INTERNATIONAL STANDARD

ISO 11296-3

Second edition
2018-08

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

Part 3: Lining with close-fit pipes

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

Partie 3: Tubage par tuyau continu sans espace annulaire

Reference number
ISO 11296-3:2018(E)

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Published in Switzerland

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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 on 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 the following URL: 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*.

This second edition cancels and replaces the first edition (ISO 11296-3:2009) which has been technically revised. It also incorporates the Corrigendum ISO 11296-3:2009/Cor 1:2011.

The main changes compared to the previous edition are as follows:

— Clauses 3, 5, 6, 8 and 9 have been technically revised;

— the previous Annex B has been deleted.

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

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Introduction

This document is a part of a system standard for plastics piping systems of various materials used for renovation of existing pipelines in a specified application area. System standards for renovation dealing with the following applications are either available or in preparation:

— ISO 11296, *Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks* (this series);

— 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 system standards 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 verification of characteristics of plastics piping systems "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* (this document)

— *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*

— *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 close-fit pipes. For complementary information, see ISO 11295. 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 to facilitate direct comparisons across renovation technique families.

Figure 1 shows the common part and clause structure and the relationship between ISO 11296 and system standards for other applications.

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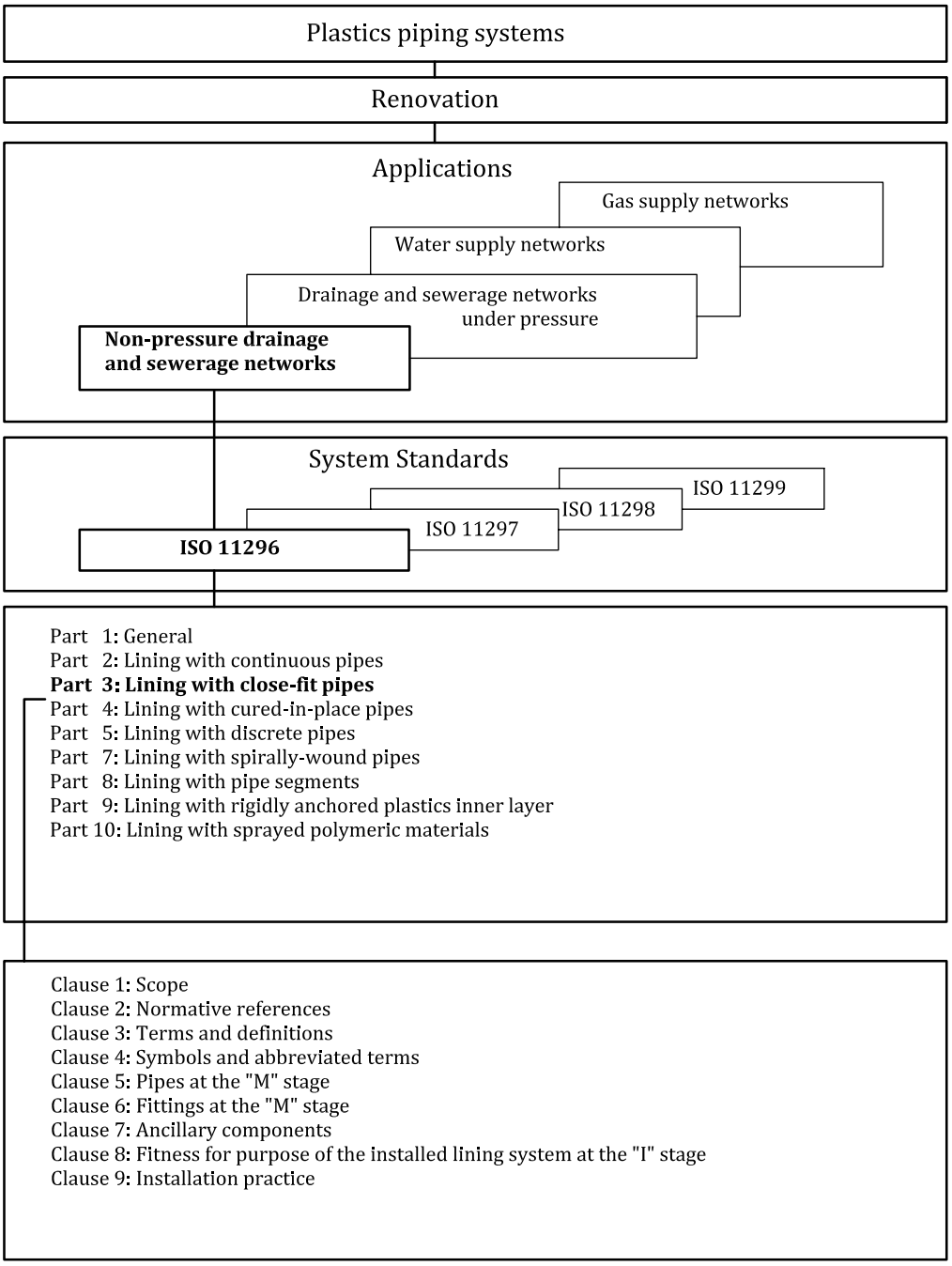


Figure 1 — Format of the renovation system standards

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

Part 3:
Lining with close-fit pipes

1 Scope

This document, in conjunction with ISO 11296-1, specifies requirements and test methods for close-fit lining systems used for the renovation of underground non-pressure drainage and sewerage networks.

It applies to pipes and fittings made of polyethylene (PE) or unplasticized poly(vinyl chloride) (PVC-U) as manufactured, as well to the installed lining system with its associated joints.

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.

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

ISO 2507-1, *Thermoplastics pipes and fittings — Vicat softening temperature — Part 1: General test method*

ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions*

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

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

ISO 8772, *Plastics piping systems for non-pressure underground drainage and sewerage — Polyethylene (PE)*

ISO 9852, *Unplasticized poly(vinyl chloride) (PVC-U) pipes — Dichloromethane resistance at specified temperature (DCMT) — Test method*

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

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

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

ISO 12176-1, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 1: Butt fusion*

ISO 12176-2, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 1: Electrofusion*

ISO 13953, *Polyethylene (PE) pipes and fittings — Determination of the tensile strength and failure mode of test pieces from a butt-fused joint*

ISO 18373-1:2007, *Rigid PVC pipes — Differential scanning calorimetry (DSC) method — Part 1: Measurement of the processing temperature*

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3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1 General

3.1.1
close fit
situation 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

3.1.2
close-fit pipe
continuous lining pipe of thermoplastic material reshaped or otherwise expanded after insertion to achieve a close fit to the existing pipeline

3.2 Techniques

No additional definitions apply.

3.3 Characteristics

3.3.1
MFR
melt mass-flow rate
rate of extrusion of a molten resin through a die of specified length and diameter under prescribed conditions of temperature, load and piston position in the cylinder of an extrusion plastometer, the rate being determined as the mass extruded over a specified time

Note 1 to entry: MFR is expressed in units of grams per 10 min.

[SOURCE: ISO 1133-1:2011, 3.1, modified - the second sentence in the NOTE has been deleted.]

3.4 Materials

3.4.1
crazing
microstructural phenomenon associated with the short-term application of tensile bending strain exceeding the material-related critical yield strain

3.5 Product stages

No additional definitions apply.

3.6 Service conditions

No additional definitions apply.

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3.7 Joints

3.7.1
butt fusion joint
joint made by heating the planed ends of matching surfaces by holding them against a flat heating plate until the PE material reaches fusion temperature, quickly removing the heating plate and pushing the two softened ends against one another

3.7.2
fusion compatibility
ability of two similar or dissimilar PE materials to be fused together to form a joint which conforms to the performance requirements of this document

4 Symbols and abbreviated terms

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

d_{manuf}	original circular outside diameter of the pipe (before processing for insertion)
$e_{m,\,max}$	maximum mean wall thickness
MFR	melt mass-flow rate
OIT	oxidation induction time

5 Pipes at the “M” stage

5.1 Materials

5.1.1 General

The material shall be either polyethylene (PE) or unplasticized poly(vinyl chloride) (PVC-U), to which are added those additives needed to facilitate the manufacture and/or installation of pipes conforming to this document.

5.1.2 Distinction between PVC-U types

PVC-U materials used for liner pipes may have PVC content less than the minimum of 80 %, and/or Vicat softening temperature less than 79 °C as specified by ISO 4435. For the purposes of this document distinction shall be made between PVC-U conforming to ISO 4435 (designated standard PVC-U) and PVC-U modified for lining applications.

NOTE This distinction is reflected in the requirements given in Table 4 and Table 9.

5.1.3 Virgin material

Virgin material, as defined in ISO 11296-1, may be used without limitations.

5.1.4 Reprocessable material and recyclable material

5.1.4.1 Reprocessable material

Own reprocessable material may be used, provided that it is derived from the same compound used for the relevant production. External reprocessable material shall not be used.

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