TECHNICAL SPECIFICATION

ISO/TS 23818-1

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Assessment of conformity of plastics piping systems for the rehabilitation of existing pipelines —

Part 1: Polyethylene (PE) material

L'évaluation de la conformité des systèmes de canalisations en plastique destinés à la réhabilitation des réseaux existantes —

Partie 1: Matériau Polyéthylène (PE)

Reference number
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Contents

Page

Foreword

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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).

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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/TS 23818 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

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

— 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*;

— ISO 21225, *Plastics piping systems for the trenchless replacement of underground pipeline 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.

For the assessment of conformity, three Technical Specifications for pipes of distinct materials are applicable:

— ISO/TS 23818-1 (this document), *Assessment of conformity of plastics piping systems for the rehabilitation of existing pipelines — Part 1: Polyethylene (PE) material*;

— ISO/TS 23818-2[1)], *Assessment of conformity of plastics piping systems for the rehabilitation of existing pipelines — Part 2: Resin-fibre composite (RFC) material*;

— ISO/TS 23818-3[2)], *Assessment of conformity of plastics piping systems for the rehabilitation of existing pipelines — Part 3: Unplasticized poly(vinyl chloride) (PVC-U) material*.

These three Technical Specifications cover the system standards, as presented in Table 1.

1) Under preparation. Stage at the time of publication: ISO/WD TS 23818-2:2020.

2) Under preparation. Stage at the time of publication: ISO/WD TS 23818-3:2020

Table 1 — Structure of Technical Specifications for assessment of conformity

Technical Specification	Material	Technique	Application			
			Non-pressure drainage and sewerage networks	Drainage and sewerage networks under pressure	Water supply networks	Gas supply networks
ISO/TS 23818-1	PE	LINING WITH CONTINUOUS PIPES, CLOSE-FIT PIPES AND SPIRALLY WOUND PIPES	ISO 11296-2 ISO 11296-3 ISO 11296-7	ISO 11297-2 ISO 11297-3	ISO 11298-2 ISO 11298-3	ISO 11299-2 ISO 11299-3
		TRENCHLESS REPLACEMENT USING PIPE BURSTING, PIPE EXTRACTION, HORIZONTAL DRILLING AND IMPACT MOLING	ISO 21225-1 ISO 21225-2	ISO 21225-1 ISO 21225-2	ISO 21225-1 ISO 21225-2	ISO 21225-1 ISO 21225-2
ISO/TS 23818-2[a]	RFC	LINING WITH CURED-IN-PLACE PIPES (CIPP)	ISO 11296-4	ISO 11297-4	ISO 11298-4[a]	—
ISO/TS 23818-3[a]	PVC-U	LINING WITH CLOSE-FIT PIPES AND SPIRALLY WOUND PIPES	ISO 11296-3 ISO 11296-7	—	—	—

[a] Under preparation. Stage at the time of publication: ISO/DIS 11298-4.

The format of the three Technical Specifications is in line with technical specifications for assessment of conformity to other system standards, apart from presenting the detailed requirements for inspection and testing in two annexes, for non-pressure applications and pressure applications (where applicable) respectively.

The format is schematically represented in Figure 1.

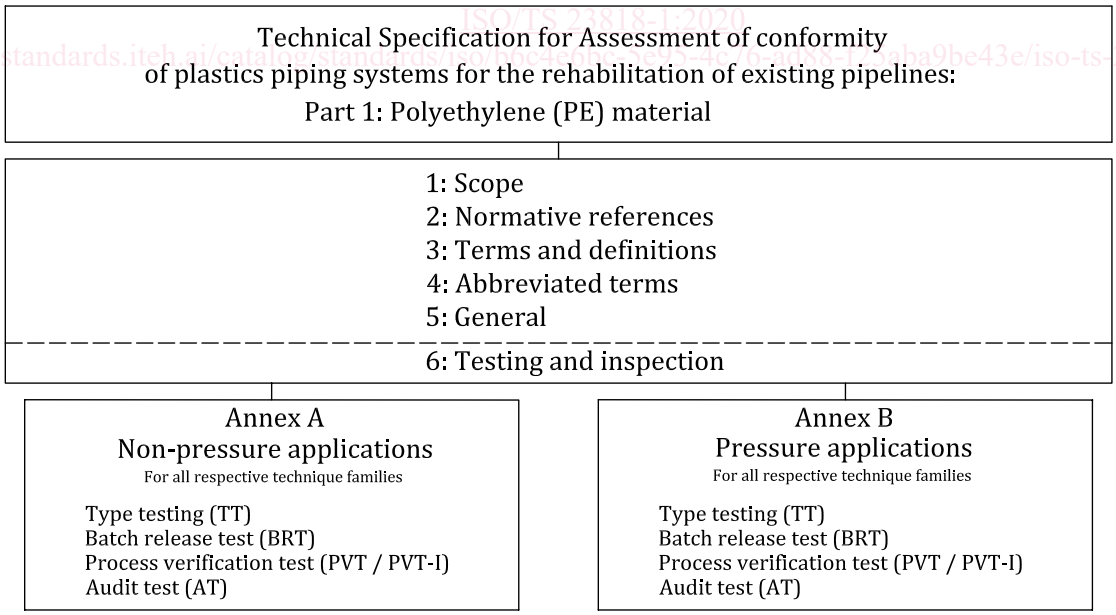

Figure 1 — Format of the Technical Specifications for conformity assessment

Figures 2 and 3 are intended to provide general information on the concept of testing and organisation of those tests used for the purpose of the assessment of conformity. For each type of test, i.e. type testing (TT), batch release test (BRT), process verification test (PVT), and audit test (AT), this document details the applicable characteristics to be assessed as well as the frequency and sampling of testing.

A typical scheme for the assessment of conformity of PE pipes, fittings, joints or assemblies by manufacturers is given in Figure 2.

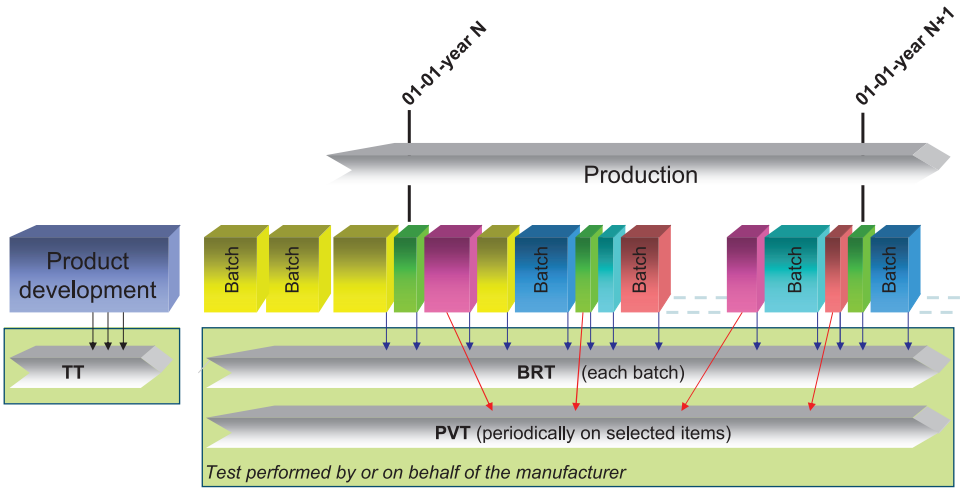

Figure 2 — Typical scheme for the assessment of conformity by a manufacturer

A typical scheme for the assessment of conformity of PE pipes, fittings, joints or assemblies by manufacturers, including certification, is given in Figure 3.

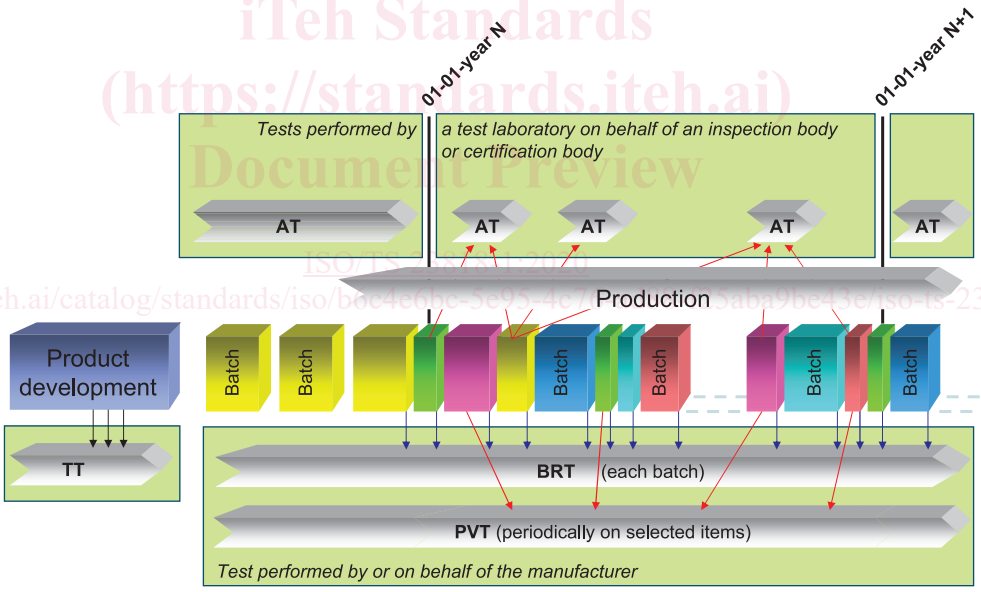

Figure 3 — Typical scheme for the assessment of conformity by a manufacturer, including certification

Assessment of conformity of plastics piping systems for the rehabilitation of existing pipelines —

Part 1:
Polyethylene (PE) material

1 Scope

This document provides a scheme for the assessment of conformity of PE products and assemblies for the rehabilitation of existing pipelines, in accordance with the applicable parts of ISO 11296, ISO 11297, ISO 11298, ISO 11299 and ISO 21225, and intended to be included in the manufacturer's quality plan as part of the quality management system and for the establishment of certification procedures.

NOTE In order to help the reader, summary tables of overall scheme requirements are provided in Annex E.

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 4427-1, *Plastics piping systems for water supply and for drainage and sewerage under pressure — Polyethylene (PE) — Part 1: General*

ISO 4427-2, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 2: Pipes*

ISO 4427-3, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 3: Fittings*

ISO 4437-1:2014, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 1: General*

ISO 4437-2:2014, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*

ISO 4437-3:2014, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 3: Fittings*

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

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

ISO 11296-2:2018, *Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks — Part 2: Lining with continuous pipes*

ISO 11296-3:2018, *Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks — Part 3: Lining with close-fit pipes*

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 11297-1:2018, *Plastics piping systems for renovation of underground drainage and sewerage networks under pressure — Part 1: General*

ISO 11297-2:2018, *Plastics piping systems for renovation of underground drainage and sewerage networks under pressure — Part 2: Lining with continuous pipes*

ISO 11297-3:2018, *Plastics piping systems for renovation of underground drainage and sewerage networks under pressure — Part 3: Lining with close-fit pipes*

ISO 11298-1:2018, *Plastics piping systems for renovation of underground water supply networks — Part 1: General*

ISO 11298-2:2018, *Plastics piping systems for renovation of underground water supply networks — Part 2: Lining with continuous pipes*

ISO 11298-3:2018, *Plastics piping systems for renovation of underground water supply networks — Part 3: Lining with close-fit pipes*

ISO 11299-1:2018, *Plastics piping systems for renovation of underground gas supply networks — Part 1: General*

ISO 11299-2:2018, *Plastics piping systems for renovation of underground gas supply networks — Part 2: Lining with continuous pipes*

ISO 11299-3:2018, *Plastics piping systems for renovation of underground gas supply networks — Part 3: Lining with close-fit pipes*

ISO 12162, *Thermoplastics materials for pipes and fittings for pressure applications — Classification, designation and design coefficient*

ISO 13477, *Thermoplastics pipes for the conveyance of fluids — Determination of resistance to rapid crack propagation (RCP) — Small-scale steady-state test (S4 test)*

ISO 13478, *Thermoplastics pipes for the conveyance of fluids — Determination of resistance to rapid crack propagation (RCP) — Full-scale test (FST)*

ISO 21225-1:2018, *Plastics piping systems for the trenchless replacement of underground pipeline networks — Part 1: Replacement on the line by pipe bursting and pipe extraction*

ISO 21225-2:2018, *Plastics piping systems for the trenchless replacement of underground pipeline networks — Part 2: Replacement off the line by horizontal directional drilling and impact moling*

ISO 21751, *Plastics pipes and fittings — Decohesion test of electrofusion assemblies — Strip-bend test*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the applicable parts of ISO 11296, ISO 11297, ISO 11298, ISO 11299, ISO 21225 and the following apply.

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

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

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

3.1 Assessment of conformity

3.1.1
certification body
impartial body, governmental or non-governmental, possessing the necessary competence and responsibility to carry out certification of conformity according to given rules of procedure and management

Note 1 to entry: A certification body should preferably operate in accordance with ISO/IEC 17021-1[4] or ISO/IEC 17065[6].

3.1.2
inspection body
body that performs inspection

Note 1 to entry: An inspection body can be an organization, or part of an organization.

Note 2 to entry: An inspection body should preferably operate in accordance with ISO/IEC 17020[3] or ISO/IEC 17021-1[4].

[SOURCE: ISO/IEC 17020:2012[3], 3.5, modified — Note 2 to entry added.]

3.1.3
testing laboratory
laboratory which measures, tests, calibrates or otherwise determines the characteristics of the performance of *materials* (3.1.13) and products

Note 1 to entry: In the context of this document, the materials and products can be subjected to *type testing* (3.1.6), *batch release test* (3.1.7), *process verification test* (3.1.8), *audit test* (3.1.10), and *witness test* (3.1.12), as applicable.

Note 2 to entry: A testing laboratory should preferably operate in accordance with ISO/IEC 17025[5].

3.1.4
quality management system
part of a management system with regard to quality

Note 1 to entry: Requirements for quality management systems are given in ISO 9001[2].

[SOURCE: ISO 9000:2015, 3.5.4, modified — Note 1 to entry added.]

3.1.5
quality plan
document setting out the specific quality practices, resources and sequence of activities relevant to a particular product or range of products

3.1.6
type testing
TT
testing performed to prove that the *material* (3.1.13), pipe, *joint* (3.1.21) or *assembly* (3.1.23) is capable of conforming to the requirements given in the relevant standard

Note 1 to entry: The type test results should remain valid until there is a change in the material or product or assembly provided that the *process verification tests* (3.1.8) are done regularly.

3.1.7
batch release test
BRT
test performed by or on behalf of the manufacturer on a batch of PE products, which has to be satisfactorily completed before the batch can be released

3.1.8
process verification test
PVT
test performed by or on behalf of the manufacturer on PE products at specific intervals to confirm that the process continues to be capable of producing products which conform to the requirements given in the relevant standard

Note 1 to entry: Such tests are not required to release batches of products and are carried out as a measure of process control.

3.1.9
process verification test at the "I" stage
PVT-I
test performed by or on behalf of the manufacturer or installer at specific intervals during the installation process to confirm that the process as specified in the installation manual continues to be capable of producing installed products which conform to the requirements given in the relevant standard

Note 1 to entry: Such tests are not required to release batches of products and are carried out as a measure of process control.

3.1.10
audit test
AT
test performed by a test laboratory on behalf of an *inspection body* (3.1.2) or *certification body* (3.1.1) to confirm that the product continues to conform to the requirements given in the relevant standard

3.1.11
indirect test
IT
test performed by or on behalf of the manufacturer, different from that specified test for that particular characteristic, having previously verified its correlation with the specified test

3.1.12
witness test
WT
test accepted by an inspection or a *certification body* (3.1.1) for *type testing* (3.1.6) and/or *audit test* (3.1.10), which is carried out by or on behalf of the manufacturer and supervised by a representative of the inspection or certification body, competent in testing

3.1.13
material
generic term for compositions grouped by families, expressed by generic names, e.g. polypropylene, stainless steel, brass or EPDM

Note 1 to entry: Definition from European Commission, Directorate-General for Enterprise and Industry, Sub-group on Product Testing Procedures (EC, DG ENT and IND, SG PTP).

3.1.14
material batch
clearly identified quantity of a given homogeneous compound manufactured under uniform conditions and defined and identified by the compound manufacturer

3.1.15
product
pipe, fitting, or valve of a clearly identified type intended to be a part of a piping system which the manufacturer puts on the market

3.1.16
product batch
clearly identified collection of products, manufactured consecutively or continuously under the same conditions, using the same compound conforming to the same specification

Note 1 to entry: The production batch is defined and identified by the product manufacturer.

3.1.17
lot
clearly identifiable sub-division of a batch for inspection purposes

3.1.18
sample
one or more products drawn from the same production batch or *lot* (3.1.17), selected at random without regard to their quality

Note 1 to entry: The number of products in the sample is the sample size.

3.1.19
group
collection of similar products from which *samples* (3.1.18) are selected for testing purposes

3.1.20
component
product manufactured out of a specific composition compound brought to the market as part of another product or as a spare part.

Note 1 to entry: For drinking water application, components may be considered as products and be individually approved (e.g. O-ring, gasket) or they are tested as an integral part of a finished product (e.g. in a valve).

3.1.21
joint
connection between two products

3.1.22
assembled product
assembled final product using two or more single parts

3.1.23
assembly
product that can be dismantled into a set of *components* (3.1.20)

EXAMPLE A test piece consisting of various products.

3.1.24
sampling plan
specification of the type of sampling to be used combined with the operational specification of the entities or increments to be taken, the *samples* (3.1.18) to be constituted and the measurements or tests to be made

EXAMPLE A specific plan which indicates the number of units of products or assemblies to be inspected.

3.1.25
product type
generic description of a product

EXAMPLE A pipe or fitting or valve or their main parts, of the same design, from a particular compound.

3.1.26
cavity
<moulding> space within a mould to be filled to form the moulded product

EXAMPLE That part of an injection mould which gives the form to the injection-moulded product.

3.2 Rehabilitation general

3.2.1
rehabilitation
measures for restoring or upgrading the performance of existing systems, including *renovation* (3.2.2), *repair* (3.2.4) and *replacement* (3.2.3)

3.2.2
renovation
work incorporating all or part of the original fabric of the pipeline, by means of which its current performance is improved

3.2.3
replacement
construction of a new pipeline, on or off the line of an existing pipeline, where the function of the new pipeline system incorporates that of the old

3.2.4
repair
rectification of local damage

3.2.5
lining pipe
pipe inserted for *renovation* (3.2.2) purposes

3.2.6
characteristic
property, dimension or other feature of a *material* (3.1.13) or *component* (3.1.20)

3.2.7
"M" stage
stage as manufactured, before any subsequent site processing of *components* (3.1.20) associated with the particular *renovation* (3.2.2) technique

3.2.8
"I" stage
stage as installed, i.e. in final configuration after any site processing of *components* (3.1.20) associated with the particular *renovation* (3.2.2) technique

3.2.9
nominal size
DN
<DN> numerical designation of the size of a *component* (3.1.20), which is a convenient round number approximately equal to the inside or outside diameter in millimetres

3.2.10
nominal size
DN/OD
<DN/OD> numerical designation of the size of a component related to the outside diameter

[SOURCE: ISO 4427-1:2019, 3.1.1]

3.2.11
nominal outside diameter
d_n
specified outside diameter assigned to a *nominal size* DN/OD (3.2.9)

Note 1 to entry: Expressed in millimetres.