



**International
Standard**

ISO 527-2

**Plastics — Determination of tensile
properties —**

**Part 2:
Test conditions for moulding and
extrusion plastics**

Plastiques — Détermination des propriétés en traction —

*Partie 2: Conditions d'essai des plastiques pour moulage et
extrusion*

**Third edition
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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 document 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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This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical behavior*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 249, *Plastics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 527-2:2012), which has been technically revised.

The main changes are as follows:

- [Figure 1](#) and [Table 1](#) have been moved from [Clause 11](#) to [subclause 6.1](#);
- former subclause 6.6, Number of test specimens, has been renumbered as [Clause 7](#) to align with ISO 527-1:2019;
- the reference to ISO 3167 has been replaced with ISO 20753;
- test specimens 1A and 1B have been replaced by test specimen A1 and A2 according to ISO 20753;
- small test specimen in [Annex A](#), Type 1BA and 1BB have been replaced by reduced scale specimen, as specified in ISO 20753.

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.

Plastics — Determination of tensile properties —

Part 2: Test conditions for moulding and extrusion plastics

1 Scope

1.1 This document specifies the test conditions for determining the tensile properties of moulding and extrusion plastics, based upon the general principles given in ISO 527-1.

1.2 The methods are selectively suitable for use with the following range of materials in the preferred thickness, or, in case of specimen machined from moulded parts in the thickness as moulded:

- rigid and semi-rigid thermoplastics moulding, extrusion and cast materials, including compounds filled and reinforced by, for example, short fibres, small rods, plates or granules but excluding textile fibres (see ISO 527-4 and ISO 527-5).

NOTE See ISO 527-1:2019, Clause 3 for the definition of "rigid" and "semi-rigid".

- rigid and semi-rigid thermosetting moulding and cast materials, including filled and reinforced compounds but excluding textile fibres as reinforcement (see ISO 527-4 and ISO 527-5);
- thermotropic liquid crystal polymers.

The methods are not normally suitable for use with rigid cellular materials or sandwich structures containing cellular material. For rigid cellular materials, see ISO 1926.

The methods are not suitable for flexible films and sheets, of thickness smaller than 1 mm, see ISO 527-3.

1.3 The methods are applied using specimens which can be either moulded to the chosen dimensions or machined, cut or punched from injection- or compression-moulded plates. The multipurpose test specimen is preferred (see ISO 20753).

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 293, *Plastics — Compression moulding of test specimens of thermoplastic materials*

ISO 294-1, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 1: General principles, and moulding of multipurpose and bar test specimens*

ISO 295, *Plastics — Compression moulding of test specimens of thermosetting materials*

ISO 527-1:2019, *Plastics — Determination of tensile properties — Part 1: General principles*

ISO 2818, *Plastics — Preparation of test specimens by machining*

ISO 10724-1, *Plastics — Injection moulding of test specimens of thermosetting powder moulding compounds (PMCs) — Part 1: General principles and moulding of multipurpose test specimens*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 527-1 apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Principle and methods

The principle and methods shall be in accordance with ISO 527-1:2019, Clause 4.

5 Apparatus

5.1 General

The apparatus shall be in accordance with ISO 527-1:2019, Clause 5, specifically 5.1.1 to 5.1.4.

5.2 Extensometer

The extensometer shall be in accordance with ISO 527-1:2019, 5.1.5.

For this document, a gauge length of 75 mm is preferred when a test specimen Type A1 of ISO 20753 is used.

A gauge length of 50 mm is also acceptable for quality-control purposes or where specified.

If strains are recorded only on one side of the test specimen, ensure that low strains are not falsified by bending, which may result from even faint misalignment and initial warpage of the test specimen and which generates strain differences between opposite surfaces of the test specimen.

Increasing the gauge length leads to higher accuracy, especially for the modulus determination. The absolute accuracy of the measurement of elongation required for a $\pm 1\%$ accuracy of modulus determination is $\pm 1,5\ \mu\text{m}$. This is less severe than the $\pm 1\ \mu\text{m}$ needed if a gauge length of 50 mm is used. Furthermore, necking outside of the gauge length will be less frequent.

5.3 Recording of data

See ISO 527-1:2019, 5.1.6.

NOTE For the determination of the tensile modulus under the conditions $v = 1\ \text{mm/min}$, $L_0 = 75\ \text{mm}$, $L = 115\ \text{mm}$ and $r = 0,000\ 5\ \text{mm}$, the recording frequency for the strain signal greater than or equal to $22\ \text{s}^{-1}$ is appropriate according to ISO 527-1:2019, Formula (1). This frequency increases as the gauge length increases. With larger gauge length the absolute elongation measured by the extensometer is larger for the same crosshead displacement, i.e. the recording instrument will see more data points in the same time span.

6 Test specimens

6.1 Shape and dimensions

Wherever possible, the test specimens shall be dumb-bell-shaped types A1 and A2 in accordance with ISO 20753, as shown in [Figure 1](#) and [Table 1](#). Type A1 shall be used for directly injection-moulded multipurpose test specimens, type A2 for machined specimens. For the use of proportionally scaled miniaturized specimens, [Annex A](#) and ISO 20753 shall be taken into account.