INTERNATIONAL STANDARD

ISO 6259-2

Second edition
2020-09

Thermoplastics pipes — Determination of tensile properties —

Part 2: Pipes made of unplasticized poly(vinyl chloride) (PVC-U), oriented unplasticized poly(vinyl chloride) (PVC-O), chlorinated poly(vinyl chloride) (PVC-C) and high-impact poly(vinyl chloride) (PVC-HI)

Tubes en matières thermoplastiques — Détermination des caractéristiques en traction —

Partie 2: Tubes en poly(chlorure de vinyle) non plastifié (PVC-U), poly(chlorure de vinyle) non plastifié orienté (PVC-O), poly(chlorure de vinyle) chloré (PVC-C) et poly(chlorure de vinyle) à résistance au choc améliorée (PVC-HI)

Reference number
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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 5, *General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications.*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 155, *Plastics piping systems and ducting systems,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 6259-2:1997), which has been technically revised.

The main changes compared to the previous edition are as follows:

— the introduction of PVC-O pipes;

— the correction of cross-references to ISO 6259-1:2015;

— the introduction of stress at break as an additional characteristic to be measured and recorded;

— the addition of extended sampling for pipe dimensions above or equal to 250 mm;

— updated informative annexes.

A list of all parts in the ISO 6259 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 specifies a method for determining the tensile properties of pipes made of PVC-U, PVC-O, PVC-C and PVC-HI.

NOTE In some countries, PVC-HI is designated as PVC-M or PVC-A.

It can provide data for further testing for the purpose of research and development.

It cannot be regarded as significant for applications in which the conditions of application of the force differ considerably with those in this test method, as such applications require the appropriate impact, creep and fatigue tests.

The tests of tensile properties are intended to be principally regarded as tests of material in the form of pipe. The results can be useful as a material process control test, but are not a quantitative assessment of long term pipe performance.

This document has been developed on the basis of ISO 527-1 and ISO 527-2.

For ease of use, it has been thought preferable to draw up a complete document that can be used for determining the tensile properties of thermoplastics pipes. For greater detail, reference can be made to the ISO 527 series.

However, the ISO 527 series is applicable to materials in sheet form, whereas the ISO 6259 series is applicable to materials in pipe form.

As it was considered essential to test the pipes as supplied, i.e. without reduction in thickness, difficulties arose in the choice of test piece.

The ISO 527 series specifies test pieces a few millimetres thick, whereas the thickness of a pipe can be in excess of 50 mm. This is why certain changes have been made on this point.

For thin-walled pipes, the test piece can be obtained by die cutting, while for thick pipes, it can be obtained only by machining.

At present, the ISO 6259 series comprises three parts:

— ISO 6259-1 gives the general conditions under which the tensile properties of thermoplastics pipes are to be determined.

— ISO 6259-2 (this document) and ISO 6259-3 provide, respectively, specific information on the execution of tests on pipes made from different materials (see the Foreword).

The basic specifications for the various materials are given in informative annexes in the relevant parts.

Thermoplastics pipes — Determination of tensile properties —

Part 2:
Pipes made of unplasticized poly(vinyl chloride) (PVC-U), oriented unplasticized poly(vinyl chloride) (PVC-O), chlorinated poly(vinyl chloride) (PVC-C) and high-impact poly(vinyl chloride) (PVC-HI)

1 Scope

This document specifies a method for determining the tensile properties of pipes made of unplasticized poly(vinyl chloride) (PVC-U), oriented unplasticized poly(vinyl chloride) (PVC-O), chlorinated poly(vinyl chloride) (PVC-C) and high-impact poly(vinyl chloride) (PVC-HI, PVC-M or PVC-A), and in particular the following properties:

— the stress at yield and stress at break;

— the elongation at break.

NOTE The general method of test for the determination of the tensile properties of thermoplastics pipes is given in ISO 6259-1.

This document also gives, for information purposes only, the corresponding basic specifications in Annexes A, B, C and D.

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 6259-1:2015, *Thermoplastics pipes — Determination of tensile properties — Part 1: General test method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6259-1 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 Definitions related to material characteristics

3.1.1
force at break
F_b
force measured at the break

Note 1 to entry: It is expressed in Newton (N).

Note 2 to entry: It is the value of force on the force-strain curve directly prior to the separation of the specimen, i.e. directly prior to the load drop caused by crack initiation.

3.1.2
stress at break
σ_b
stress measured at the break

Note 1 to entry: It is expressed in megapascal (MPa).

Note 2 to entry: It is the value of stress on the stress-strain curve directly prior to the separation of the specimen, i.e. directly prior to the load drop caused by crack initiation.

4 Principle

See ISO 6259-1:2015, Clause 4, applicable to thermoplastics materials which are in the scope of this document.

5 Apparatus

See ISO 6259-1:2015, Clause 5, applicable to thermoplastics materials which are in the scope of this document.

6 Test pieces

6.1 General

The test pieces shall be obtained by die cutting or machining. The method is determined by the thickness of the pipe wall and thermoplastics material.

Care should be taken when using die cutting to avoid damaging the test specimen or producing non-parallel sides.

6.2 Dimensions of test pieces

Depending on the method by which they are prepared (see 6.3), the shape and dimensions of the test pieces shall conform to Table 1 and Figure 1 or Table 2 and Figure 2, as applicable.

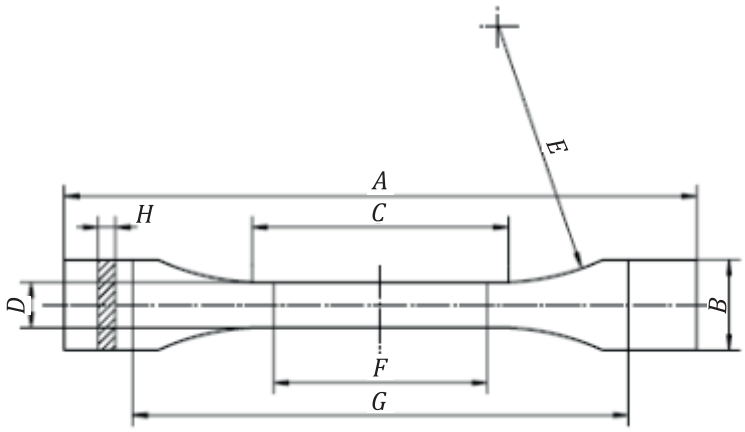
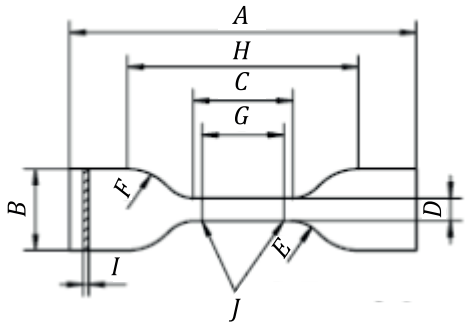


Figure 1 — Test piece obtained by machining (type 1)

Table 1 — Dimensions of test pieces prepared by machining

Symbol	Description	Dimensions mm
A	Minimum total length	115
B	Width of ends	≥15
C	Length of narrow, parallel-sided portion	33 ± 2
D	Width of narrow, parallel-sided portion	$6^{+0,4}$
E	Radius	14 ± 1
F	Gauge length	25 ± 1
G	Initial distance between grips	80 ± 5
H	Thickness	That of the pipe



Key

J positions of gauge marks

Figure 2 — Test piece obtained by die cutting (type 2)