SLOVENSKI STANDARD
SIST EN 15885:2011

01-november-2011

Klasifikacija in tehnične lastnosti za obnovo in popravilo vodov in kanalov

Classification and characteristics of techniques for renovation and repair of drains and sewers

Klassifizierung und Eigenschaften von Techniken für die Renovierung und Reparatur von Abwasserkanälen und -leitungen

Classification et caractéristiques des techniques de rénovation et de réparation des réseaux d'évacuation et d'assainissement

Ta slovenski standard je istoveten z: **EN 15885:2010**

ICS:

93.030	Zunanji sistemi za odpadno vodo	External sewage systems

SIST EN 15885:2011 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15885

December 2010

ICS 93.030

English Version

Classification and characteristics of techniques for renovation and repair of drains and sewers

Classification et caractéristiques des techniques de rénovation et de réparation des réseaux d'évacuation et d'assainissement

Klassifizierung und Eigenschaften von Techniken für die Renovierung und Reparatur von Abwasserkanälen und -leitungen

This European Standard was approved by CEN on 30 October 2010.

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 CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 15885:2010: E

Contents

Page

Foreword

This document (EN 15885:2010) has been prepared by Technical Committee CEN/TC 165 “Waste water 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 June 2011, and conflicting national standards shall be withdrawn at the latest by June 2011.

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

It provides an overview of systems used for renovation and repair of drains and sewers, regardless of the material used. In respect of sewer renovation techniques using plastics materials only, it reproduces definitions and other information (but no requirements) contained in EN ISO 11295. Due to their continuous development the most up-to-date information on these particular techniques may be contained in either this document or EN ISO 11295, whichever is the latest dated edition. Regarding general requirements for drain and sewer systems and existing standards and draft standards on the subject of rehabilitation of drain and sewer systems, information in summary form is available in CEN/TR 15128.

For management and control of rehabilitation activities in drains and sewers a European Standard is in preparation in CEN/TC 165/WG 22.

This document refers to existing EN product standards to the extent available for the techniques and materials covered.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies a system for the classification of techniques for renovation and repair of drains and sewers outside buildings, operated under gravity or pressure, including pipes, connections and manholes. It defines and describes families of techniques and their different generic methods and materials used.

This European Standard does not describe specific products.

For each technique family it lists relevant existing standards, materials and applications and outlines characteristics including installation aspects, structural and hydraulic capabilities and site impact.

Necessary work on the existing pipe prior to renovation and repair is outside the scope of this European Standard.

This European Standard provides information needed to determine viable options for identification of the optimal technique with regard to a given set of renovation and repair objectives.

NOTE It is the responsibility of the designer to choose and design the renovation and repair systems.

It does not specify the calculation methods to determine, for each viable technique, the required amount of lining material needed to secure the desired performance of the renovated pipeline.

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 752:2008, *Drain and sewer systems outside buildings*

3 Terms and definitions

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

3.1
rehabilitation
measures for restoring or upgrading the performance of existing drain and sewer systems

[EN 752:2008, 3.50]

3.2
renovation
work incorporating all or part of the original fabric of the drain or sewer by means of which its current performance is improved

[EN 752:2008, 3.52]

3.3
repair
rectification of local damage

[EN 752:2008, 3.53]

3.4
technique family
grouping of renovation or repair techniques which are considered to have common characteristics for classification purposes

3.5
lining
process of renovating an existing pipeline by introducing material on the inside

3.6
liner
lining pipe after installation

[EN ISO 11295:2010, 3.2]

3.7
lining pipe
pipe inserted for renovation purposes

[EN ISO 11295:2010, 3.1]

3.8
lining system
lining pipe and all relevant fittings inserted into an existing pipeline for the purposes of renovation

[EN ISO 11295:2010, 3.3]

3.9
lining with continuous pipes
lining with pipe made continuous prior to insertion, and which has not been shaped to give it a cross-sectional diameter smaller than its final diameter after installation

[ISO 11296-1:2009, 3.2.1]

3.10
lining with close-fit pipes
lining with a continuous pipe for which the cross-section is reduced to facilitate installation and reverted after installation to provide a close fit to the existing pipe

[ISO 11296-1:2009, 3.2.2]

3.11
lining with cured-in-place pipes
lining with a flexible tube impregnated with a thermosetting resin, which produces a pipe after resin cure

[ISO 11296-1:2009, 3.2.3]

3.12
lining with discrete pipes
lining with short lengths of pipe which are jointed to form a continuous pipe one by one during insertion

3.13
lining with spirally-wound pipes
lining with a profiled strip, spirally wound to form a continuous pipe after installation

[ISO 11296-1:2009, 3.2.5]

3.14
lining with a rigidly anchored inner plastics layer
lining with a single rigid annulus of structural cementitious grout formed behind an inner plastics layer permanently anchored to the grout

3.15
lining with pipe segments
lining with prefabricated segments bonded to the existing pipe, which either:

a) have longitudinal joints and cover the whole of the pipe circumference, or

b) cover only part of circumference

3.16
lining with sprayed or cast-in-place material
lining by applying cementitious or polymeric material, with or without reinforcement, directly onto the inside surface of the host pipe and/or manhole, by manual or mechanical (including robotic) means

3.17
non-stabilising repair
repair where the materials applied have a sealing effect but do not enhance structural stability

3.18
stabilising repair
repair where the materials applied have a sealing effect and can enhance structural stability

3.19
repair by grout injection
filling of voids in existing pipe and/or surrounding ground by injection of grout over all or part of the perimeter of the sewer

NOTE Two different methods can be distinguished:

a) injection directly into a brickwork or masonry pipe structure;

b) injection of the soil around the pipe.

3.20
repair by injection sealing
repair of leakage at a crack, joint or lateral connection by resin or grout injection, with or without the aid of a packer

3.21
repair with cured-in-place patch
repair by local lining with a flexible tube impregnated with a thermosetting resin which produces a short length of pipe after resin cure

3.22
repair with lateral connection collar
repair of a connection between lateral and main pipe by installing a cured in place collar

3.23
repair with trowelled material
repair of local structural defects effecting part of the drain or sewer cross-section by trowelling material directly onto the wall or into the defect of the existing pipeline by manual or mechanical means

3.24
repair with internal mechanical devices
repair with internal mechanical seals or re-rounding clips

3.25
repair with internal mechanical seal
sealing of local pipe damage and/or joints by use of an internal elastomeric seal held in place by compression rings

3.26
repair with mechanical re-rounding clip
restoration of pipe roundness by insertion of an overlapping or hinged metal ring, which is expanded hydraulically and locks into place to permanently reverse local cross section deformation of circular pipe

3.27
flow diversion
temporary abatement of all flows into the section of pipeline to be renovated or repaired by bypassing or other means

3.28
maintenance
routine work undertaken to ensure the continuing performance of drain and sewer systems

[EN 752:2008, 3.40]

4 Symbols and abbreviations

SEL	structural integrity based on external loads capacity
G	gravity pipeline applications
P	pressurized pipeline applications
SIL	structural integrity based on internal loads capacity
EW	excavation works
NM	non man entry
ME	man entry
CS	circular shape
NC	non circular and circular shapes possible
CCTV	closed circuit television
UP	unsaturated polyester
EP	epoxy
VE	vinylester
PE	polyethylene
PVC-U	unplasticized poly(vinyl chloride)
PP	polypropylene
EPDM	ethylene-propylene-diene monomer
GRP	glass reinforced plastics
GRC	glass reinforced cement

PUR polyurethane

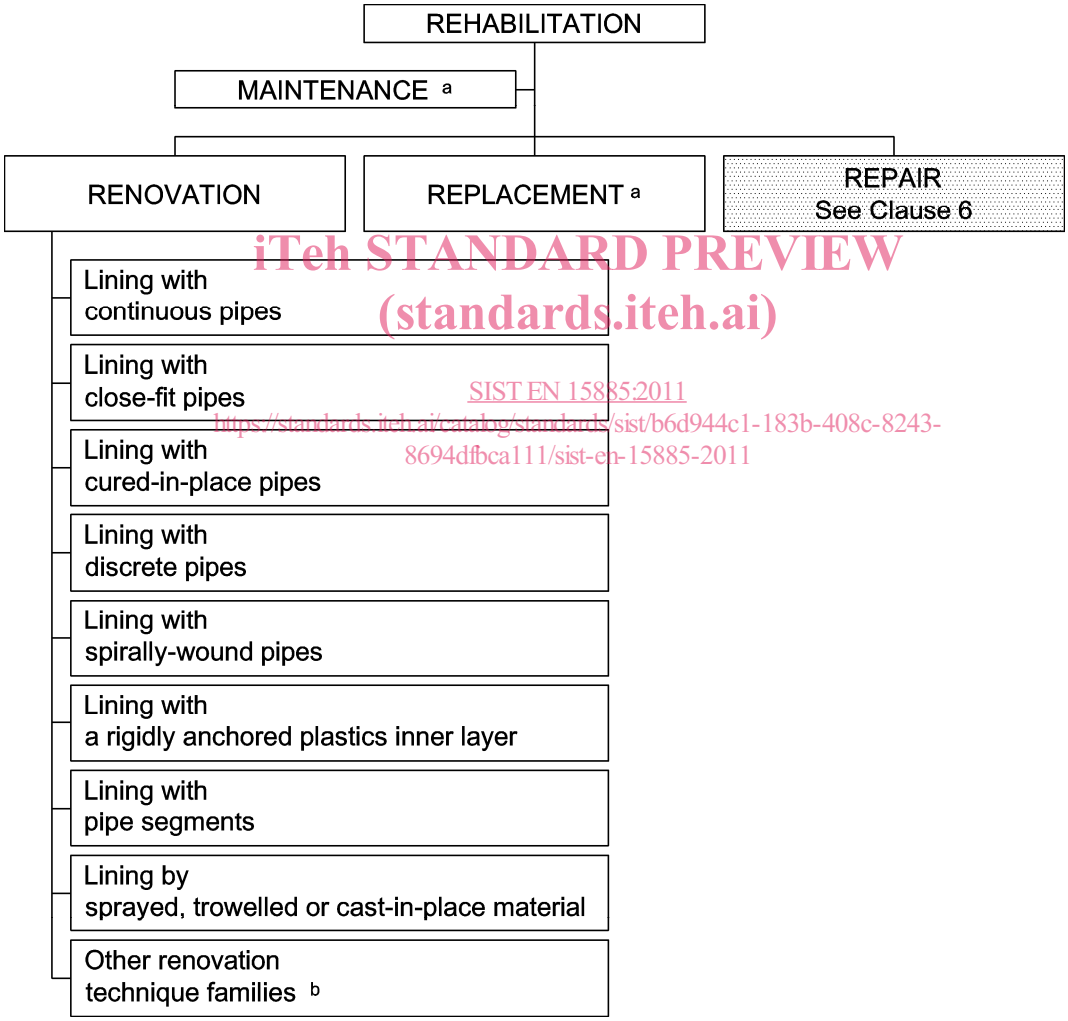
PCC polymer concrete

5 Classification of renovation techniques for drains and sewers

5.1 General

Renovation technique families within the scope of this European Standard are shown in Figure 1. This clause establishes a classification of renovation techniques into families, where renovation is applied to continuous lengths of drain or sewer usually between two or more access points.

Individual techniques shall be classified into families according to 5.2 to 5.9 where the different renovation technique families are defined and their respective features, including materials, applications, as well as geometric, performance and installation characteristics, are described.



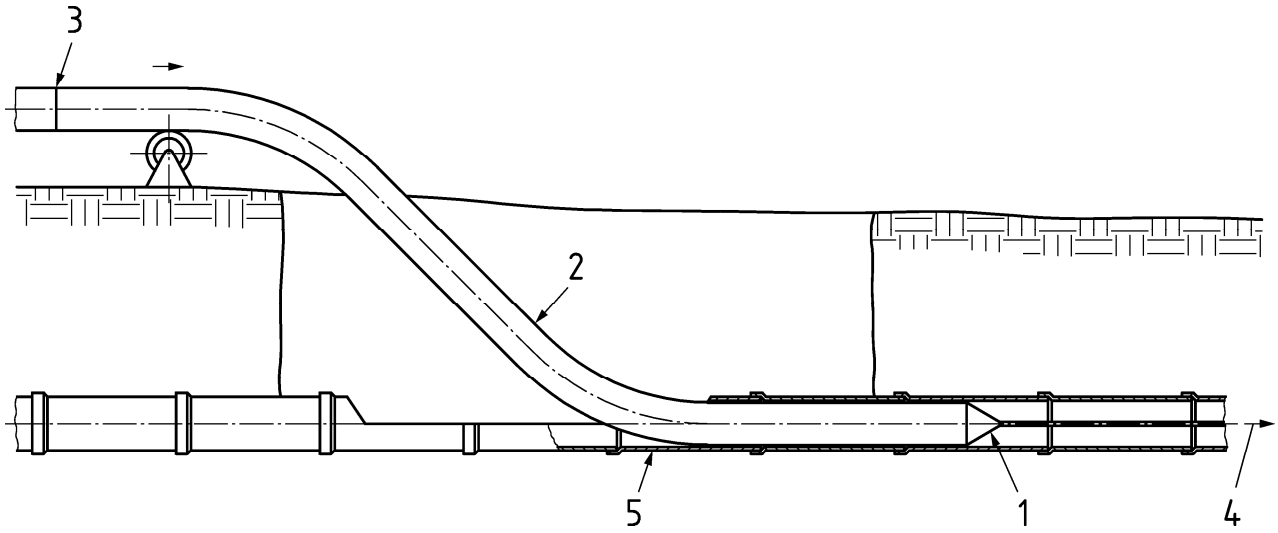
a Outside the scope of this European Standard.

b Other renovation techniques, which do not fit into the above families, are outside the scope of this European Standard which covers only technique families commonly available at the time of drafting.

Figure 1 — Renovation technique families

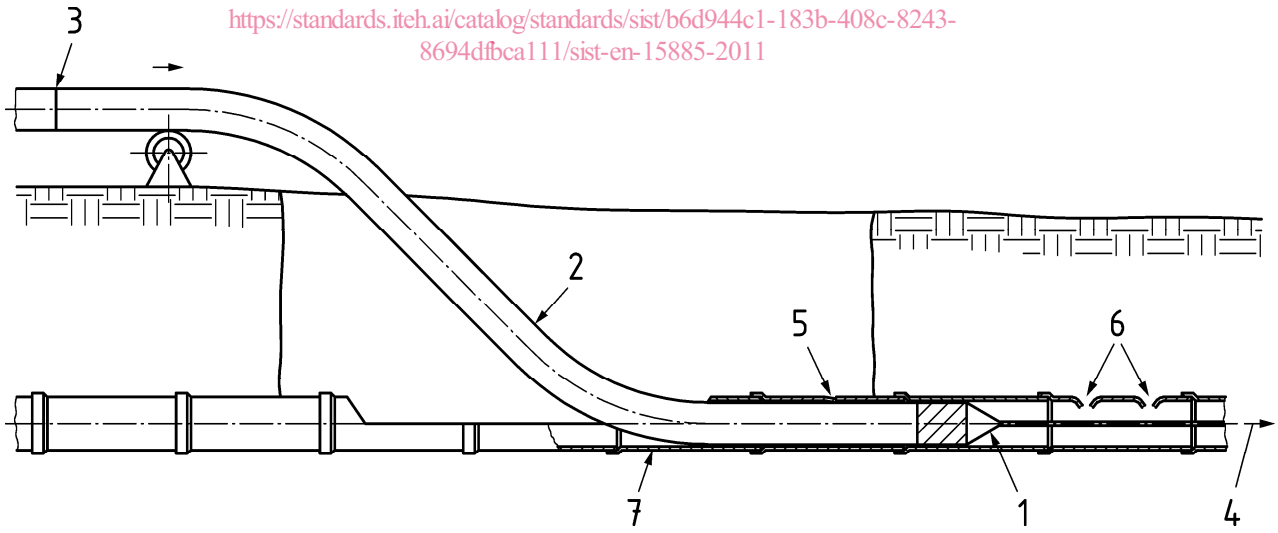
5.2 Lining with continuous pipes

Lining with pipe made continuous, typically by butt-fusion, prior to insertion, where the cross section of the pipe used for lining remains unchanged. Two possible methods of lining with continuous pipes are shown in Figure 2 and Table 1. Method B of this technique re-rounds the existing pipeline just ahead of insertion of the lining pipe in order to maximise cross section and reduce average annular gap.



Key
1 pulling head 2 lining pipe 3 prior jointing of lining pipe 4 pulling force 5 existing pipe

a) Schematic representation of lining with continuous pipes without re-rounding of existing pipeline (Method A)



Key
1 pulling and re-rounding head (only for Method B) 2 lining pipe 3 prior jointing of lining pipe 4 pulling force 5 re-rounded defect 6 defects 7 existing pipe

b) Schematic representation of lining with continuous pipes with re-rounding of existing pipeline (Method B)

Figure 2 — Lining with continuous pipes

Table 1 — Features of lining with continuous pipes

Feature	Description
Relevant standards:	EN 13566-1 and EN 13566-2
Materials:	plastics (PE, PP)
Applications:	– non pressure pipes; – pressure pipes
Geometric characteristics:	– non circular cross section possible for Method A; – typical minimum size: 100 mm for Method A, 150 mm for Method B; – typical maximum size: 1 200 mm for Method A, 600 mm for Method B; – typical maximum length: 300 m for Method A, 100 m for Method B; – some Method A techniques capable of accommodating bends
Performance:	– significant reduction in hydraulic (volumetric and flow) capacity for Method A; minimal reduction of volumetric capacity with increase in flow due to reduced friction possible for Method B; – uniform gradient cannot be restored; – structural rehabilitation is possible; – abrasion resistance depends on material; – chemical resistance depends on material
Installation characteristics:	a) pipes manufactured or prior assembled into the continuous length required; for Method B pipes of non standard outside diameter required (max. 10 mm less than host pipe inside diameter); b) insertion possible by pushing and/or pulling for Method A; for Method B only by pulling with use of re-rounding head; c) surface working space: storage of the whole insertion length required on surface: 1) small diameters (typically ≤ 180 mm) can be supplied on coils, small space; 2) larger diameters: supplied in straight lengths requiring greater storage and working space; d) access to the existing pipeline: generally requires local excavation; e) technique does not rely on adhesion to host pipe; f) flow diversion is typically required for installation; g) the annular space is typically grouted for Method A but not applicable to Method B; h) reconnection of laterals: generally requires excavation for Method A except in man entry sizes; for Method B reconnection from inside possible

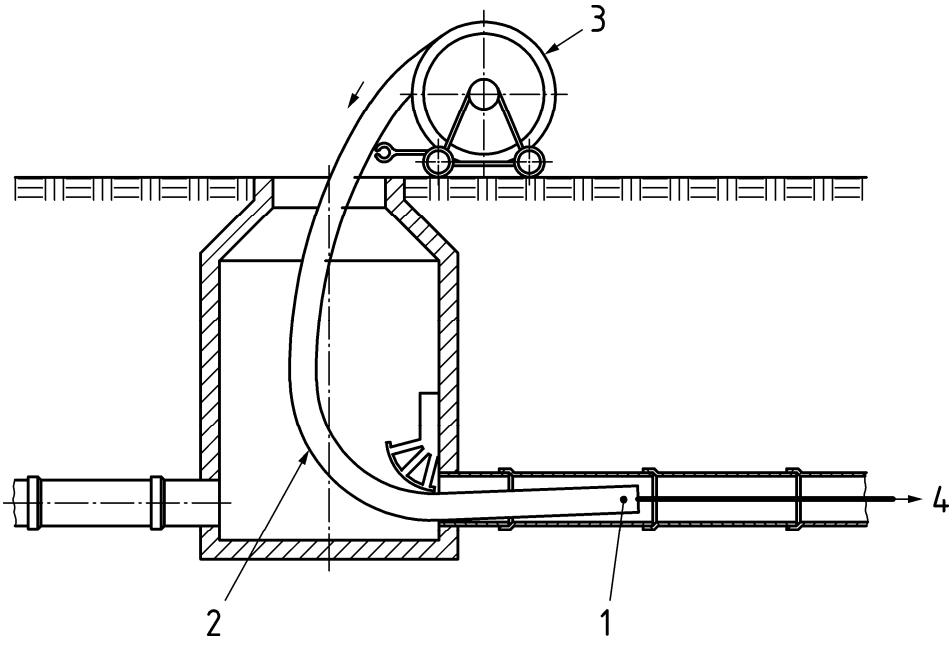
5.3 Lining with close-fit pipes

Lining with a continuous pipe for which the cross section is reduced to facilitate installation and reverted after installation to provide a close fit to the existing pipe.

Two possible methods of lining with close fit pipes are shown in Figure 3 and Table 2:

– Method A: reduction in the pipe manufacturing plant; the pipe is usually supplied coiled on a reel from which it is directly inserted;

– Method B: reduction on site (typically applied to pressure pipelines only); the pipe is fed through diameter reduction or folding equipment and simultaneously inserted.

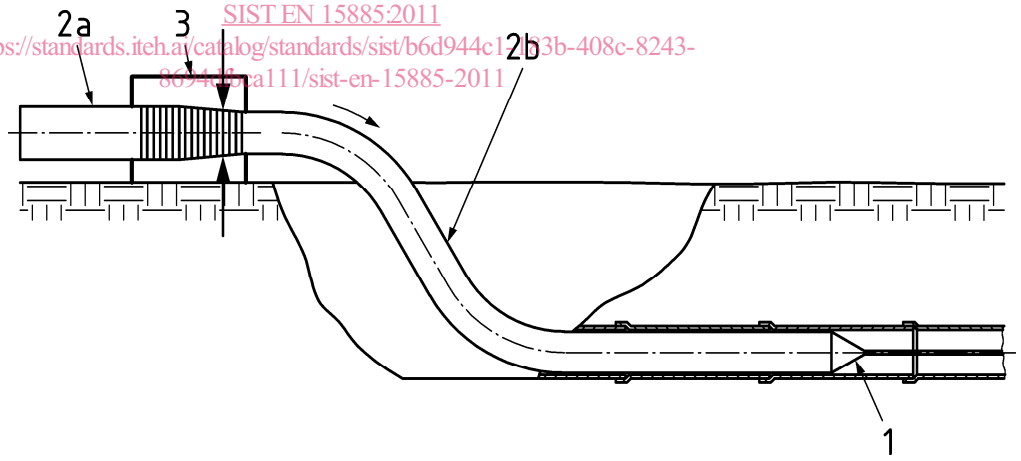


Key

1 pulling head
2 lining pipe (folded)
3 drum trailer
4 pulling line

NOTE Pipe reverted (unfolded) after insertion by application of heat and/or pressure.

a) Schematic representation of installation of a pipe reduced in cross section in the pipe manufacturing plant (Method A)



Key

1 pulling head
2a initial lining pipe
2b reduced lining pipe
3 cross section reducing device

NOTE Pipe reverted (expanded) after insertion by release of pulling force and application of pressure.

b) Schematic representation of installation of a pipe reduced in cross section on site (Method B)

Figure 3 — Lining with close-fit pipes