DRAFT INTERNATIONAL STANDARD ISO/DIS 11297-3

ISO/TC **138** Secretariat: **JISC**

Voting begins on **2012-05-17** Voting terminates on **2012-10-17**

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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

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 sous pression —

Partie 3: Tubage par tuyau continu sans espace annulaire

ICS 23.040.20; 23.040.45; 91.140.80; 93.030

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as r eceived from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 11297-3 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Working Group WG 12, *Rehabilitation of pipeline systems*.

ISO 11297 consists of the following parts, under the general title *Plastics piping systems for renovation of underground drainage and sewerage networks under pressure*:

— *Part 1: General*

— *Part 3: Lining with close-fit pipes*

Lining with continuous pipes is to form the subject of a part 2; lining with cured-in-place pipes is to form the subject of a part 4; and lining with adhesive-backed hoses is to form the subject of a part 6.

Introduction

System standards dealing with the following applications are either available or in preparation:

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

— Plastics piping systems for renovation of underground drainage and sewerage networks under pressure (this application);

— 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 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.

This System Standard ISO 11297 comprises a:

— Part 1: General

and the following technique family-related parts:

— Part 2: Lining with continuous pipes

— Part 3: Lining with close-fit pipes

— Part 4: Lining with cured-in-place pipes

— Part 6: Lining with adhesive-backed hoses

The requirements for any given renovation technique family are given in part 1 applied in conjunction with the relevant other part. For example, both ISO 11297-1 and this part of ISO 11297 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 of ISO 11297, in order to facilitate direct comparisons across renovation technique families.

Figure 1 shows the common part and clause structure and the relationship between ISO 11297 and the system standards for other application areas.

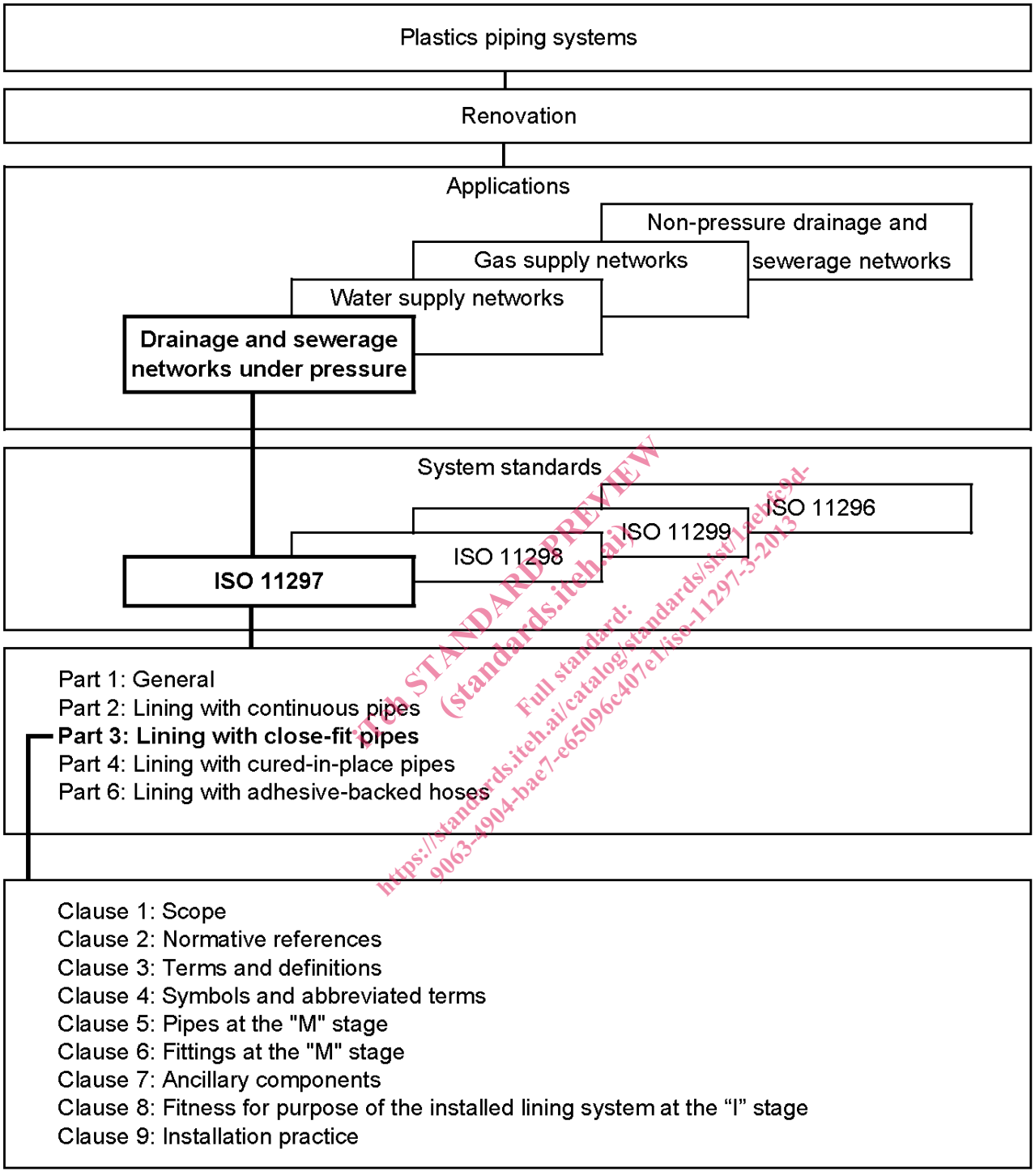

Figure 1 — Format of the renovation system standards

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

Part 3:
Lining with close-fit pipes

1 Scope

This part of ISO 11297, in conjunction with ISO 11297-1, specifies requirements and test methods for close-fit lining systems intended to be used for the renovation of underground drainage and sewerage networks under pressure. It is applicable to pipes and fittings, as manufactured, as well as to the installed lining system. It is applicable to polyethylene (PE) pipe for both independent and interactive pressure pipe liners as well as associated fittings and joints for the construction of the lining system.

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 3, *Preferred numbers — Series of preferred numbers*

ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method*

ISO 1167-2, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 2: Preparation of pipe test pieces*

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

ISO 4427-1:2007, *Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply — Part 1: General*

ISO 4427-2, *Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply — Part 2: Pipes*

ISO 4427-3, *Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply — Part 3: Fittings*

ISO 4427-5:2007, *Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply — Part 5: Fitness for purpose of the system*

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 9967, *Thermoplastics pipes — Determination of creep ratio*

ISO 11297-1:—[1)], *Plastics piping systems for renovation of underground drainage and sewerage networks under pressure — 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 12201-2:2011, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 2: Pipes*

EN 12201-4, *Plastics piping systems for water supply — Polyethylene (PE) — Part 4: Valves*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11297-1 and the following apply.

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
maximum mean outside diameter
$d_{em,max}$
maximum value of the outside diameter as specified for a given nominal size

3.3.2
minimum required strength
MRS
value of σ_{LPL} rounded down to the next smaller value of the R10 series or R20 series, depending on the value of σ_{LPL}

NOTE R10 and R20 series are the Renard number series according to ISO 3 and ISO 497.

3.3.3
melt mass-flow rate
MFR
value relating to the viscosity of the molten material at a specified temperature and rate of shear

1) To be published.

3.4 Materials

No additional definitions apply.

3.5 Product stages

No additional definitions apply.

3.6 Service conditions

3.6.1
nominal pressure
PN
numerical designation used for reference purposes related to the mechanical characteristics of the component of a piping system.

For thermoplastics piping systems conveying water or sewage, it corresponds to the allowable operating pressure (PFA) in bar[2)], which can be sustained with water at 20 °C with a design basis of 50 years, and based on the minimum design coefficient:

$$\text{PN} = \frac{20 \times (\text{MRS})}{C \times (\text{SDR} - 1)}$$

3.6.2
design coefficient
C
coefficient with a value greater than 1, which takes into consideration service conditions as well as properties of the components of a piping system other than those represented in the lower confidence limit

3.7 Joints

3.7.1
electrofusion joint
joint between a PE socket or saddle electrofusion fitting and a pipe or fitting with spigotted ends, made by heating the electrofusion fittings by the Joule effect of the heating element incorporated at their jointing surfaces, causing the material adjacent to them to melt and pipe and fitting surfaces to fuse

3.7.2
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

3.7.3
mechanical joint
joint made by assembling a PE pipe to another PE pipe or any other element of the piping system, using a fitting that generally includes a compression part to provide for pressure integrity and leaktightness and a gripping part to provide resistance to end loads

NOTE A support sleeve inserted into the pipe bore can be used to provide a permanent support for the PE pipe to prevent creep in the pipe wall under radial compressive forces.

3.7.4
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 part of ISO 11297.

---

2) 1 bar =0,1 MPa = 0,1 N/mm^2 = 10^5·N/m^2.

4 Symbols and abbreviated terms

4.1 Symbols

For the purpose of this document, the symbols given in ISO 11297-1 and the following apply.

C overall service (design) coefficient

d_e outside diameter (at any point)

$d_{em,max}$ maximum mean outside diameter

d_{manuf} original circular outside diameter of the pipe (before processing for insertion)

$e_{m,max}$ maximum mean wall thickness

T temperature at which stress rupture data have been determined

t time to occurrence of a leak in the pipe

σ_{LPL} quantity with the dimensions of stress, which represents the 97,5 % lower confidence limit of the predicted hydrostatic strength at a temperature, T, and time t

4.2 Abbreviated terms

LPL lower confidence limit of the predicted hydrostatic strength

MFR melt mass-flow rate

MRS minimum required strength

PE polyethylene

R series of preferred numbers, conforming to the Renard series

5 Pipes at the “M” stage

5.1 Materials

5.1.1 Virgin material

The virgin material used shall be in accordance with one of the PE compound designations given in Table 1.

Table 1 — PE compound designations

Designation	Classification by MRS MPa
PE 80	8
PE 100	10

The compound shall conform to ISO 4427-1.