

This is a preview of "BS EN ISO 527-1:2019". [Click here to purchase the full version from the ANSI store.](#)



BSI Standards Publication

Plastics – Determination of tensile properties

Part 1: General principles (ISO 527-1:2019)

This is a preview of "BS EN ISO 527-1:2019". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of EN ISO 527-1:2019. It supersedes BS EN ISO 527-1:2012, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/21, Testing of plastics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2019
Published by BSI Standards Limited 2019

ISBN 978 0 539 00948 4

ICS 83.080.01

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2019.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

EUROPÄISCHE NORM

September 2019

ICS 83.080.01

Supersedes EN ISO 527-1:2012

English Version

Plastics — Determination of tensile properties — Part 1: General principles (ISO 527-1:2019)

Plastiques — Détermination des
propriétés en traction — Partie 1:
Principes généraux (ISO 527-1:2019)

Kunststoffe — Bestimmung der Zugeigenschaften —
Teil 1: Allgemeine Grundsätze (ISO 527-1:2019)

This European Standard was approved by CEN on 20 July 2019.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

This is a preview of "BS EN ISO 527-1:2019". [Click here to purchase the full version from the ANSI store.](#)

European foreword

This document (EN ISO 527-1:2019) has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 "Plastics" the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2020, and conflicting national standards shall be withdrawn at the latest by March 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 527-1:2012.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 527-1:2019 has been approved by CEN as EN ISO 527-1:2019 without any modification.

This is a preview of "BS EN ISO 527-1:2019". [Click here to purchase the full version from the ANSI store.](#)

Contents

Page

Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Principle and methods	6
4.1 Principle.....	6
4.2 Method.....	6
5 Apparatus	7
5.1 Testing machine.....	7
5.1.1 General.....	7
5.1.2 Test speeds.....	7
5.1.3 Grips.....	7
5.1.4 Force indicator.....	8
5.1.5 Strain indicator.....	8
5.1.6 Recording of data.....	10
5.2 Devices for measuring width and thickness of the test specimens.....	11
6 Test specimens	11
6.1 Shape and dimensions.....	11
6.2 Preparation of specimens.....	11
6.3 Gauge marks.....	11
6.4 Checking the test specimens.....	11
6.5 Anisotropy.....	12
7 Number of test specimens	12
8 Conditioning	13
9 Procedure	13
9.1 Test atmosphere.....	13
9.2 Dimensions of test specimen.....	13
9.3 Gripping.....	13
9.4 Prestresses.....	14
9.5 Setting of extensometers.....	14
9.6 Test speed.....	14
9.7 Recording of data.....	15
10 Calculation and expression of results	15
10.1 Stress.....	15
10.2 Strain.....	15
10.2.1 Strains determined with an extensometer.....	15
10.2.2 Nominal strain.....	16
10.3 Tensile modulus.....	16
10.3.1 General.....	16
10.3.2 Chord slope.....	16
10.3.3 Regression slope.....	17
10.4 Poisson's ratio.....	17
10.5 Statistical parameters.....	18
10.6 Significant figures.....	18
11 Precision	18
12 Test report	18
Annex A (informative) Determination of strain at yield	20
Annex B (informative) Extensometer accuracy for the determination of Poisson's ratio	22

This is a preview of "BS EN ISO 527-1:2019". [Click here to purchase the full version from the ANSI store.](#)

Annex C (normative) Calibration requirements for the determination of the tensile modulus	23
Bibliography	25

This is a preview of "BS EN ISO 527-1:2019". [Click here to purchase the full version from the ANSI store.](#)

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 on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

This third edition cancels and replaces the second edition (ISO 527-1:2012), which has been technically revised.

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

- an error in [Figure 1](#) concerning ε_{tM} has been removed;
- the inconsistency concerning the accuracy of the elongation used in the calculation of the tensile modulus between [5.1.5.1](#), [Figure 1](#) and [Annex C](#) has been removed. For gauge lengths $L_0 \leq 50$ mm, the accuracy is set to $\pm 1 \mu\text{m}$;
- the normative references (see [Clause 2](#)) have been updated;
- minor editorial changes have been applied;
- language has been clarified.

A list of all parts in the ISO 527 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.

This is a preview of "BS EN ISO 527-1:2019". [Click here to purchase the full version from the ANSI store.](#)

This is a preview of "BS EN ISO 527-1:2019". [Click here to purchase the full version from the ANSI store.](#)

Plastics – Determination of tensile properties —

Part 1: General principles (ISO 527-1:2019)

1 Scope

1.1 This document specifies the general principles for determining the tensile properties of plastics and plastic composites under defined conditions. Several different types of test specimen are defined to suit different types of material which are detailed in subsequent parts of ISO 527.

1.2 The methods are used to investigate the tensile behaviour of the test specimens and for determining the tensile strength, tensile modulus and other aspects of the tensile stress/strain relationship under the conditions defined.

1.3 The methods are selectively suitable for use with the following materials:

- rigid and semi-rigid moulding, extrusion and cast thermoplastic materials, including filled and reinforced compounds in addition to unfilled types; rigid and semi-rigid thermoplastics sheets and films;
- rigid and semi-rigid thermosetting moulding materials, including filled and reinforced compounds; rigid and semi-rigid thermosetting sheets, including laminates;
- fibre-reinforced thermosets and thermoplastic composites incorporating unidirectional or non-unidirectional reinforcements, such as mat, woven fabrics, woven rovings, chopped strands, combination and hybrid reinforcement, rovings and milled fibres; sheet made from pre-impregnated materials (prepregs);
- thermotropic liquid crystal polymers.

The methods are not normally suitable for use with rigid cellular materials, for which ISO 1926 is used, or for sandwich structures containing cellular materials.

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 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 2602, *Statistical interpretation of test results — Estimation of the mean — Confidence interval*

ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

ISO 9513:2012, *Metallic materials — Calibration of extensometer systems used in uniaxial testing*

ISO 16012, *Plastics — Determination of linear dimensions of test specimens*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*