 – Scheme of the principle of the type B test

C.2.2.2.3 Expression of results

The load F corresponding to failure shall be noted and expressed in kN.

C.2.2.3 Type C test (vertical load)

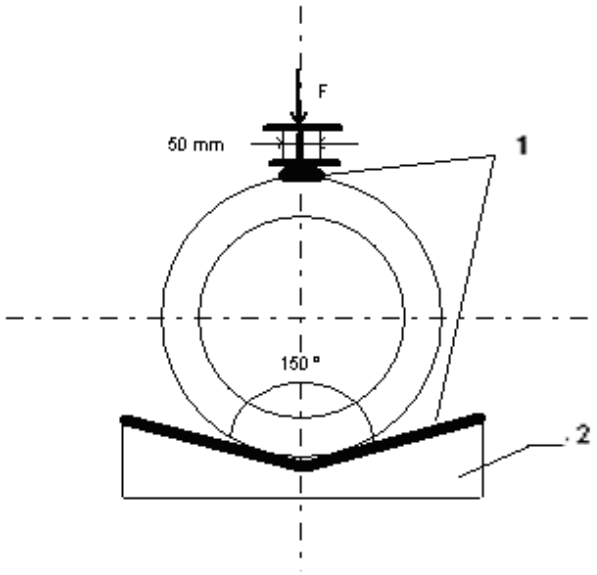
C.2.2.3.1 Sample

The test shall be carried out on an empty plant without its cover(s) and any extension and/or maintenance shaft.

C.2.2.3.2 Procedure

The plant shall be placed over its whole length on a "V" support forming a 150° angle and covered with a rubber strip of 50 mm wide and 10 mm to 20 mm thick with a mean hardness not less than 45 IRHD (see the scheme of the principle in Figure C.3).

The load shall be applied at a uniform rate and the maximum loading time shall not be less than 5 min. The tolerance on the load shall be ± 3 %. The load shall be applied up to failure.



Key

1 rubber strip (10 mm to 20 mm thick)

2 rigid support (wood)

Figure C.3 – Scheme of the principle of the type C test

C.2.2.3.3 Expression of results

The load F corresponding to failure shall be noted and expressed in kN.

C.3 Polyethylene and polypropylene plant

This test method is applicable for use in dry conditions only.

C.3.1 Vertical load test

C.3.1.1 Sample

The test shall be carried out on an empty plant equipped with its cover(s) without any extension and/or possible maintenance shafts.

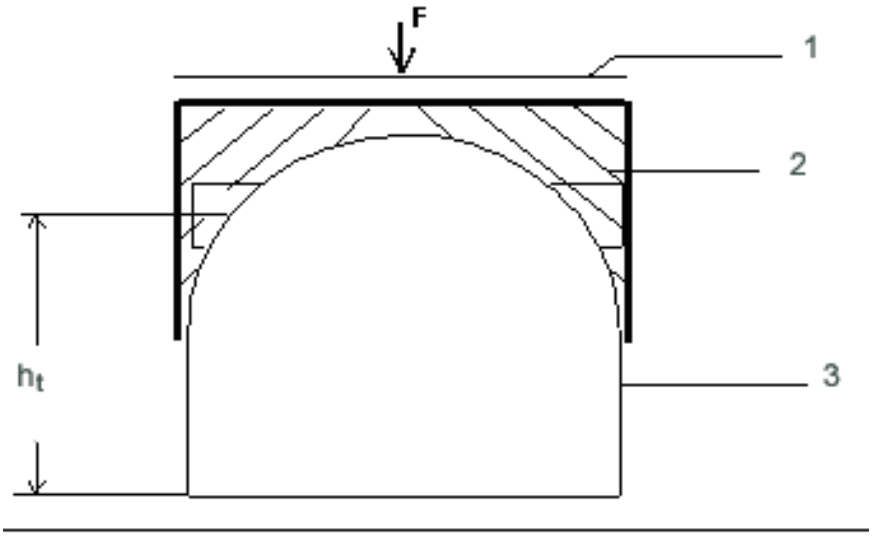
C.3.1.2 Procedure

Testing shall be carried out at the temperature of (25 ± 5) °C.

The plant shall be placed in conditions representative of end use on a sand bed of granulometry 0 mm to 5 mm, water content less than 15 %. This sand bed shall be levelled to a thickness of (6 ± 1) cm before the installation of the tank (see Figure C.4).

A vertical load shall be equally distributed on the upper part of the plant. A loading plate shall be adjusted to the centre of the upper part of the plant and shall be placed on a 1 cm thick soft plywood plate. If the upper part of the plant in contact with the loading plate is not plane (covers, raised points), level differences shall be compensated.

The load shall be applied at a uniform rate and the maximum loading time shall not be less than 5 min. The load shall be accurate to ± 3 %. The load on the tank shall be increased to collapse. Variation of h_t shall be noted, step by step. The maximum load F shall be noted.



Key:

1 distributed load

2 polyurethane foam

3 tank

h_t distance between the bottom of the plant and the axis of the inlet pipe

Figure C.4 – Scheme of the principle of PE and PP plant tests

C.3.1.3 Expression of results

The load corresponding to collapse shall be noted and expressed in kN.

C.4 Determination of mechanical characteristics of test samples used for calculation

C.4.1 Concrete

The preparation, the construction and the test shall be carried out in accordance with EN 13369.

C.4.2 Glass reinforced plastic (GRP)

The creep factor ($\alpha_{material}$) shall be determined according to 6.5.6.

The ageing factor (β) shall be determined according to 6.5.6.

C.4.3 PVC-U

The initial stiffness (S_0) shall be determined according to EN ISO 9969.

The long term stiffness (S_t) shall be determined according to EN ISO 9967.

The creep factor (γ) shall be calculated using the following formula:

$$\gamma = \frac{S_o}{S_t} \quad \text{(C.1)}$$

C.4.4 PE, PP

The initial flexural modulus (Ef,i), shall be determined according to EN ISO 178 at a temperature of (23 ± 2) °C on test pieces which have an age of (21 ± 2) d (stored in normal laboratory conditions). The test pieces are taken directly from the tank or from forms which are produced with the same raw materials following the same fabrication method as for the tanks.

The long term flexural modulus (Et) is determined according to EN ISO 899-2 under the following conditions:

1. testing temperature (23 ± 2) °C;
2. test pieces are taken directly from the tank or from forms which are produced with the same raw materials following the same fabrication method as for the tanks;
3. age of test pieces (21 ± 2) d (conservation in normal laboratory conditions);
4. extrapolation procedure according EN ISO 9967.

C.4.5 Steel

Steel characteristics are obtained following the relevant standard.

C.5 Vacuum test for Glass Reinforced Plastic

The plant shall be designed to withstand an external pressure P. The plant shall be tested for the designed external load in any conditions, using the following formula:

$$P = \frac{L}{f} \quad \text{(C.2)}$$

where

P is the external pressure in kPa;

L is the load in kN (the greater of the vertical or horizontal load due to backfill and hydrostatic load, where applicable);

f is the factor to take into account long term physical properties of GRP material using the equation

$$f = \beta\sqrt{\alpha_{\text{construction}}} \quad \text{(C.3)}$$

where

$\alpha_{\text{construction}}$ (long term creep performance) is determined according to the test of EN 978:1997, 7.2;

β (ageing factor) is determined according to 6.5.6.

The test procedure shall be in accordance with EN 976-1:1997, 6.8 without taking into account 6.8.1.

C.6 Pit test

C.6.1 Sample

The test shall be carried out on an empty plant equipped with pipe connections (inlet, outlet and interconnection pipes), its cover(s) and any extension and/or maintenance shaft(s).

The plant shall be installed in a watertight test excavation. The size of the testing excavation shall be calculated to avoid side effects. The plant shall be fixed on the base of the excavation, according to the manufacturer's installation instructions.

The excavation shall be backfilled with rounded gravel (size from 3 mm to 8 mm).

To test in wet ground conditions, add water to the top of the plant, as defined in Figure C.5.

C.6.2 Procedure

Step 1: Measure the initial internal dimensions of the plant.

Step 2: Place the plant in the test excavation.

Step 3: Backfill with gravel up to the level of pipe connections and simultaneously fill the plant with water up to the top, after sealing the inlet and outlet pipe connections. The volume of water shall be measured. After that, discharge the plant.

For tanks made of concrete or GRP, the volume of water in the plant shall be measured; after that, discharge the plant.

For tanks made of other materials, discharge the plant and measure the volume of water in the plant one day later.

Step 4: Check the position of the inlet and outlet pipe connections.

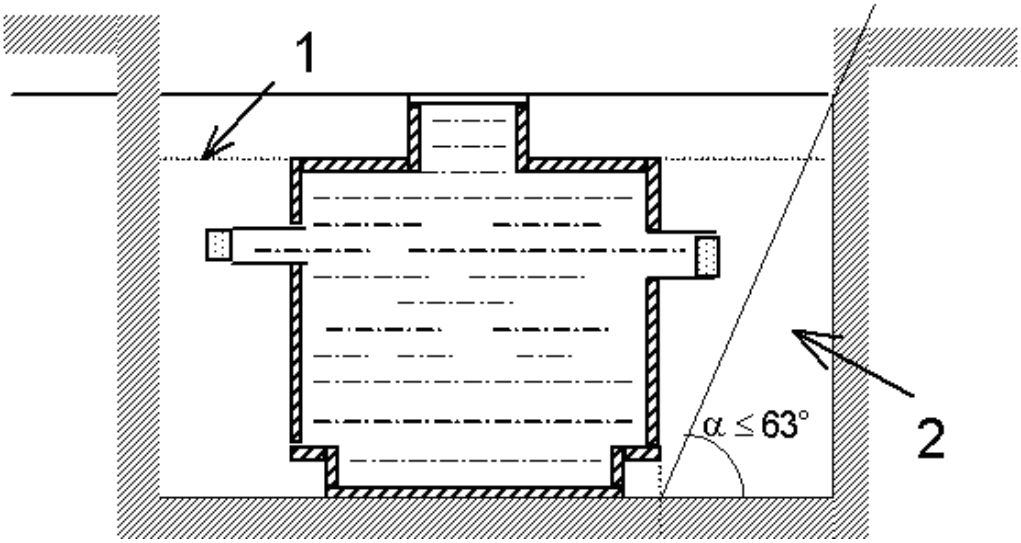
Step 5: Complete the backfill up to the maximum permitted depth, in accordance with the manufacturer's installation instructions, including the pedestrian load (2,5 kN/m^2) converted to a uniform backfill load. Seal the inlet and outlet pipe connections and, for a wet ground test, add water in the excavation to the level of the top of the plant.

Step 6: For a plant with a tank made of concrete or GRP, maintain the test conditions for 24 h. For a plant with a tank made of other materials, maintain the test conditions for 3 weeks.

Step 7: In wet condition: examine the inside of the plant to show the watertightness is maintained. Discharge the water from the excavation. If the plant is watertight, refill with water, and measure any change in the capacity of the plant.

In dry condition: examine the inside of the plant. Refill with the volume of water required to fill the plant and measure any change in the capacity of the plant.

Check the position of inlet and outlet pipe connections and the internal dimensions of the plant.



Key

1 water table level

2 backfill

Figure C.5 – Scheme of the principle for the pit test

C.6.3 Expression of results

For plants with tanks made of concrete or GRP, no failure shall occur during the test. In addition, no lack of watertightness shall be recorded.

For plants with tanks made with other materials:

— variation of the volume of the plant (expressed in litres) shall be lower than 20 % of the internal volume of the plant;

— movement of inlet, outlet and interconnecting pipe works shall not lead to a loss of watertightness.

Annex ZA
(informative)

Clauses of this European Standard addressing the provisions of the EU Construction Products Directive

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under Mandate M/118 "Wastewater engineering products" given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard shown in this annex meet the requirements of the Mandate M/118 given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the construction products covered by this annex for their intended uses indicated herein. Reference shall be made to the information accompanying the CE marking.

WARNING: Other requirements and other EU Directives, not affecting the fitness for intended use, may be applicable to the construction products falling within the scope of this standard.

NOTE In addition to any specific clauses relating to dangerous substances contained in this European Standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply. An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (accessed through http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm).

This annex has the same scope as Clause 1 of this standard with regard to the products covered. It establishes the conditions for the CE marking of small waste water treatment plants intended for the use indicated in Table ZA.1.

Table ZA.1 – Relevant characteristics

Construction product: Small wastewater treatment systems up to 50 PT: prefabricated plants Intended use: Treatment of domestic wastewater for a population up to 50 PT			
Performance characteristic	**Requirement clauses in this standard**	**Mandated levels and/or classes**	**Notes**
Treatment efficiency (effectiveness of treatment)	6.3	-	
Nominal designation (treatment capacity)	5	-	In cubic metres per day for the hydraulic daily flow or in kg of BODx per day for the nominal organic daily load
Watertightness	6.4	-	Passed
Crushing resistance and maximum load deformation	6.2	-	Calculation or test methods in Annex C in relation to the material
Durability	6.5	-	

The requirement on a certain characteristic is not applicable in those Member States (MSs) where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these Mss are not obliged to determine nor declare the performance of their products with regards to this characteristic and the option "No performance determined" (NPD) in the information accompanying the CE marking (see ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level.

ZA.2 Procedure of attestation of conformity of plants

ZA.2.1 System of attestation of conformity

The system of attestation of conformity for plants indicated in Table ZA.1, in accordance with the Decision of the Commission 95/467/EC as given in Annex 3 of the mandate M/118 "Wastewater engineering products", is shown in Table ZA.2 for the indicated intended use.

Table ZA.2 – Attestation of conformity system

Product	**Intended use**	**Level(s) or class(es)**	**Attestation of conformity system**
Plants	To be used for faecal and organic effluents in a buried installation	-	3

The attestation of conformity of the plants in Table ZA.1 shall be according to the evaluation of conformity procedure indicated in Table ZA.3 resulting from the application of the clauses of this European Standard indicated in Table ZA.3.

Table ZA.3 – Assignment of evaluation of conformity tasks

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks under the responsibility of the manufacturer	Factory production control (F.P.C.)	Parameters related to all characteristics of Table ZA.1	9.3
	Initial type testing by the manufacturer	All other characteristics of Table ZA.1 other than those shown below	9.2
	Initial type testing by a notified test laboratory	Structural behaviour test or checking manufacturer's calculation and conformity of the product to the calculation Treatment efficiency test Watertightness tests Durability	9.2

ZA.2.2 Declaration of conformity

When compliance with the conditions of this annex is achieved, the manufacturer or his agent established in the European Economic Area (EEA) shall prepare and retain a declaration of conformity, which authorises the affixing of the CE marking. This declaration shall include:

— name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;

— description of the product (type, identification, use, ...), and a copy of the information accompanying the CE marking;

NOTE Where some of the information required for the declaration is already given in the CE marking information, it does not need to be repeated.

— provisions to which the product conforms (i.e. Annex ZA of this EN), and a reference to the ITT report(s) and factory production control records, as appropriate;

— particular conditions applicable to the use of the product (i.e. provisions for use under certain conditions);

— name and address (or identification number) of the approved body(ies);

— name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or his authorised representative.

The above mentioned declaration shall be presented in the language or languages accepted in the Member State in which the product is to be used.

ZA.3 CE Marking

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol shall be in accordance with Directive 93/68/EEC.

The CE marking symbol, the name (or identifying mark) of the manufacturer, the last two digits of the year of affixing the CE marking and the number of this standard (EN 12566-3) shall appear on the product.

The CE marking symbol shall also appear on the accompanying commercial documents together with the following information and characteristics:

— name (or identifying mark) and the address of the manufacturer;

— last two digits of the year of CE marking;

— number of this standard (EN 12566-3);

— product name and nominal designation;

— installation and if applicable operation and maintenance instructions;

— information on the relevant essential characteristics in Table ZA.1. Values to declare for each essential characteristic not included in the designation:

  — material (type), and coating where applicable;

  — watertightness (test method): "pass";

  — structural behaviour: results of the calculation method, crushing test, vertical load test, vacuum test or pit test;

  — treatment efficiency ratios;

  — where subject to regulatory requirements: pH, nitrogen parameters (efficiency ratio), total phosphorus (efficiency ratio), dissolved oxygen concentration, sludge production and total power consumption (if applicable), otherwise NPD.

The "No Performance Determined" (NPD) option may not be used where the characteristic is subject to a threshold level. Otherwise, the NPD option may be used when the characteristic, for a given intended use, is not subject to regulatory requirements.

Figure ZA.1 gives an example of the information to be given on the commercial documents (especially both name and registered address of the manufacturer appear).

Figure ZA.2 gives an example of the information to be given on the product.

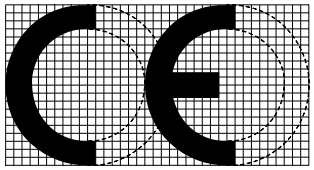
	*CE conformity marking, consisting of the "CE" symbol given in Directive 93/68/EEC*
Any Co Ltd, P.O. Box 21, B–1050 **05**	*Name or identifying mark and registered address of the producer* *Last two digits of the year in which the marking was affixed*
EN 12566-3	*Number of the European Standard*
"BWV 714" **Hydraulic daily load:** 3 m^3/day **Material:** (name of material) **Watertightness** (water test)**:** pass **Crushing resistance:** pass **Treatment efficiency:** COD : 80% BOD: 80% TSS: 80% **Electrical consumption:** 2.4 kWh/d **pH:** NPD **Nitrogen parameters:** NPD **Total phosphorus:** NPD **Dissolved oxygen concentration:** NPD **Sludge production:** NPD	*Description of product and Information on regulated characteristics*

Figure ZA.1 – Example CE marking information on the accompanying documents

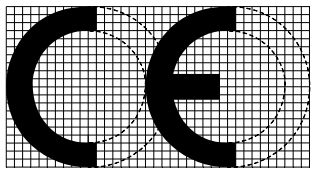
	*CE conformity marking, consisting of the "CE" symbol given in Directive 93/68/EEC*
AnyCo Ltd **05**	*Name or identifying mark of the producer* *Last two digits of the year in which the marking was affixed*
EN 12566-3	*Number of the European Standard*

Figure ZA.2 – Example CE marking information on the product

In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation.

NOTE European legislation without national derogation need not be mentioned.

Bibliography

[1] EN 476, *General requirements for components used in discharge pipes, drains and sewers for gravity systems*