

**Avlopp – Reningsanläggning upp till 50 PT –**  
Del 2: Infiltration i mark

**Small wastewater treatment systems for**  
**up to 50 pe –**  
Part 2: Soil infiltration systems

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TECHNICAL REPORT

**CEN/TR 12566-2**

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

June 2005

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ICS 13.060.30

English version

## Small wastewater treatment systems for up to 50 PT - Part 2: Soil infiltration systems

Petites installations de traitement des eaux usées jusqu'à  
50 PTE - Partie 2: Systèmes d'infiltration dans le sol

Kleinkläranlagen für bis zu 50 EW - Teil 2:  
Bodeninfiltrationssysteme

This Technical Report was approved by CEN on 19 December 2004. It has been drawn up by the Technical Committee CEN/TC 165.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (CEN/TR 12566-2:2005) has been prepared by Technical Committee CEN/TC 165 "Wastewater engineering", the secretariat of which is held by DIN.

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

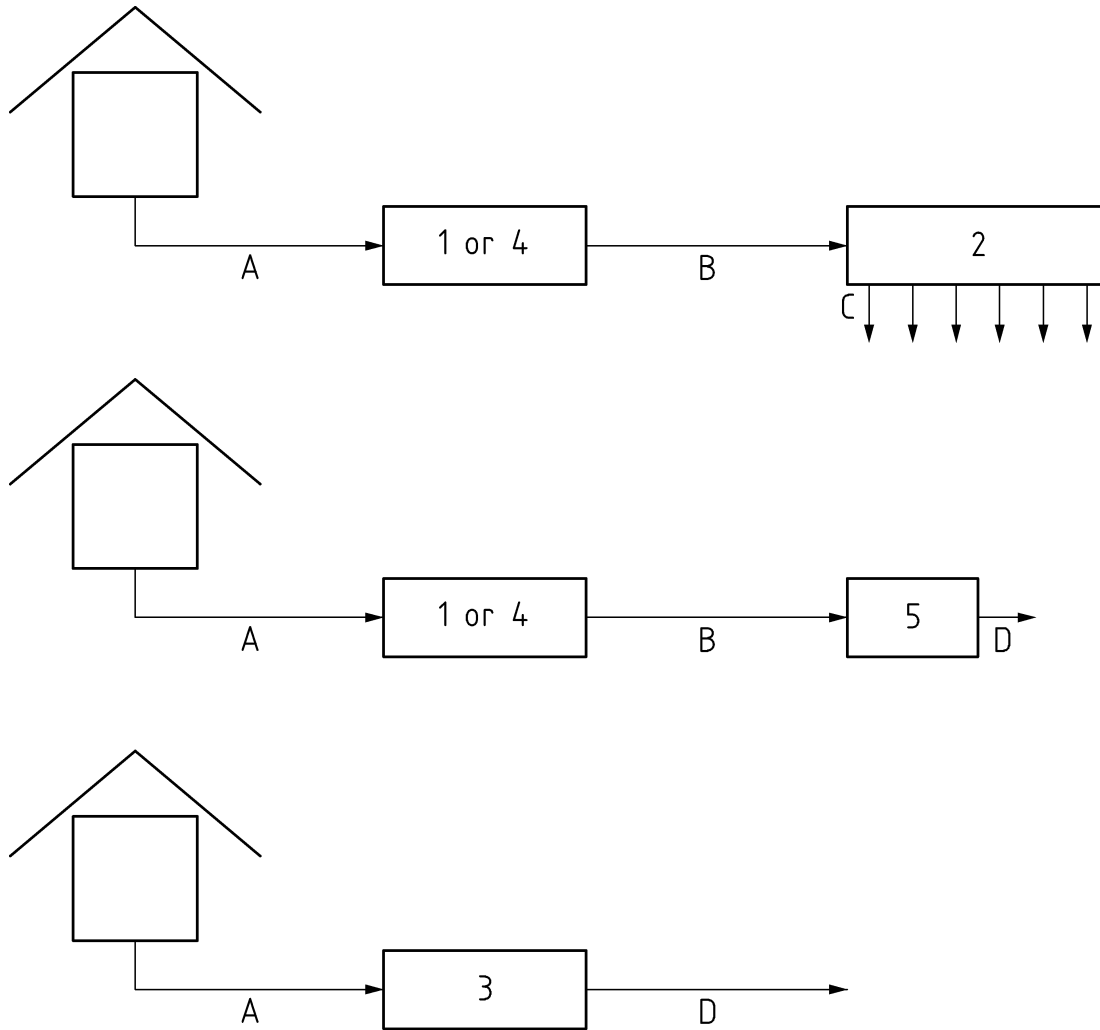
This document is considered as Code of Practice and provides the general requirements for packaged and/or site assembled treatment plants used for domestic wastewater treatment for a total number of inhabitants and population equivalents (PT)  $\leq 50$  PT (see Clause 1).

EN 12566 with the generic title "Small wastewater treatment systems up to 50 PT" consists of the following parts:

- Part 1: Prefabricated septic tanks (specifies the requirements and laboratory test method for prefabricated septic tank units. Requirements and tests for treatment efficiency are not specified),
- Part 2: Soil infiltration systems (applies for in-situ constructed soil infiltration systems. No treatment requirements are specified; Technical Report),
- Part 3: Packaged and/or site assembled domestic wastewater treatment plants (specifies the requirements and laboratory test method used to evaluate packaged wastewater treatment plants, which are required to treat sewage to a predetermined standard),
- Part 4: Septic tanks built in situ from pre-fabricated kits - Execution standard (in preparation),
- Part 5: Filtration systems (including sand filters) (in preparation),
- Part 6: Test methods for the evaluation of the effectiveness of treatment on users site.

The application of the parts of EN 12566 is shown in the following scheme:

**CEN/TR 12566-2:2005 (E)**



**Key**

- |   |  |   |  |
|---|--|---|--|
| A | Domestic wastewater (influent)             | 2 | Infiltration system (into the ground) (see CEN/TR 12566-2; in preparation) |
| B | Pre-treated wastewater                     | 3 | Wastewater treatment plant (see prEN 12566-3)                              |
| C | Infiltration into the ground               | 4 | Septic tank built in situ (see prEN 12566-4)                               |
| D | Outlet of treated wastewater (effluent)    | 5 | Filtration systems (see prEN 12566-5)                                      |
| 1 | Prefabricated septic tank (see EN 12566-1) |   |  |

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Report: 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 the United Kingdom.

## **Introduction**

This document gives guidance for soil infiltration systems which can be used together with small waste water systems according to EN 12566-1, prEN 12566-3 or prEN 12566-4 in places of use where legally provisions for soil infiltration systems do not exist.

National forewords of this document may give information on provisions for soil infiltration in the place of use (see Clause 5).

## CEN/TR 12566-2:2005 (E)

### 1 Scope

This document specifies the recommended requirements for soil infiltration systems ranging in size from a single house to 50 PT receiving domestic wastewater from septic tanks manufactured according to the requirements given in EN 12566-1 and prEN 12566-4.

This document gives design parameters, construction details, installation and component requirements for soil infiltration systems.

### 2 Normative references

The following referenced documents are indispensable for the 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, *Waste water treatment – Vocabulary*

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

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

EN 12056-2, *Gravity drainage systems inside buildings - Part 2: Sanitary pipework, layout and calculation*

EN ISO 10319, *Geotextiles – Wide-width tensile test (ISO 10319:1993)*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1085 and the following apply.

#### 3.1

##### **biological layer**

biological film which grows on the base of the infiltration system or on top of the filter material when pre-treated effluent infiltrates the subsoil or the filter material

#### 3.2

##### **connection pipe**

non-perforated pipe used to connect the septic tank to the distribution chamber

#### 3.3

##### **disposal area**

total area of the site where the pre-treated effluent is discharged into the ground using a soil infiltration system

#### 3.4

##### **distribution chamber**

chamber allowing even gravity distribution of pre-treated effluent via the distribution pipes

#### 3.5

##### **distribution layer**

layer of the system composed of granular fill material in which pre-treated effluent is discharged through infiltration pipes

#### 3.6

##### **distribution pipe**

non-perforated pipe used to connect the distribution chamber to a single infiltration pipe

#### 3.6

##### **dosing chamber**

small tank receiving pre-treated effluent and containing a dosing device e.g. a pump, a hydraulic siphon or a tipping trough, which automatically discharges the desired quantity



**3.7**

**end connection**

perforated and non-perforated pipes and fittings that connect the lower ends of any parallel infiltration pipes, to enable airflow between infiltration pipes. The connecting fittings may incorporate ventilation and access provision.

**3.8**

**filter material**

granular inert material, usually sand, placed beneath the distribution layer, the purpose of which is to provide a degree of filtration to the pre-treated effluent

**3.9**

**geotextile**

fabric, which is permeable to liquid and air but prevents solid particles from passing through it and is resistant to decomposition

**3.10**

**granular fill material**

inert material in which the infiltration pipes are placed in the distribution layer

**3.11**

**impermeable film**

inert membrane, which is impermeable to liquid

**3.12**

**infiltration**

percolation of effluent around the point at which it is discharged

**3.13**

**infiltration bed**

wide excavation in which a number of infiltration pipes are placed in parallel and surrounded by fill material

**3.14**

**infiltration pipes**

perforated pipes through which the pre-treated effluent is discharged to the infiltration trench or bed

**3.15**

**infiltration system**

series of infiltration pipes, placed in either single trenches or one large bed, used to discharge effluent in such a way that it percolates into the disposal area

**3.16**

**infiltration trench**

trench in which a single infiltration pipe is placed and surrounded by fill material and separated from other infiltration trenches by undisturbed soil

**3.17**

**land drains**

surface or subsurface channels for the transportation of rain water. They are used to dewater ground and divert the natural flow of surface and subsurface water away from infiltration area

**3.18**

**long Term Acceptance Rate**

**LTAR**

amount of pre-treated effluent which the system can infiltrate during its lifetime without water logging or clogging ( $l/m^2/d$ )

**3.19**

**mesh**

fabric, which is permeable to liquid and air but prevents rough solid particles from passing through it and which is resistant to decomposition. The hole diameters are approximately 1 mm.

## CEN/TR 12566-2:2005 (E)

### 3.20 permeability coefficient

$k$   
measure of the percolation ability of the soil (m/d)

### 3.21 prefilter

device that helps to prevent clogging of infiltration system

### 3.22 pre-treated effluent

wastewater that has undergone at least primary treatment

### 3.23 subsoil

unconsolidated material beneath the topsoil and above the bedrock

### 3.24 topsoil

upper layer of soil

### 3.25 water table

level below which the soil is saturated with water

### 3.26 water table level

surface of the groundwater when related to the ground level or other point of reference

## 4 Symbols and abbreviations

$k$  Darcy's permeability coefficient determined from small tube permeable test (m/d)

$k_N$  Normalised permeability coefficient determined from falling head percolation test (m/d)

$k_C$  Constant permeability coefficient determined from constant head percolation test (m/d)

## 5 General

Infiltration systems provide a measure of treatment when constructed according to this document or to appropriate national regulations; their effectiveness is usually not measured.

The systems described are intended to illustrate the main principles of construction and are subject to national variation. Provisions in the place of use shall be taken into account. The regulatory authorities shall be contacted.

## 6 Design parameters

### 6.1 General

To ensure that a sustainable solution is achieved each site shall be assessed (see Annex A and Annex B). The choice of infiltration system will depend upon the site considerations detailed in 6.2. The preferential order of systems is:

- Infiltration trench (see 10.2),
- Shallow infiltration bed (see 10.3.1),
- Vertical infiltration bed (see 10.3.2),
- Infiltration mound (see 10.3.3).

Pre-treated effluent discharging to unsuitable sub-soils may result in system failure.

## **6.2 Site considerations**

### **6.2.1 Climatic conditions**

When designing, constructing and locating the soil infiltration system, climatic conditions in the area such as extremes of temperature, rainfall, snow shall be taken into consideration.

### **6.2.2 Water table**

The seasonally highest groundwater table shall be determined in the disposal area, prior to the construction.

Unless specified in national regulations or guidance, a minimum of 1,0 m of unsaturated soil and/or filter material shall be present above the determined seasonally highest level of the groundwater table.

Where these dimensions cannot be accommodated, alternative arrangements (e.g. raised disposal area) shall be adopted to achieve these dimensions (see 10.3.3).

### **6.2.3 Location**

#### **6.2.3.1 General**

In order to take into consideration all relevant site features when locating the disposal areas a detailed site investigation shall be carried out. Annex A lists the site considerations which should be assessed as part of the site investigation; all or some of these considerations may be defined by the national authorities.

In absence of any national regulations or guidance, the disposal area shall be located according to the following minimum criteria:

- No part of the soil disposal area shall be closer than 4 m to the nearest point of the nearest habitable dwelling.
- No part of the disposal area shall be within 4 m of the nearest road boundary or ditch nor within 2 m of the boundary of the adjoining site. Disposal areas in the vicinity of small water courses shall be at least 10 m from the highest level. Larger water courses will need special considerations.
- The growth of any type of tree or plant which develops an extensive root system is limited to a minimum distance of 3 m from the infiltration system. This restriction also applies to the cultivation of crops which would inevitably necessitate the use of machinery, even light machinery, likely to disturb the materials installed at a shallow depth.
- Water supply pipes or underground services other than those required by the infiltration system itself shall not be located within the disposal area.
- Access roads, driveways or paved areas shall not be located within the disposal area.

#### **6.2.3.2 Groundwater protection**

Groundwater, in particular any water to be used for drinking shall be protected.

The risk of polluting groundwater is minimised when the disposal area is hydraulically downslope of groundwater sources.

**NOTE** The direction of the groundwater flow may be estimated from a trial hole test (see Annex B) and also from the topography, wells and local knowledge.

Distances are based chiefly on the most important geological and hydrogeological factors, e. g. the type and depth of subsoil and the depth to the water table, all of which can be assessed as part of the detailed site investigations.