

---

---

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

**Part 3:  
Unplasticised poly(vinyl chloride)  
(PVC-U) material**

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

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

*Partie 3: Matériau poly(chlorure de vinyle) non-plastifié (PVC-U)*

<https://standards.iteh.ai/catalog/standards/sist/9774c2e2-06bf-49fc-9191-1dc1125390b4/iso-ts-23818-3-2021>



**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO/TS 23818-3:2021  
<https://standards.iteh.ai/catalog/standards/sist/9774c2e2-06bf-49fc-9191-1dc1125390b4/iso-ts-23818-3-2021>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2021

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  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
Foreword .....	iv
Introduction .....	v
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms and definitions .....</b>	<b>1</b>
3.1 Assessment of conformity .....	2
3.2 Rehabilitation, general .....	4
<b>4 Abbreviated terms .....</b>	<b>5</b>
<b>5 General .....</b>	<b>6</b>
<b>6 Testing and inspection .....</b>	<b>6</b>
6.1 Grouping .....	6
6.1.1 General .....	6
6.1.2 Size groups .....	6
6.1.3 Fitting groups .....	6
6.2 Type testing .....	7
6.3 Batch release tests .....	7
6.4 Process verification tests .....	7
6.5 Audit tests .....	8
6.6 Indirect tests .....	8
6.7 Test records .....	8
<b>Annex A (normative) Test procedures for plastics piping systems for the rehabilitation of networks for underground non-pressure drainage and sewerage .....</b>	<b>9</b>
<b>Annex B (normative) Specification of new system (N), change in design (D), change in material (M) and extension of the product range (E) .....</b>	<b>15</b>
<b>Annex C (informative) Summary tables of scheme requirements .....</b>	<b>17</b>
<b>Bibliography .....</b>	<b>19</b>

## 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](http://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](http://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](http://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 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](http://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 pipe systems of distinctive 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<sup>1)</sup>, *Assessment of conformity of plastics piping systems for the rehabilitation of existing pipelines — Part 2: Resin-fibre composite (RFC) material*;

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

These three documents cover the system standards, as presented in [Table 1](#).

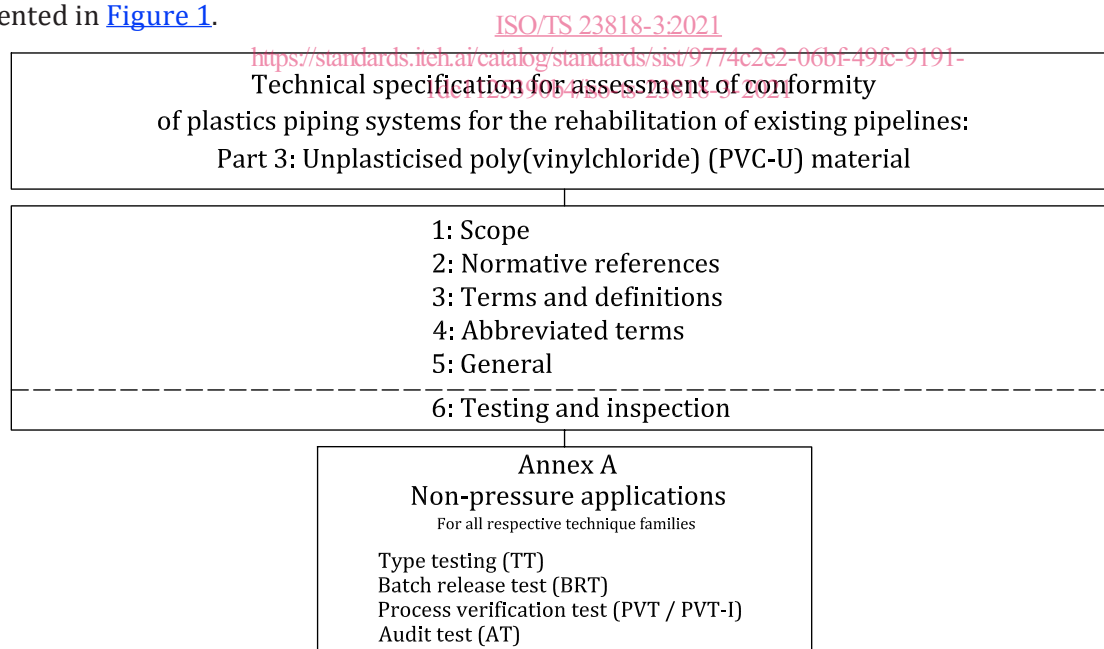
1) Under preparation. Stage at the time of publication: ISO/DTS 23818-2:2021.

**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
		TRENCHLESS REPLACEMENT USING PIPE BURSTING, PIPE EXTRACTION, HORIZONTAL DRILLING AND IMPACT MOLING	ISO 11296-7			
			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 <sup>a</sup>	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			

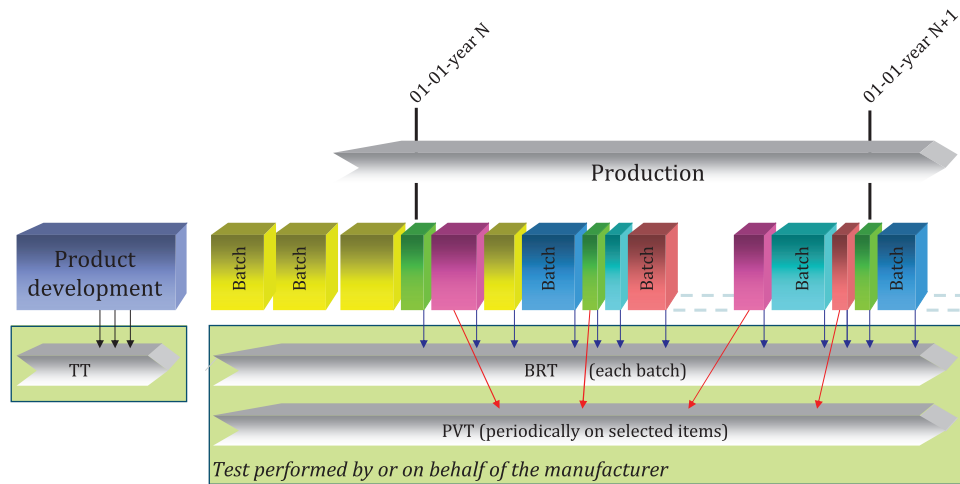
<sup>a</sup> Under preparation. Stage at the time of publication: ISO/DTS 23818-2:2021.

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. For this document, covering only non-pressure applications, the format is schematically represented in [Figure 1](#).

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

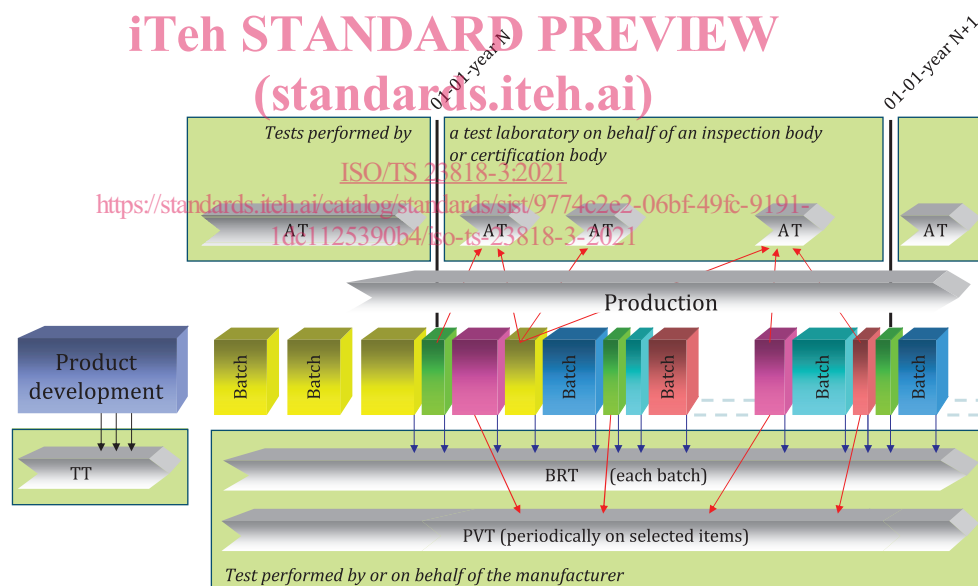
[Figures 2](#) and [3](#) are intended to provide general information on the concept of testing and organization of those tests used for the purpose of the assessment of conformity. For each type of test, i.e. type testing (TT), batch release test (BRT), process verification test (PVT), and audit test (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 PVC-U 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 PVC-U 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**

## **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

ISO/TS 23818-3:2021

<https://standards.iteh.ai/catalog/standards/sist/9774c2e2-06bf-49fc-9191-1dc1125390b4/iso-ts-23818-3-2021>



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

## Part 3: Unplasticised poly(vinyl chloride) (PVC-U) material

### 1 Scope

This document provides a scheme for the assessment of conformity of PVC-U products and assemblies for the rehabilitation of existing pipelines, in accordance with the applicable parts of ISO 11296 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 C](#).

### 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/TS 23818-3:2021](#)

ISO 1628-2, *Plastics — Determination of the viscosity of polymers in dilute solution using capillary viscometers — Part 2: Poly(vinyl chloride) resins*

ISO 4435:2003, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U)*

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

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*

EN 1401-1, *Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticized poly(vinyl chloride) (PVC-U) – Part 1: Specifications for pipes, fittings and the system*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11296-3, ISO 11296-7 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 or ISO/IEC 17065.

#### 3.1.2

##### **inspection body**

body that performs inspection

Note 1 to entry: A 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 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.

#### 3.1.4

##### **quality management system**

management system to direct and control an organization with regard to quality

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

#### 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* (3.1.22) 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 performed regularly.

#### 3.1.7

##### **batch release test**

##### **BRT**

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

Note 1 to entry: A batch can either be a *material batch* (3.1.14) or a *product batch* (3.1.16).

[SOURCE: ISO/TS 23818-1:2020, 3.1.8, modified — "PE" changed to "PVC-U" and Note 1 to entry added.]

**3.1.8****process verification test****PVT**

test performed by or on behalf of the manufacturer on PVC-U 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 body* (3.1.2) 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 integral part of a finished product (e.g. in a valve).

### 3.1.21

#### **joint**

connection between two products

ISO/TS 23818-3:2021  
<https://standards.iteh.ai/catalog/standards/sist/9774c2e2-06bf-49fc-9191-1dc1125390b4/iso-ts-23818-3-2021>

### 3.1.22

#### **assembly**

product that can be dismantled into a set of *components* ([3.1.20](#))

EXAMPLE A test piece consisting of various products.

### 3.1.23

#### **cavity**

(moulding) space within a mould to be filled to form the 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