
**Plastics piping systems for renovation
of underground gas supply
networks —**

**Part 2:
Lining with continuous pipes**

*Systemes de canalisations en plastique pour la rénovation des réseaux
enterrés de distribution de gaz —
Partie 2: Tubage par tuyau continu avec espace annulaire*

ISO 11299-2:2018

<https://standards.iteh.ai/catalog/standards/sist/436504bb-826a-4265-9549-b08878ee507e/iso-11299-2-2018>



iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO 11299-2:2018

<https://standards.iteh.ai/catalog/standards/sist/436504bb-826a-4265-9549-b08878ee507e/iso-11299-2-2018>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

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
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols and abbreviated terms	2
4.1 Symbols	2
4.2 Abbreviated terms	3
5 Pipes at the “M” stage	3
5.1 Materials	3
5.2 General characteristics	3
5.3 Material characteristics	3
5.4 Geometrical characteristics	3
5.5 Mechanical characteristics	3
5.6 Physical characteristics	3
5.7 Jointing	3
5.8 Marking	3
5.9 Regional requirements for pipes	3
6 Fittings at the “M” stage	4
6.1 Requirement for fittings	4
6.2 Marking	4
6.3 Regional requirements for fittings	4
7 Ancillary components	4
8 Fitness for purpose of the installed lining system at the “I” stage	4
9 Installation practice	4
9.1 Preparatory work	4
9.2 Storage, handling and transport	4
9.3 Equipment	5
9.3.1 Butt fusion equipment and debanding equipment	5
9.3.2 Pipe rollers	5
9.3.3 Winching and rod-pulling equipment	5
9.3.4 Pipe entry guides	5
9.3.5 Electrofusion equipment	5
9.3.6 Inspection equipment	5
9.3.7 Lifting equipment	6
9.4 Installation	6
9.5 Process-related inspection and testing	6
9.6 Lining termination	6
9.7 Reconnections to the existing pipeline system	6
9.8 Final inspection and testing	7
9.9 Documentation	7
Annex A (normative) Layered pipes	8
Bibliography	9

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*.

A list of all parts in the ISO 11299 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.

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 under preparation:

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

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 gas supply networks, include or potentially include the following:

- *Part 2: Lining with continuous pipes* (this document);
- *Part 3: Lining with close-fit pipes*;
- *Part 4: Lining with cured-in-place pipes*;
- *Part 6: Lining with adhesive-backed hoses*;
- *Part 11: Lining with inserted hoses*.

The requirements for any given renovation technique family are specified in Part 1, applied in conjunction with the other relevant part. For example, this document and ISO 11299-1 together specify the requirements relating to lining with continuous 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 11299 and system standards for other applications.

[Annex A](#) of this document is normative.

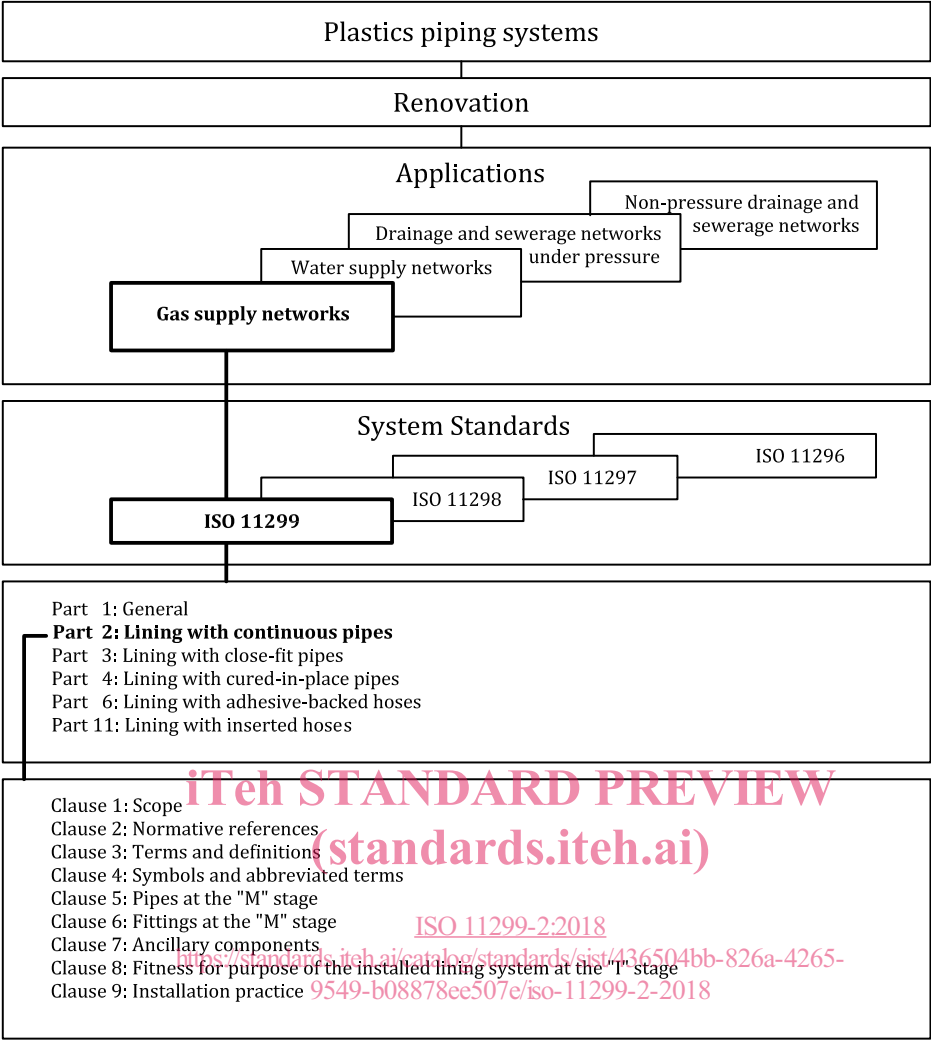


Figure 1 — Format of the renovation System Standards

Plastics piping systems for renovation of underground gas supply networks —

Part 2: Lining with continuous pipes

1 Scope

This document, read in conjunction with ISO 11299-1, specifies requirements and test methods for pipes and fittings which are part of plastics piping systems installed as continuous pipes in the renovation of underground gas supply networks. It is applicable to polyethylene (PE) pipes of three different types:

- PE solid wall single layered pipes (nominal outside diameter, d_n), including any identification stripes;
- PE pipes with co-extruded layers on either or both the outside and inside of the pipe (total outside diameter, d_n), as specified in [Annex A](#), where all layers have the same MRS rating;
- Coated PE pipes (outside diameter, d_n) having a peelable, contiguous, thermoplastics additional layer on the outside of the pipe ("coated pipe"), as described in [Annex A](#).

In addition it covers:

- jointing of pipe lengths by means of butt fusion;
- fabricated and injection-moulded fittings made of PE;

It is applicable to PE pipes, fittings and assemblies intended to be used at an operating temperature of 20 °C as the reference temperature.

NOTE For other operating temperatures, guidance is given in ISO 4437-5:2014.

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 4437-1, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 1: General*

ISO 4437-2, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*

ISO 4437-3, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 3: Fittings*

ISO 4437-5:2014, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 5: Fitness for purpose of the system*

ISO 11299-1:2018, *Plastics piping systems for renovation of underground gas supply 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 2: Electrofusion*

EN 1555-1, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 1: General*

EN 1555-2, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*

EN 1555-3, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 3: Fittings*

EN 1555-5, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 5: Fitness for purpose of the system*

3 Terms and definitions

For the purposes of this document the terms and definitions given in ISO 11299-1 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

compound formulation

clearly defined homogenous mixture of base polymer with additives, e.g. anti-oxidants, pigments, stabilisers and others, at a dosage level necessary for the processing and intended use of the final product

3.2

coated pipe

pipe with a peelable, contiguous thermoplastic additional layer on the outside of the pipe

3.3

solid wall single layered pipe

pipe with smooth internal and external surface, extruded from the same compound/formulation throughout the wall

3.4

pipe with co-extruded layers

pipe with smooth internal and external surface, having co-extruded layers on either or both the outside and inside of the pipe, where all layers have the same MRS rating

3.5

out-of-roundness

difference between the measured maximum and the measured minimum outside diameter in the same cross-sectional plane of the pipe

4 Symbols and abbreviated terms

4.1 Symbols

For the purposes of this document the following symbols apply:

- d_n nominal outside diameter
- e_{coating} nominal thickness of the coating

4.2 Abbreviated terms

For the purposes of this document the following abbreviated terms apply:

CCTV	closed-circuit television
MFR	melt mass-flow rate
MRS	minimum required strength
OIT	oxidation induction time
PE	polyethylene

5 Pipes at the “M” stage

5.1 Materials

Pipes shall be made of PE conforming to the requirements of ISO 4437-1.

5.2 General characteristics

General characteristics of pipes shall conform to the requirements of ISO 4437-2.

5.3 Material characteristics

Material characteristics shall conform to the requirements of ISO 4437-2.

5.4 Geometrical characteristics

Geometrical characteristics of pipes shall conform to the requirements of ISO 4437-2.

5.5 Mechanical characteristics

The mechanical characteristics of pipes shall conform to the requirements of ISO 4437-2.

5.6 Physical characteristics

The physical characteristics of pipes shall conform to the requirements of ISO 4437-2.

5.7 Jointing

When pipes are assembled to each other or to components the joints shall conform to ISO 4437-2, ISO 4437-3 and ISO 4437-5. All butt fusions shall be externally de-beaded and, if required by the client, internally de-beaded.

5.8 Marking

All pipes shall be marked either in accordance with ISO 11299-1 or in accordance with ISO 4437-2. Where the pipe is coated (see [A.3](#)), the coating shall be marked to clearly distinguish the pipe from a non-coated pipe in service (e.g. by broad colour bands).

5.9 Regional requirements for pipes

In countries of the Single European Market, the parts of ISO 4437 specified as normative references in [5.1](#) to [5.8](#) (e.g. ISO 4437-1, ISO 4437-2, ISO 4437-3, ISO 4437-5) are replaced by the corresponding parts of EN 1555 (e.g. EN 1555-1, EN 1555-2, EN 1555-3, EN 1555-5).