SLOVENSKI STANDARD
SIST-TP CEN/TR 17179:2018

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Cevni in kanalski sistemi iz plastomernih materialov - Sistemi za infiltracijo in zadrževanje shranjene deževnice - Postopki za vgradnjo pod zemljo

Thermoplastics piping and ducting systems - Rainwater infiltration and storage attenuation systems - Practices for underground installation

Einbauanleitungen für Rohrleitungs-, Regenwasserversickerungs- und Regenrückhaltungshaltesysteme außerhalb von Gebäuden - Verfahren für den Erdeinbau

Systèmes de canalisations et de gaines en matières thermoplastiques - Pratiques pour la pose en enterrée

Ta slovenski standard je istoveten z: **CEN/TR 17179:2018**

ICS:

13.060.30	Odpadna voda	Sewage water
23.040.05	Cevovodi za zunanje sisteme za odpadno vodo in njihovi deli	Pipeline and its parts for external sewage systems

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Thermoplastics piping and ducting systems - Rainwater infiltration and storage attenuation systems - Practices for underground installation

Systèmes de canalisations et de gaines en matières thermoplastiques - Pratiques pour la pose en enterrée

Einbauanleitungen für Rohrleitungs-, Regenwasserversickerungs- und Regenrückhaltungshaltesysteme außerhalb von Gebäuden - Verfahren für den Erdeinbau

This Technical Report was approved by CEN on 17 December 2017. It has been drawn up by the Technical Committee CEN/TC 155.

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European foreword

This document (CEN/TR 17179:2018) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

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.

Introduction

Ecological and sustainable rainwater management is an increasingly important subject for communities, designers and other agencies. Due to the increasing amount of impermeable surfaces being created by buildings and roads, rainwater falling in urban areas can have great difficulty in finding its way into the ground or to receiving surface water. This can cause flash flooding, water in basements and other life threatening situations.

Rainwater harvesting, infiltration and decentralized retention of rainwater (attenuation), are examples of ecological and sustainable rainwater management. Excess water from rainwater harvesting systems should be infiltrated into the ground or released in a controlled manner into surface water bodies. Plastic geocellular systems, sometimes referred to as 'boxes', are a preferred solution for temporarily storing rainwater underground. These boxes can be stacked in layers to form underground storage reservoirs (e.g. tanks) able to store run-off from intensive rainfall falling over large surface areas. Plastic boxes have the advantage of being light and easy to install whilst providing a large capacity for storage relative to their overall volume. Some boxes are strong enough to be installed under roads, parking areas and other landscape features. They can also be recycled very easily.

This Technical Report contains guidance for installation procedures for thermoplastic infiltration and attenuation systems outside building structures, which should be completed in conjunction with product specific installation instructions.

This Technical Report is a guidance document only. It provides a set of general guidelines which gives best practice for underground installation of thermoplastic infiltration and attenuation systems outside building structures.

This Technical Report includes recommendations for the reservoir surround and backfilling procedures but not road base and road sub-base details. Attention is drawn to any national regulations which may cover these or other aspects of installation.

This Technical Report is intended to be used by local authorities, design engineers, installation contractors and manufacturers.

In this Technical Report, much of the guidance is expressed as requirements, e.g. by use of "shall" or by instructions in the imperative. It is strongly recommended that these be followed whenever applicable.

Other guidance is presented for consideration as a matter of judgement in each case, e.g. by use of "should".

1 Scope

This Technical Report is applicable to the installation of rainwater infiltration and storage/attenuation systems under gravity.

This Technical Report covers installations including:

— reservoirs made by assembled cuboid shaped thermoplastic boxes;

— integral components;

— ancillary components (e.g. access provisions and connections);

— geotextiles and/or geomembranes;

— embedment and backfill.

These systems are intended for underground use in landscape, pedestrian or vehicular traffic areas and are used outside building structures.

This Technical Report is only applicable to systems containing boxes to create a reservoir where the manufacturer has clearly stated in the installation instructions how the components should be assembled.

This Technical Report is a guidance document. It provides a set of general guidelines which gives best practice for installation.

NOTE 1 It is anticipated that additional recommendations and/or requirements (e.g. design, dimensioning and structural aspects) will be detailed in the relevant standards.

NOTE 2 Attention is drawn to the need to comply with national or local regulations.

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 1610:2015, *Construction and testing of drains and sewers*

EN 13249, *Geotextiles and geotextile-related products - Characteristics required for use in the construction of roads and other trafficked areas (excluding railways and asphalt inclusion)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
system
assembly including:

— a reservoir made by assembled cuboid shaped thermoplastic boxes (injection moulded or extruded);

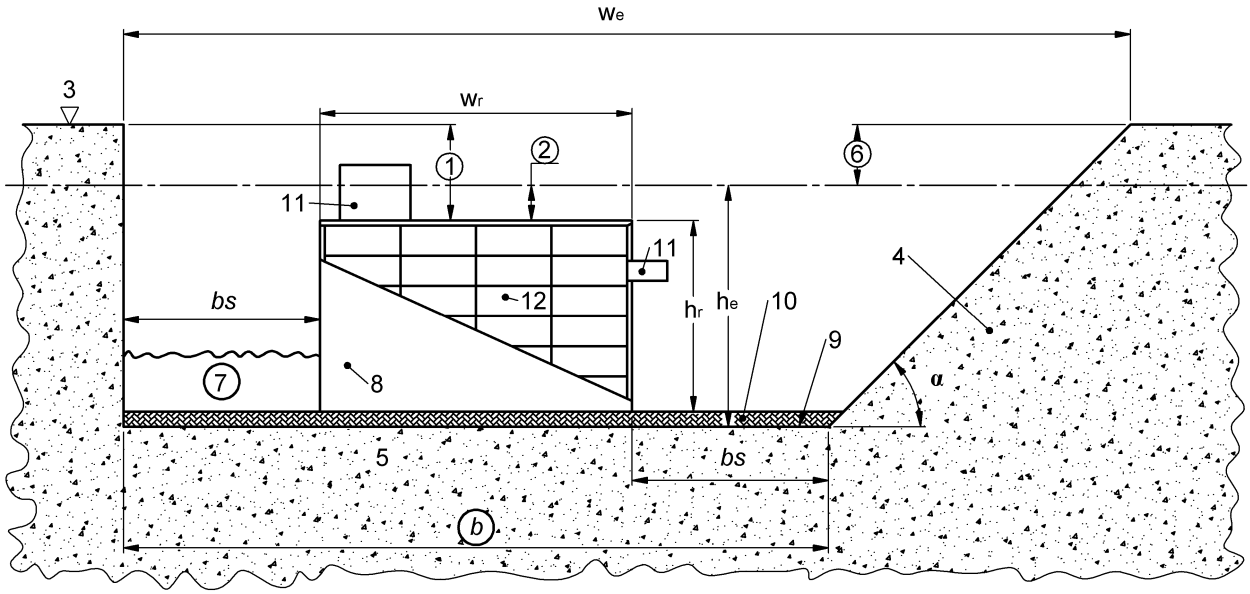
— integral components;

— ancillary components (e.g. access provisions and connections);

— geotextiles and/or geomembranes;

— embedment and backfill

Note 1 to entry: See Figure 1 for an illustration of the meaning and limits of the terms used in this Technical Report.



Key

1	cover layer	b_S	horizontal clearance between the reservoir and the excavation sidewall
2	initial backfill	b	width of a trench cross-section
3	ground surface	h_e	height of the embedment
4	native (e.g. *in situ*) soil	h_r	height of the reservoir
5	foundation zone	α	angle of the trench
6	main backfill	w_r	width of the reservoir
7	side backfill	w_e	width of excavation on surface level
8	geotextile / geomembrane		
9	bottom excavation		
10	lower bedding		
11	ancillary components		
12	box including integral components		

Figure 1 — Terminology infiltration/attenuation system

3.2
reservoir
assembly of boxes including integral components

3.3
ancillary components
products including inlets, outlets, ventilation, access for measurements and inspection

3.4
integral components
load bearing components contributing to the overall strength of the box

3.5
main backfill
layer on top of the initial and side backfill

Note to entry: The requirements for the main backfill are dependent on the intended use of the surface.

3.6
initial backfill
layer of fill material immediately above the crown of the reservoir

3.7
cover layer
initial plus main backfill

3.8
height of the embedment
height of the lower bedding, plus height of the reservoir plus the height of the initial backfill

3.9
lower bedding
part of the construction which supports the reservoir on top of the excavation bottom

4 Symbols and abbreviations

For the purposes of this document, the following symbols apply.

b	width of a trench cross-section (see Figure 1);
b_S	horizontal clearance between the reservoir and the trench (see Figure 1);
h_e	height of the embedment;
h_r	height of the reservoir;
α	angle of the trench;
w_r	width of the reservoir;
w_e	width of excavation on surface level;
M	compaction class moderate;
N	compaction class not;
W	compaction class well.

5 Transport, handling and storage at depots and sites

5.1 General

Thermoplastics boxes and box components may be supplied with or without packaging.

Attention is drawn to the need for consideration of personnel safety during the transport, handling and storage, especially in wet and cold weather conditions.

5.2 Transportation of boxes and box components

Box and components should be inspected on delivery to ensure that they are marked appropriately and comply with the specified requirements.

Any handling or transportation instructions from the manufacturer should be complied with.

Products should be examined both on delivery and immediately prior to installation to ensure that all components have been delivered and that all components are free from damage and in accordance with the relevant product standard.

Care should be taken to avoid positioning of boxes and components near to any exhaust systems or any other potential contaminations such as diesel oil.

When boxes and components require specific transportation practices, the manufacturer should notify the customer of the procedures to be used.

NOTE Attention is drawn to the need to confirm to national and/or local transport regulations.

5.3 Handling

When handling box and components, care should be taken to prevent damage.

When box and components are to be handled individually, they should be lifted, lowered and carried in a controlled fashion and should never be thrown, dropped or dragged.

When loading or unloading box and components with forklift equipment, only forklift trucks with smooth or suitably protected forks should be used. Care should be taken to ensure that forks do not impact box and components when lifting.

The impact resistance of thermoplastics boxes is reduced at low temperatures; under these conditions, more care should be taken during handling. Where cold conditions are expected, the advice of the manufacturer should be sought.

NOTE In general cold conditions are considered if temperatures are lower than 5 °C.

5.4 Storage

Any storage instructions from the manufacturer and the requirements of the appropriate product standards shall be adhered to.

All products should be stored in such a manner to keep them clean and avoid contamination or degradation.

Excessive stacking heights should be avoided so that boxes and components in the lower part of the stacks are not overloaded and/or the stack becomes unstable. Stacks of boxes should not be placed close to open excavations. Strapping bands should not cause damage or deformation of the boxes or components.

Stack the boxes on reasonably flat surfaces free from sharp objects, stones or projections in order to avoid localized deformation or damage to the products.

Boxes and components should be stored on supports in very cold weather to avoid freezing to the ground.

Storage in direct sunlight for long periods and/or high temperatures can affect the performance of the products and should be avoided.

The fading of the colour caused by outside storage does not affect the mechanical properties of products.

If boxes, box components and ancillary components are supplied in packaging, the restraints and/or packaging should be removed as late as possible prior to installation.

6 Installation

6.1 Behaviour of reservoirs

There are several methods of structural design (see national standards and guidance) that are used to calculate the long-term performance of reservoirs.

The use of the installation procedures detailed in this Technical Report and the manufactures instructions together with the structural design methods will ensure an optimal performance of the reservoirs.

In general, vehicular traffic is not allowed on unpaved surfaces in the zone of influence of the reservoir unless calculations prove otherwise.

6.2 Design considerations

6.2.1 General

It is essential to determine the soil conditions that relate to excavation construction and reservoir installation prior to construction; the native soil and the backfill material should be classified in accordance with Annex A. The classification is then used to choose a suitable type of installation in accordance with 6.2.2.

The classification will also indicate where excavated material will be suitable for reservoir backfill, so that importation of material may be minimized. Native materials conforming to classes 1 to 4 in Table A.1 are all suitable as backfill in the embedment. If backfill materials have to be imported, it is recommended that class 1 or 2 materials are used.

6.2.2 Types of installation

The three most common applications of thermoplastics reservoirs are:

— attenuation systems (could be wrapped in geomembranes or/and geotextiles). The sidefill material and compaction requirements depend on the expected load and the performance of the reservoir;

— infiltration systems (mostly wrapped in geotextiles). The sidefill material and compaction requirements depend on the expected load and the performance, and the infiltration capacity required;

— storage systems (wrapped in geomembranes). The sidefill material and compaction requirements depend on the expected load and the performance of the reservoir.

NOTE Reservoirs can have mixed applications.

6.3 Excavation construction

6.3.1 Safety

Operations in excavations are carried out in potentially hazardous conditions.

Shore, sheet, brace, and slope or otherwise support the excavation walls as appropriate to protect any person in the excavation. Take precautions to prevent objects from falling into the excavation, or its collapse caused by the position or movements of adjacent machinery or equipment, whilst the excavation is occupied.

Excavated material should be deposited in a location and manner that does not endanger the stability of the excavation.

National and local safety regulations must be complied with.