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

**Part 2:
Resin-fibre composite (RFC) material**

*Évaluation de la conformité des systèmes de canalisations en
plastique destinés à la réhabilitation des réseaux existants —*

Partie 2: Matériau composite résine-fibres (RFC)

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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 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*.

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.

A list of all parts in the ISO 23818 series can be found on the ISO website.

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 pipe lining systems of distinct materials are applicable:

- ISO/TS 23818-1, *Assessment of conformity of plastics piping systems for the rehabilitation of existing pipelines — Part 1: Polyethylene (PE) material*;
- ISO/TS 23818-2 (this document), *Assessment of conformity of plastics piping systems for the rehabilitation of existing pipelines — Part 2: Resin-fibre composite (RFC) material*;
- ISO/TS 23818-3, *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](#).

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 11297-2	ISO 11298-2	ISO 11299-2
			ISO 11296-3	ISO 11297-3	ISO 11298-3	ISO 11299-3
			ISO 11296-7			
		TRENCHLESS REPLACEMENT USING PIPE BURSTING, PIPE EXTRACTION, HORIZONTAL DRILLING AND IMPACT MOLING	ISO 21225-1	ISO 21225-1	ISO 21225-1	ISO 21225-1
ISO 21225-2	ISO 21225-2		ISO 21225-2	ISO 21225-2		
ISO/TS 23818-2	RFC	LINING WITH CURED-IN-PLACE PIPES (CIPP)	ISO 11296-4	ISO 11297-4	ISO 11298-4	
ISO/TS 23818-3	PVC-U	LINING WITH CLOSE-FIT PIPES AND SPIRALLY WOUND PIPES	ISO 11296-3			
			ISO 11296-7			

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 requirement 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](#).

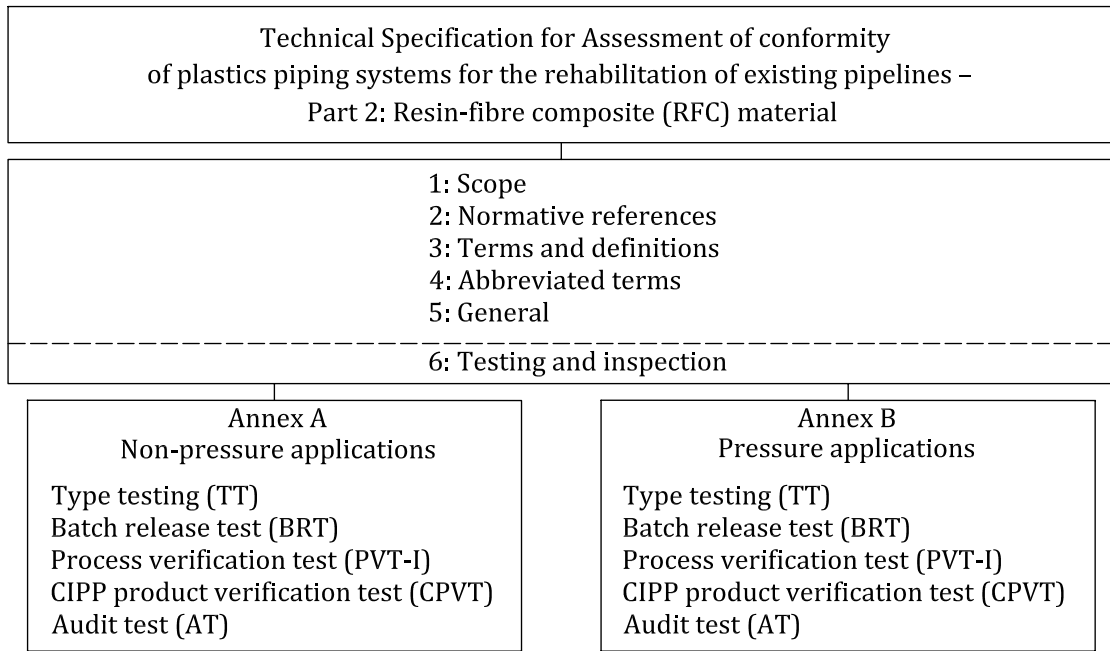


Figure 1 — Format of the Technical Specifications for the assessment of conformity

[Figure 2](#) is intended to provide general information on the concept of testing and organization 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-I), CIPP product verification test (CPVT) and audit test (AT), this document details the applicable characteristics to be assessed as well as the frequency and sampling of testing.

[Figure 2](#) also provides a typical scheme for the assessment of conformity of RFC pipes, fittings, joints or assemblies by manufacturers and/or installers, including certification.

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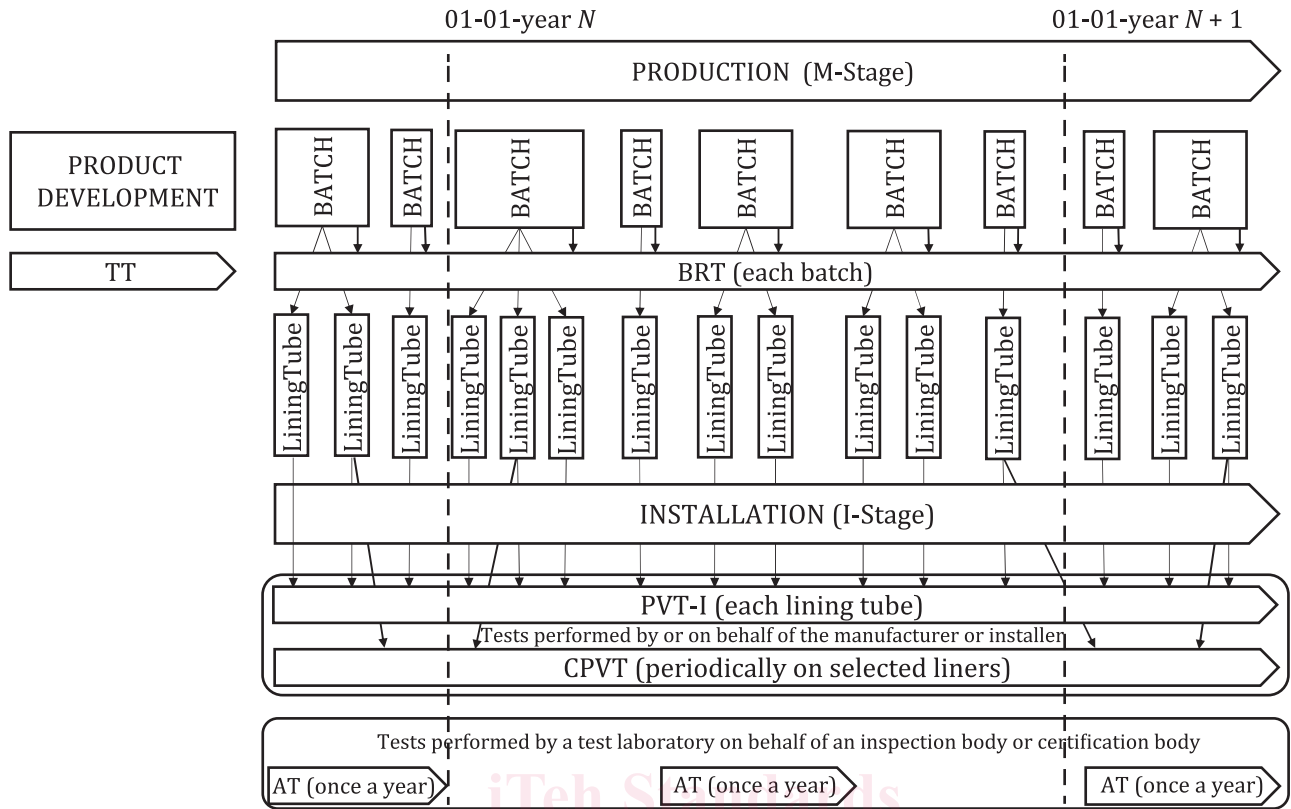


Figure 2 — Typical scheme for the assessment of conformity by a manufacturer, including certification

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

Part 2: Resin-fibre composite (RFC) material

1 Scope

This document provides a scheme for the assessment of conformity of RFC products for the rehabilitation of existing pipelines, in accordance with the applicable parts of ISO 11296, ISO 11297 and ISO 11298, 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.

It applies to cured-in-place pipe (CIPP) products only. It applies to non-pressure pipe liners, and to independent (fully structural, class A) and interactive (semi-structural, class B) pressure pipe liners, as defined in ISO 11295, which do not rely on adhesion to the existing pipeline.

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 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*

ISO 10928, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Methods for regression analysis and their use*

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

ISO 11296-4:2018, *Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks — Part 4: Lining with cured-in-place pipes*

ISO 11296-4:2018/Amd 1:2021, *Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks — Part 4: Lining with cured-in-place pipes — Amendment 1: Updated definitions, marking requirements and procedure for alternative expression of flexural test results*

ISO 11297-4:2018, *Plastics piping systems for renovation of underground drainage and sewerage networks under pressure — Part 4: Lining with cured-in-place pipes*

ISO 11298-4:2021, *Plastics piping systems for renovation of underground water supply networks — Part 4: Lining with cured-in-place pipes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11296-4, ISO 11297-4, ISO 11298-4 and the following apply.

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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 or ISO/IEC 17065.

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 or ISO/IEC 17021-1.

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

3.1.3

testing laboratory

laboratory which measures, tests, calibrates or otherwise determines the *characteristics* (3.2.6) of the performance of *materials* (3.1.13) and products

Note 1 to entry: In the context of this document, the *materials* (3.1.13) and products can be subjected to *type testing* (3.1.6), *batch release test* (3.1.7), *process verification test at the "I" stage* (3.1.8), *CIPP product verification test* (3.1.20), *audit test* (3.1.9), and *witness test* (3.1.11), as applicable.

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

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.

[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* (3.1.17) or assembly is capable of conforming to the requirements given in the relevant standard

Note 1 to entry: The type test results remain valid until there is a change in the *material* (3.1.13) or product or assembly provided that the process verification tests are done regularly.

3.1.7**batch release test****BRT**

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

Note 1 to entry: For CIPP, BRT is applicable to a *lining tube batch* (3.1.19) only.

[SOURCE: ISO/TS 23818-1:2020, 3.1.7, modified — "PE" changed to "RFC" and Note 1 to entry added.]

3.1.8**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.

3.1.9**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 and to provide information to assess the effectiveness of the *quality management system* (3.1.4)

3.1.10**indirect test****IT**

test performed by or on behalf of the manufacturer, different from that specified test for that particular *characteristic* (3.2.6), having previously verified its correlation with the specified test

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3.1.11**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* (3.1.9), which is carried out by or on behalf of the manufacturer and supervised by a representative of the inspection or *certification body* (3.1.1), competent in testing

3.1.12**reduced long-term test****RLTT**

test using shorter time periods or fewer test pieces than those specified for a full long-term test

[SOURCE: CEN/TS 14632:2012, 3.17, modified]

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).