
Cevni sistemi iz polimernih materialov za obnovo podzemnih omrežij za odvodnjavanje in kanalizacijo za obratovanje brez tlaka (vodi s prosto gladino) - 9. del: Oblaganje s trdno zasidrano notranjo plastjo iz plastike (ISO/DIS 11296-9:2021)

Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks - Part 9: Lining with a rigidly anchored plastics inner layer (ISO/DIS 11296-9:2021)

Kunststoff-Rohrleitungssysteme für die Renovierung von erdverlegten drucklosen Entwässerungsnetzen (Freispiegelleitungen) - Teil 9: Lining mit einer fest verankerten Kunststoffsaukleidung (ISO/DIS 11296-9:2021)

<https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-604481b61d22/osist-pr-en-iso-11296-9-2021>

Systèmes de canalisations en plastique pour la rénovation des réseaux de branchements et de collecteurs d'assainissement enterrés sans pression - Partie 9: Chemisage par revêtement de plastique interne rigidement ancré (ISO/DIS 11296-9:2021)

Ta slovenski standard je istoveten z: prEN ISO 11296-9

ICS:

23.040.05	Cevovodi za zunanje sisteme za odpadno vodo in njihovi deli	Pipeline and its parts for external sewage systems
91.140.80	Drenažni sistemi	Drainage systems
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

oSIST prEN ISO 11296-9:2021

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 11296-9:2021](https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-6043b8fbc1d2/osist-pren-iso-11296-9-2021)

<https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-6043b8fbc1d2/osist-pren-iso-11296-9-2021>

DRAFT INTERNATIONAL STANDARD

ISO/DIS 11296-9

ISO/TC 138/SC 8

Secretariat: JISC

Voting begins on:
2021-05-21Voting terminates on:
2021-08-13

Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks —

Part 9: Lining with a rigidly anchored plastics inner layer

Systèmes de canalisations en plastique pour la rénovation des réseaux de branchements et de collecteurs d'assainissement enterrés sans pression —

Partie 9: Chemisage par revêtement de plastique interne rigidement ancré

ICS: 93.030; 23.040.45; 91.140.80; 23.040.20

iteh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 11296-9:2021](https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-6043b8fbc1d2/osist-pren-iso-11296-9-2021)

<https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-6043b8fbc1d2/osist-pren-iso-11296-9-2021>

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

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.

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING



Reference number
ISO/DIS 11296-9:2021(E)

© ISO 2021

iTeh STANDARD PREVIEW (standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-6043b8fbc1d2/osist-pren-iso-11296-9-2021>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols and abbreviations	4
4.1 Symbols.....	4
4.2 Abbreviations.....	5
5 Pipes at the “M” stage	5
5.1 Materials.....	5
5.1.1 Product variants.....	5
5.1.2 Components of RAPL.....	5
5.2 General characteristics.....	7
5.3 Material characteristics.....	7
5.3.1 Material characteristics of studded PE sheet and PE profiled plastics strip.....	7
5.3.2 Material characteristics of PVC-U profiled plastics strips.....	8
5.3.3 Material characteristics of seam sealant.....	8
5.3.4 Material characteristics of the grout system.....	8
5.4 Geometric characteristics.....	9
5.4.1 General.....	9
5.4.2 Studded PE sheet.....	9
5.4.3 Profiled plastics strips.....	10
5.5 Mechanical characteristics.....	11
5.6 Physical characteristics.....	11
5.7 Jointing.....	12
5.7.1 General.....	12
5.7.2 Welding of studded PE sheet to form it into tube.....	12
5.7.3 Mechanical jointing of spirally wound PVC-U plastics profiled strips.....	13
5.7.4 Mechanical jointing of PE plastics profile strips.....	14
5.8 Marking.....	14
5.8.1 Marking of plastics inner layers.....	14
5.8.2 Marking of packaged or bulk containerised grout.....	14
5.9 Regional requirements for pipes.....	14
6 Fittings at the “M” stage	15
6.1 General.....	15
6.2 Materials.....	15
6.3 Geometric characteristics.....	15
7 Ancillary components	16
8 Fitness for purpose of the installed lining system at the “I” stage	16
8.1 Materials.....	16
8.2 General characteristics.....	16
8.3 Material characteristics.....	16
8.4 Geometric characteristics.....	17
8.5 Mechanical characteristics.....	17
8.6 Physical characteristics.....	17
8.7 Additional characteristics.....	17
8.8 Sampling.....	17
9 Installation practice	18
9.1 Preparatory work.....	18
9.2 Storage, handling and transport of pipe components.....	18
9.3 Equipment.....	18

ISO/DIS 11296-9:2021(E)

9.4	Installation.....	18
9.5	Process-related inspection and testing.....	19
9.6	Lining termination.....	19
9.7	Reconnection to existing laterals.....	19
9.8	Final inspection and testing.....	19
9.9	Documentation.....	19
Annex A (normative) Test method for anchoring strength of plastics inner layer by pull-off.....		20
Annex B (normative) “I” stage crushing strength test.....		26
Bibliography.....		29

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN ISO 11296-9:2021](https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-6043b8fbc1d2/osist-pren-iso-11296-9-2021)
<https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-6043b8fbc1d2/osist-pren-iso-11296-9-2021>

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 8, *Rehabilitation of pipeline systems*.

A list of all parts in the ISO 11296 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

ISO/DIS 11296-9:2021(E)

Introduction

This document is a part of a System Standard for plastics piping systems of various materials used for the renovation of existing pipelines in a specified application area. System Standards for renovation deal with the following applications:

- ISO 11296, *Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks (this application)*;
- ISO 11297, *Plastics piping systems for renovation of underground drainage and sewerage networks under pressure*;
- ISO 11298, *Plastics piping systems for renovation of underground water supply networks*;
- ISO 11299, *Plastics piping systems for renovation of underground gas supply networks*.

These System Standards are distinguished from those for conventionally installed plastics piping systems by the requirement to verify certain characteristics in the “as-installed condition”, after site processing. This is in addition to specifying requirements for plastics piping system components “as manufactured”.

Each of the System Standards comprises a:

- *Part 1: General*

and all applicable renovation technique family-related parts, which for non-pressure drainage and sewerage networks include or potentially include the following:

- *Part 2: Lining with continuous pipes*;
- *Part 3: Lining with close-fit pipes*; <https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-019258fbc1d2/osist-pr-en-iso-11296-9-2021>
- *Part 4: Lining with cured-in-place pipes*;
- *Part 5: Lining with discrete pipes*;
- *Part 7: Lining with spirally-wound pipes*;
- *Part 8: Lining with pipe segments*;
- *Part 9: Lining with rigidly anchored plastics inner layer (this document)*;
- *Part 10: Lining with sprayed polymeric materials*.

The requirements for any given renovation technique family are specified in part 1, applied in conjunction with the relevant other part. For example, both ISO 11296-1 and this document together specify the requirements relating to lining with a rigidly anchored plastics inner layer. For complementary information, see ISO 11296-1. Not all technique families are pertinent to every area of application and this is reflected in the part numbers included in each System Standard.

A consistent structure of clause headings has been adopted for all parts of ISO 11296, in order to facilitate direct comparisons across renovation technique families.

[Figure 1](#) shows the common part and clause structure and the relationship between ISO 11296-1 and the System Standards for other application areas.

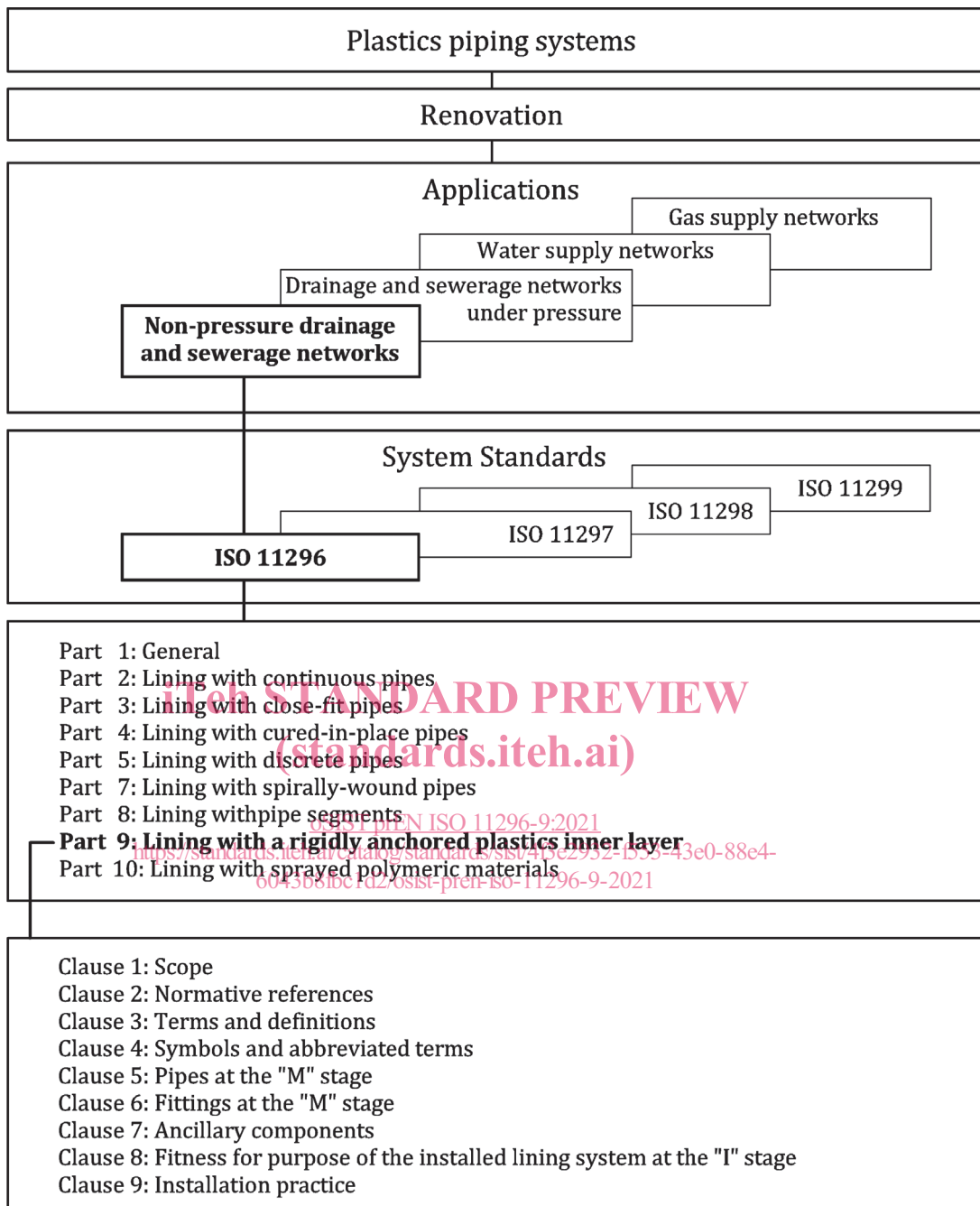


Figure 1 — Format of the renovation system standards

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 11296-9:2021](https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-6043b8fbc1d2/osist-pren-iso-11296-9-2021)

<https://standards.iteh.ai/catalog/standards/sist/4f3e2932-f553-43e0-88e4-6043b8fbc1d2/osist-pren-iso-11296-9-2021>

Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks —

Part 9: Lining with a rigidly anchored plastics inner layer

1 Scope

This document, in conjunction with ISO 11296-1, specifies requirements and test methods for pipes and fittings for the renovation of underground non-pressure drainage and sewerage networks by lining with a single rigid annulus of structural cementitious grout formed behind a plastics inner layer. This plastics layer serves as permanent formwork anchored to the grout.

This document is applicable to plastics inner layers and grout systems with or without steel reinforcement. It does not apply to the structural design of the lining system.

NOTE Systems with multiple annuli are available, but these are controlled by patent rights and not covered by this document.

iTeh STANDARD PREVIEW

2 Normative references

(standards.iteh.ai)

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.

ISO 306, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST)*

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48-4, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 4: Indentation hardness by durometer method (Shore hardness)*

ISO 75-2:2013, *Plastics — Determination of temperature of deflection under load — Part 2: Plastics and ebonite*

ISO 527-2:2012, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

ISO 1133-1:2011, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 1: Standard method*

ISO 1133-2:2011, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 2: Method for materials sensitive to time-temperature history and/or moisture*

ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method*

ISO 4624:2003, *Paints and varnishes — Pull-off test for adhesion*

ISO 4948-2, *Steels — Classification — Part 2: Classification of unalloyed and alloy steels according to main quality classes and main property or application characteristics*

ISO 6316, *Hot-rolled steel strip of structural quality*

ISO/DIS 11296-9:2021(E)

ISO 6935 (series), *Steel for the reinforcement of concrete*

ISO 11296-1:2018, *Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks — Part 1: General*

ISO 11296-7:2019, *Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks — Part 7: Lining with spirally-wound pipes*

ISO 11357-6, *Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT)*

ISO 13262, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics spirally-formed structured-wall pipes — Determination of the tensile strength of a seam*

EN 196-1, *Methods of testing cement — Part 1: Determination of strength*

EN 445:2007, *Grout for prestressing tendons — Test methods*

EN 1015-3, *Methods of test for mortar for masonry — Part 3: Determination of consistence of fresh mortar (by flow table)*

EN 1015-6, *Methods of test for mortar for masonry — Part 6: Determination of bulk density of fresh mortar*

EN 1107-2, *Flexible sheets for waterproofing — Determination of dimensional stability — Part 2: Plastic and rubber sheets for roof waterproofing*

EN 1542:1999, *Products and systems for the protection and repair of concrete structures — Test methods — Measurement of bond strength by pull-off*

EN 1610:1997, *Construction and testing of drains and sewers*

EN 1916:2002, *Concrete pipes and fittings, unreinforced, steel fibre and reinforced*

EN 10025-1, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*

EN 10025-2, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10048, *Hot rolled narrow steel strip — Tolerances on dimensions and shape*

EN 12814-2, *Testing of welded joints of thermoplastics semi-finished products — Part 2: Tensile test*

EN 12814-8, *Testing of welded joints of thermoplastics semi-finished products — Part 8: Requirements*

EN 13067, *Plastics welding personnel - Qualification testing of welders — Thermoplastics welded assemblies*

EN 13100-4, *Non-destructive testing of welded joints of thermoplastics semi-finished products — Part 4: High voltage testing*

EN 13412, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of modulus of elasticity in compression*

EN 14117, *Products systems for the protection and repair of concrete structures — Test methods — Determination of time of efflux of cementitious injection products*

EN 14654-1:2014, *Management and control of operational activities in drain and sewer systems outside buildings — Part 1: Cleaning*

CEN/TR 14920, *Jetting resistance of drain and sewer pipes — Moving jet test method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11296-1 and the following apply.