SLOVENSKI STANDARD
kSIST-TS FprCEN/TS 1046:2021

01-februar-2021

Cevni in kanalski sistemi iz plastomernih materialov - Sistemi zunaj stavb za transport vode in odpadne vode - Postopki za vgradnjo pod zemljo

Thermoplastics piping and ducting systems - Outside the building structures for gravity and pressurised systems - Trench installation

Thermoplastische Kunststoff-Rohrleitungs- und Schutzrohr-Systeme - Systeme außerhalb der Gebäudestruktur zum Transport von Wasser oder Abwasser - Verfahren zur unterirdischen Verlegung

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Systèmes de canalisations et de gaines en matières thermoplastiques - Système d'adduction d'eau ou d'assainissement à l'extérieur de la structure des bâtiments - Pratiques pour la pose en enterrée

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Ta slovenski standard je istoveten z: **FprCEN/TS 1046**

ICS:

23.040.03	Cevovodi za zunanje sisteme transporta vode in njihovi deli	Pipeline and its parts for external water conveyance systems
93.025	Zunanji sistemi za prevajanje vode	External water conveyance systems
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

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2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

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December 2020

ICS 23.040.01; 93.030

Will supersede CEN/TR 1046:2013

English Version

Thermoplastics piping and ducting systems - Outside the building structures for gravity and pressurised systems - Trench installation

Systèmes de canalisations et de gaines en matières thermoplastiques - Système d'adduction d'eau ou d'assainissement à l'extérieur de la structure des bâtiments - Pratiques pour la pose en enterrée

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This draft Technical Specification is submitted to CEN members for Vote. It has been drawn up by the Technical Committee CEN/TC 155.

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

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

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European foreword

This document (FprCEN/TS 1046:2020) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

This document is currently submitted to the Vote on TS.

This document will supersede CEN/TR 1046:2014.

This document is changed fundamentally by taking out design topics and topics already dealt with in EN 1610 and EN 805. The lay-out was changed and the pressure systems are described more in detail.

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Introduction

This Document contains guidance for installation procedures for thermoplastics piping systems and their components intended to be used below ground for pressure and non-pressure applications outside building structures. This document is intended to be used in conjunction with general standards for installation recommendations, for example those issued by CEN/TC 164 “Water supply” and CEN/TC 165 “Waste water engineering” as stated in EN 805 and EN 1610 respectively.

NOTE Guidelines for installation of pipelines made out of thermosetting materials can be found in the ISO/TS 10465 series [23].

This Document is based on the results from research with full-scale trials undertaken by the thermoplastics pipes industry and expressed in CEN/TS 15223.

This Document is a guidance document only. It provides a set of general guidelines which gives best practices for underground installation of thermoplastics piping and ducting systems outside building structures.

This Document includes recommendations for the pipe 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 the installation.

This Document does not cover matters relating to renovation of existing pipeline systems using lining techniques, or replacement of existing pipeline systems using trenchless techniques.

NOTE Guidelines for installation of lining techniques can be found in the EN 12889 series

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

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In this Document, 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”.

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1 Scope

This document gives the recommended practise for underground open trench installation and commissioning of thermoplastics piping systems to be used for the conveyance of water under pressure (in addition to EN 805) and for the discharge of wastewater under gravity (in addition to EN 1610).

In the field of non-pressure underground drainage and sewerage this is reflected in the marking of products by application code “U” and “UD”:

— outside the building structure (U);

— both buried in ground within the building structure (application area code “D”) and outside the building (application area code “UD”).

This document covers also installation and/or connections to valves, manholes, inspection chambers, gullies and other ancillary components in piping systems.

NOTE 1 Code of practise for pipelines for gas supply is covered by EN 12007-series [21].

NOTE 2 Recommended practices for installation of plastic piping systems for soil and waste discharge within the building structure is covered by CEN/TR 13801 [12].

NOTE 3 Practices for underground installation of rainwater infiltration and storage attenuation systems are covered by CEN/TR 17179 [13].

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NOTE 4 It is assumed that additional recommendations and/or requirements are detailed in the individual product standards.

NOTE 5 If non-plastic components are part of the plastic system there will be applicable manufacturer's instructions.

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Requirements and instructions concerning commissioning of systems can be found in EN 805 and EN 1610 and the relevant national and/or local regulations. This document gives specific additional recommendations for commissioning relevant for plastic piping systems.

Attention is drawn to any relevant local and/or national regulations (e.g. health, safety and hygienic requirements).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 805, *Water supply — Requirements for systems and components outside buildings*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply in addition to EN 1610.

3.1
deformation
change in the true shape of the cross-section

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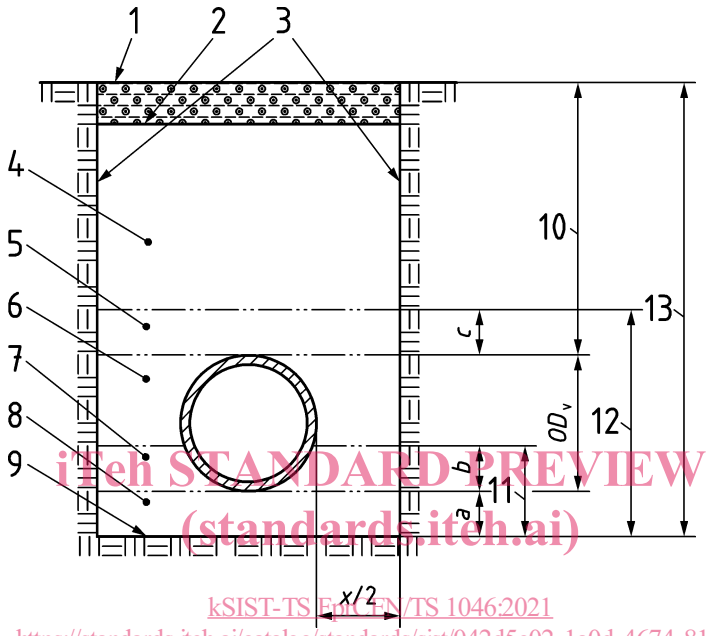
3.2
deflection
change of direction

3.3
trench
excavation of the soil for the underground embedment of the pipeline

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



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Key

1	surface	10	depth of cover
2	bottom of road or railway construction, if any	11	depth of bedding
3	trench walls	12	depth of embedment
4	main backfill	13	trench depth
5	initial backfill, *c*	*a*	thickness of lower bedding
6	sidefill	*b*	thickness of upper bedding
7	upper bedding, *b*	*c*	thickness of initial backfill
8	lower bedding, *a*	OD_V	outside diameter (vertical)
9	trench bottom	*x*/2	working space

Note 1 to entry: For minimum values of *a* and *c*, see 7.2.4.1.

Figure 1 — Terminology trench cross-section

4 Symbols

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

x	w_{min}-OD
x/2	horizontal clearance between the pipe or fitting and the trench sidewall or an adjacent pipe or fitting
d_e	(mean) external diameter of a pipe

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e	pipe wall thickness
w_{min}	minimum trench width
M	compaction classification: Moderate
N	compaction classification: Not
W	compaction classification: Well
β	the angle of unsupported trench side measured to the horizontal

5 Abbreviations

For the purposes of this document, the following abbreviations apply:

DN/OD	nominal outside diameter of a pipe and associated fittings;
OD	outside diameter
OD_h	Horizontal outside diameter
OD_v	outside diameter (vertical)
DN	nominal diameter
SN	stiffness number or classification
SDR	standard dimension ratio
PN	nominal pressure
UV	ultraviolet
STP	system test pressure

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6 Delivery, handling, transportation and storage on site

6.1 General

Correct delivery, handling, transportation and storage is a pre-condition for good installation and the performance of the system.

Products shall be inspected on delivery to ensure that they are marked and packed (e.g. plugged pipe ends for drinking water) in compliance with the specification (e.g. product standard, SN, SDR, PN, DN/OD and material designation). Non-compliant products should not be accepted and appropriate measures should be taken to avoid the use of these products.

Products shall be examined both on delivery and immediately prior to installation to ensure that they are free from damage, assessed in accordance with the relevant Product Standard. Damaged products should be marked and appropriate measures should be taken to avoid the use of these products.

6.2 Handling and transportation

Regarding handling and transportation the following should be taken into account:

— any handling or transportation instructions from the manufacturer should be complied with;

— pipes may be supplied in straight lengths or coiled forms (either free standing or on drums). Care should be taken when de-coiling pipes, as considerable forces can be released;

— secure the products or product bundles effectively before transporting on the site;

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— when transporting socketed pipes, loading of the sockets should be avoided;

— when handling products care should be taken to prevent damage;

NOTE Avoid lifting equipment with sharp edges.

— the impact resistance of thermoplastics products is reduced at low temperatures. Under these conditions, take more care during handling. Where cold conditions are expected, the advice of the manufacturer should be followed.

6.3 Storage of pipes

Regarding storage of pipes the following should be taken into account:

— manufacturers' instructions should be followed;

— when pipes or coils are stored on site in stacks, the manufacturer's advice regarding correct practice should be followed;

— stack the pipes or coils on reasonably flat surfaces free from sharp objects, stones or projections in order to avoid localized deformation or damage to the pipes;

— respect the maximum stacking height as defined by the manufacturer;

— do not place products in close proximity to fuels, solvents, oils, greases, paints and/or heat sources;

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— storage in direct sunlight for long periods and/or high temperatures could cause deformations which could affect the jointing negatively. To avoid this risk, the following precautions are recommended:

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— limit the height of the stacks of pipes;

— shield the stacks of pipes from continuous and direct sunlight;

— arrange to allow the free passage of air around the pipes.

— pipes have a restriction for storage under direct UV radiation. Respect therefor the manufacturer's storage instructions.

NOTE Fading of the colour is not necessarily affecting the mechanical properties of products.

6.4 Storage of fittings and other products

Regarding storage of fittings and other products the following should be taken into account:

— manufacturer’s instructions should be followed;

— the original packaging should be kept intact if products are supplied in packaging, the packaging should be removed as late as possible prior to installation;

— products should be protected from environmental influences;

— it's recommended to store the products below +50 °C;

— the products should be protected from direct exposure to sunlight;

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— the products should be protected from other heavy energy radiation from devises.

7 Installation

7.1 General

Deformation in a plastic piping system (pressure and non-pressure) is significantly influenced by the quality of the installation, especially the degree of compaction and choice of bedding material. The use of the installation procedures detailed in this document will minimize the deformation. A more detailed description of this behaviour and its limitations is given in CEN/TS 15223:2017, 7.2 and 7.3.

The most commonly used practice for the installation of thermoplastics systems is to surround the pipe (see Figure 1, key 5+6+7+8) with one type of bedding material.

7.2 Trench construction

7.2.1 General

Operations in open trenches are carried out in potentially hazardous conditions.

Where appropriate apply shore, sheet, brace, slope or other supports of the trench walls to protect any person in the trench. When the trench is occupied take precautions:

— to prevent objects from falling into the trench;

— to prevent collapse caused by the position or movements of adjacent machinery or equipment.

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Excavated material should be deposited at a distance of not less than 0,5 m from the edge of the trench, and the proximity and height of the excavated material (spoil bank) should not be allowed to endanger the stability of the excavation.

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When trench supports such as sheet piling or similar is used, the pipe support and any compacted soil around the pipe shall be maintained throughout installation. Ensure that sheeting is sufficiently tight to prevent washing soil out of the trench wall from behind the sheeting.

If trench supports are removed after the trench has been backfilled, care should be taken to not disturb the compaction of the primary backfill material around the pipe.

If it is not possible to remove trench supports without disturbing the trench compaction, it is recommended to keep the sheeting in place to prevent loss of support of foundation and embedment materials. Vertical and horizontal braces should be left in place. Top cross bracing may need to be installed if the top of the sheeting is cut off to accommodate for landscaping. Sheeting that is to be left in the trench shall be constructed of materials that will not corrode or rot, resulting in a loss of support for the pipe.

7.2.2 Trench width

The width of the trench at the springline of the pipe should not be greater than necessary to provide adequate room for jointing the pipe in the trench and compacting the pipe zone backfill at the haunches. The minimum trench width (see Figure 1 and 2) is given in Table 1 and Table 2.

NOTE Table 1 is in compliance with the requirements of EN 1610.

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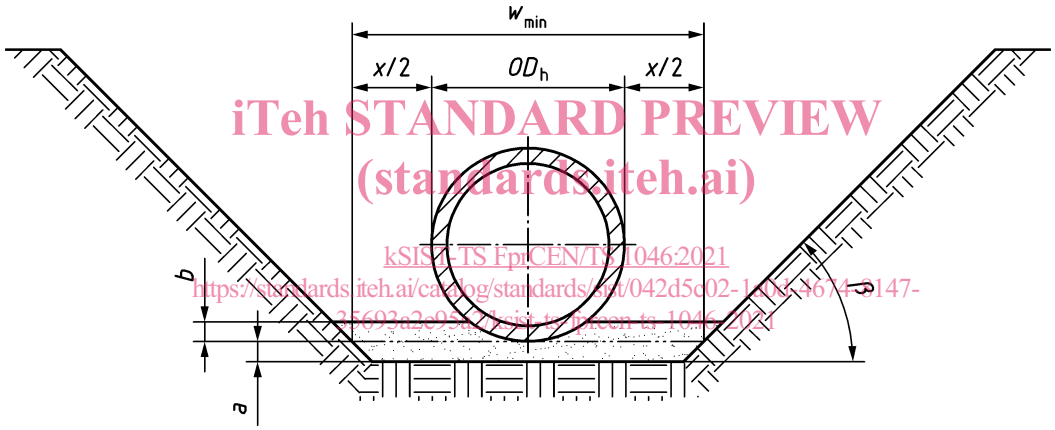
Table 1 — Minimum trench width depending on the nominal diameter (DN) of the pipe

Nominal size (DN) *DN*	**Minimum trench width (OD_h + x)** m		
	Supported trench [a]	**Unsupported trench** [a]	
		β >60°	**β ≤ 60°**
DN ≤ 225	OD_h + 0,40	OD_h + 0,40	
225 < DN ≤ 350	OD_h + 0,50	OD_h + 0,50	OD_h + 0,40
350 < DN ≤ 700	OD_h + 0,70	OD_h + 0,70	OD_h + 0,40
700 < DN ≤ 1 200	OD_h + 0,85	OD_h + 0,85	OD_h + 0,40
DN > 1 200	OD_h + 1,00	OD_h + 1,00	OD_h + 0,40
[a] See Figure 2.			



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Key

w_{min}	minimum trench width
a	thickness of lower bedding
b	thickness of upper bedding
x/2	working space next to pipe
β	angle of unsupported trench

Figure 2 — Working space next to the pipe and angle of unsupported trench