

**Plastics piping systems for renovation of underground  
nonpressure drainage and sewerage networks - Part 7:  
Lining with spirally-wound pipes (ISO 11296-7:2011)**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 11296-7:2013 sisaldab Euroopa standardi EN ISO 11296-7:2013 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 11296-7:2013 consists of the English text of the European standard EN ISO 11296-7:2013.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 20.02.2013.	Date of Availability of the European standard is 20.02.2013.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 23.040.20, 23.040.45, 23.040.99, 93.030

### Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:  
Aru 10, 10317 Tallinn, Eesti; [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

### The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:  
Aru 10, 10317 Tallinn, Estonia; [www.evs.ee](http://www.evs.ee); phone 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks - Part 7: Lining with spirally-wound pipes (ISO 11296-7:2011)

Systèmes de canalisations en plastique pour la rénovation des réseaux de branchements et de collecteurs d'assainissement enterrés sans pression - Partie 7: Tubage par enroulement hélicoïdal avec espace annulaire (ISO 11296-7:2011)

Kunststoff-Rohrleitungssysteme für die Renovierung von erdverlegten drucklosen Entwässerungsnetzen (Freispiegelleitungen) - Teil 7: Wickelrohr-Lining (ISO 11296-7:2011)

This European Standard was approved by CEN on 5 February 2013.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

## Foreword

The text of ISO 11296-7:2011 has been prepared by Technical Committee ISO/TC 138 “Plastics pipes, fittings and valves for the transport of fluids” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 11296-7:2013 by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems” the secretariat of which is held by NEN.

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 August 2013, and conflicting national standards shall be withdrawn at the latest by August 2013.

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.

This document supersedes EN 13566-7:2007.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Endorsement notice

The text of ISO 11296-7:2011 has been approved by CEN as EN ISO 11296-7:2013 without any modification.

# Contents

Page

Foreword .....	iv
Introduction .....	v
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	2
4 Symbols and abbreviated terms .....	3
4.1 Symbols .....	3
4.2 Abbreviated terms .....	3
5 Pipes at the “M” stage .....	3
5.1 Materials .....	3
5.2 General characteristics .....	4
5.3 Material characteristics .....	4
5.4 Geometric characteristics .....	5
5.5 Mechanical characteristics .....	6
5.6 Physical characteristics .....	6
5.7 Jointing .....	6
5.8 Marking .....	6
6 Fittings at the “M” stage .....	7
7 Ancillary components .....	7
8 Fitness for purpose of the installed lining system at the “I” stage .....	7
8.1 Materials .....	7
8.2 General characteristics .....	7
8.3 Material characteristics .....	7
8.4 Geometric characteristics .....	7
8.5 Mechanical characteristics .....	7
8.6 Physical characteristics .....	8
8.7 Additional characteristics .....	8
8.8 Preparation of samples .....	8
8.9 Adhesives .....	8
9 Installation practice .....	8
9.1 Preparatory work .....	8
9.2 Storage, handling and transportation of profiled plastics strips and fittings .....	8
9.3 Equipment .....	8
9.4 Installation .....	9
9.5 Process-related inspection and testing .....	10
9.6 Lining termination .....	10
9.7 Reconnecting to existing manholes and laterals .....	10
9.8 Final inspection and testing .....	10
9.9 Documentation .....	10
Annex A (normative) Spirally-wound pipe — Test method for watertightness in a deflected condition ..	11
Annex B (informative) Examples of methods for reconnecting and sealing laterals to SWO pipe .....	14
Bibliography .....	16

## Introduction

The System Standard, of which this is Part 7, specifies the requirements for plastics piping systems of various materials used for renovation of existing pipelines in a specified application area. System Standards for renovation specify procedures for the following applications:

- plastics piping systems for renovation of underground non-pressure drainage and sewerage networks (this application);
- plastics piping systems for renovation of underground drainage and sewerage networks under pressure;
- plastics piping systems for renovation of underground water supply networks;
- plastics piping systems for renovation of underground gas supply networks.

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

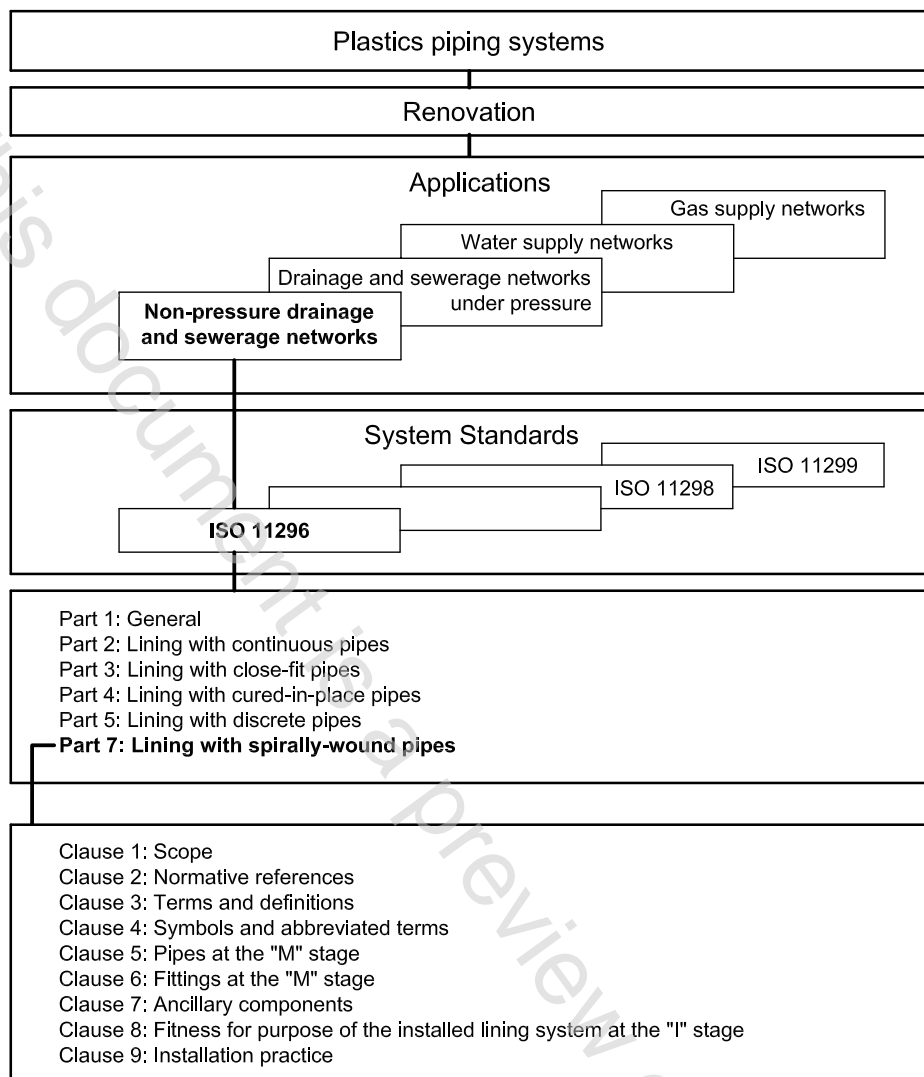
Each of the System Standards comprises a Part 1 (general) and all applicable renovation technique family-related parts from the following:

- Part 2: Lining with continuous pipes;
- Part 3: Lining with close-fit pipes;
- Part 4: Lining with cured-in-place pipes;
- Part 5: Lining with discrete pipes;
- Part 7: Lining with spirally-wound pipes.

The requirements for any given renovation technique family are given in Part 1, applied in conjunction with the relevant other part. For example, Parts 1 and 2 specify the requirements relating to lining with continuous pipes. For complementary information, see ISO 11295. Not all technique families are applicable 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 to facilitate direct comparisons across renovation technique families.

Figure 1 shows the common structure and the relationship between ISO 11296 and the System Standards for other application areas.



**Figure 1 — Format of the renovation System Standards**

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

## Part 7: Lining with spirally-wound pipes

### 1 Scope

This part of ISO 11296, in conjunction with Part 1, specifies requirements and test methods for pipes which are formed on site by spirally winding and jointing a pre-manufactured profiled plastics strip, or a profiled plastics strip and integral locking joiner strip, and used for the renovation of underground non-pressure drainage and sewerage networks.

It applies to spirally-wound pipes of fixed or variable diameter installed by one of two methods.

The first method employs a dedicated winding machine in front of the open end of an existing pipeline, e.g. in a manhole. The pipes thus formed are simultaneously inserted into the existing pipeline by the winding forces, and by certain techniques can also be expanded in diameter after or during insertion.

The second method employs a dedicated winding machine which forms the pipe as it traverses the existing pipeline from one manhole to the next.

It covers spirally-wound pipes of fixed or variable diameter made of profiled plastics strips, with or without steel stiffening elements, of unplasticized poly(vinyl chloride) (PVC-U) with integral locking mechanism or high density polyethylene (HDPE) with integrally welded joints.

### 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.

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

ISO 179-1, *Plastics — Determination of Charpy impact properties — Part 1: Non-instrumented impact test*

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

ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

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

ISO 4427 (all parts), *Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply*

ISO 4435, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U)*

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 6259-1, *Thermoplastics pipes — Determination of tensile properties — Part 1: General test method*



ISO 7619-1, *Rubber, vulcanized or thermoplastic — Determination of indentation hardness — Part 1: Durometer method (Shore hardness)*

ISO 9967, *Thermoplastics pipes — Determination of creep ratio*

ISO 9969, *Thermoplastics pipes — Determination of ring stiffness*

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

ISO 11296-4:2009, *Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks — Part 4: Lining with cured-in-place pipes*

EN 1979, *Plastics piping and ducting systems — Thermoplastics spirally-formed structured-wall pipes — Determination of the tensile strength of a seam*

EN 14364:2006, *Plastics piping systems for drainage and sewerage with or without pressure — Glass-reinforced thermosetting (GRP) plastics based on unsaturated polyester resin (UP) — Specifications for pipes, fittings and joints*

### 3 Terms and definitions

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

**3.1**  
**spirally-wound pipe**  
pipe formed by continuously winding and joining a profiled plastics strip, or a profiled plastics strip and integral locking joiner strip

**3.2**  
**seam**  
joint between adjacent profiled plastics strips formed by an integral locking mechanism and/or seam sealant

**3.3**  
**integral locking mechanism**  
mechanical interlock achieved by suitable design of the edges of the extruded profile

**3.4**  
**seam sealant**  
thermoplastic or adhesive material added to the integral locking mechanism or profiled plastics strip surface to make the seam leaktight

**3.5**  
**close fit**  
location of the outside of the installed liner relative to the inside of the existing pipeline, which may either be an interference fit or include a small annular gap resulting from shrinkage and tolerances only

NOTE Tolerances in the above definition refers to offsets and deformities in the existing pipeline. Spirally-wound liners are not subject to shrinkage.

**3.6**  
**close-fit spirally-wound pipe**  
continuous lining pipe wound from a profiled plastics strip, with or without steel reinforcement, expanded or wound in place to achieve a close fit to the existing pipeline