



SLOVENSKI STANDARD

SIST EN ISO 527-4:2023

01-junij-2023

Polimerni materiali - Določanje nateznih lastnosti - 4. del: Preskusni pogoji za izotropne in ortotropne z vlakni ojačene polimerne kompozite (ISO 527-4:2023)

Plastics - Determination of tensile properties - Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites (ISO 527-4:2023)

Kunststoffe - Bestimmung der Zugeigenschaften - Teil 4: Prüfbedingungen für isotrop und anisotrop faserverstärkte Kunststoffverbundwerkstoffe (ISO 527-4:2023)

Plastiques - Détermination des propriétés en traction - Partie 4: Conditions d'essai pour les composites plastiques renforcés de fibres isotropes et orthotropes (ISO 527-4:2023)

Ta slovenski standard je istoveten z: EN ISO 527-4:2023

ICS:

83.120

Ojačani polimeri

Reinforced plastics

SIST EN ISO 527-4:2023

en,fr,de

EUROPEAN STANDARD

EN ISO 527-4

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2023

ICS 83.120

Supersedes EN ISO 527-4:2021

English Version

Plastics - Determination of tensile properties - Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites (ISO 527-4:2023)

Plastiques - Détermination des propriétés en traction -
Partie 4: Conditions d'essai pour les composites
plastiques renforcés de fibres isotropes et orthotropes
(ISO 527-4:2023)

Kunststoffe - Bestimmung der Zugeigenschaften - Teil
4: Prüfbedingungen für isotrop und anisotrop
faserverstärkte Kunststoffverbundwerkstoffe (ISO
527-4:2023)

This European Standard was approved by CEN on 25 March 2023.

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, Türkiye and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	3

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 527-4:2023](https://standards.iteh.ai/catalog/standards/sist/4c641626-eea3-4ef6-8a59-e428787e7e00/sist-en-iso-527-4-2023)

<https://standards.iteh.ai/catalog/standards/sist/4c641626-eea3-4ef6-8a59-e428787e7e00/sist-en-iso-527-4-2023>

European foreword

This document (EN ISO 527-4:2023) 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 SIS.

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 October 2023, and conflicting national standards shall be withdrawn at the latest by October 2023.

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 527-4:2021.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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, Türkiye and the United Kingdom.

(standards.iteh.ai)

Endorsement notice

The text of ISO 527-4:2023 has been approved by CEN as EN ISO 527-4:2023 without any modification.

INTERNATIONAL
STANDARD

ISO
527-4

Third edition
2023-03

**Plastics — Determination of tensile
properties —**

Part 4:

**Test conditions for isotropic and
orthotropic fibre-reinforced plastic
composites**

Plastiques — Détermination des propriétés en traction —

*Partie 4: Conditions d'essai pour les composites plastiques renforcés
de fibres isotropes et orthotropes*

[SIST EN ISO 527-4:2023](https://standards.iteh.ai/catalog/standards/sist/4c641626-eea3-4ef6-8a59-e428787e7e00/sist-en-iso-527-4-2023)

[https://standards.iteh.ai/catalog/standards/sist/4c641626-eea3-4ef6-8a59-
e428787e7e00/sist-en-iso-527-4-2023](https://standards.iteh.ai/catalog/standards/sist/4c641626-eea3-4ef6-8a59-e428787e7e00/sist-en-iso-527-4-2023)



Reference number
ISO 527-4:2023(E)

© ISO 2023

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 527-4:2023

<https://standards.iteh.ai/catalog/standards/sist/4c641626-eea3-4ef6-8a59-e428787e7e00/sist-en-iso-527-4-2023>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

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
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Principle.....	5
5 Apparatus.....	5
6 Test specimens.....	5
6.1 Shape and dimensions.....	5
6.2 Preparation of specimens.....	10
6.2.1 General.....	10
6.2.2 End tabs for type 3 specimens.....	10
6.2.3 Applications of end tabs for type 3 specimens.....	10
6.3 Gauge marks.....	10
6.4 Checking the specimens.....	10
6.5 Anisotropy.....	11
7 Number of specimens.....	11
8 Conditioning.....	11
9 Procedure.....	11
9.1 Test atmosphere.....	11
9.2 Measurement of specimen dimensions.....	11
9.3 Clamping.....	11
9.4 Prestresses.....	11
9.5 Setting of extensometers and strain gauges and placing of gauge marks.....	11
9.6 Speed of testing.....	12
9.6.1 For type 1B test specimens.....	12
9.6.2 For type 2, type 3 and type 4 test specimens.....	12
9.7 Recording of data.....	12
10 Calculation and expression of results.....	12
10.1 Calculation of all properties for parallel sided specimens.....	12
10.2 Failure location related calculation of tensile strength for type 4 specimens.....	12
11 Precision.....	12
12 Test report.....	13
Annex A (informative) Alignment of specimens.....	14
Annex B (informative) Testing with tapered tensile specimen geometry without tabs (type 4).....	16
Annex C (informative) Unbonded tabs or gripping condition without tabs using fine grip face.....	19
Annex D (normative) Specimen preparation for type 2 and type 3.....	22
Annex E (normative) Failure location related calculation of tensile strength for type 4 specimens.....	24
Bibliography.....	28

ISO 527-4:2023(E)

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 61, *Plastics*, Subcommittee SC 13, *Composites and reinforcement fibres*, 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 527-4:2021), of which it constitutes a minor revision.

The main changes are as follows:

- symbols [Figures 1](#) and [5](#) have been updated to match the text;
- symbols in [Table B.2](#) have been updated for consistency (upper case to lower case);
- symbols in [Annex E](#) have been updated for consistency (upper case to lower case);
- a reference has been added to the bibliography.

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.

Introduction

This document introduces a new test specimen, type 4, with a tapered geometry for use without end tabs. The geometry has been developed to overcome difficulties with bonding end-tabbed test specimens, especially when testing materials based on a thermoplastic matrix.

Guidance on gripping, including grip face design, is also added.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 527-4:2023](https://standards.iteh.ai/catalog/standards/sist/4c641626-eea3-4ef6-8a59-e428787e7e00/sist-en-iso-527-4-2023)

<https://standards.iteh.ai/catalog/standards/sist/4c641626-eea3-4ef6-8a59-e428787e7e00/sist-en-iso-527-4-2023>

Plastics — Determination of tensile properties —

Part 4:

Test conditions for isotropic and orthotropic fibre-reinforced plastic composites

1 Scope

This document specifies the test conditions for the determination of the tensile properties of isotropic and orthotropic fibre-reinforced plastic composites, based upon the general principles given in ISO 527-1.

NOTE 1 Unidirectional reinforced materials are covered by ISO 527-5.

The methods are used to investigate the tensile behaviour of the test specimens and for determining the tensile strength, tensile modulus, Poisson's ratios and other aspects of the tensile stress-strain relationship under the defined conditions.

The test method is suitable for use with the following materials:

- fibre-reinforced thermosetting and thermoplastic composites incorporating non-unidirectional reinforcements such as mats, woven fabrics, woven rovings, chopped strands, combinations of such reinforcements, hybrids, rovings, short or milled fibres or prepregged materials (prepregs);

NOTE 2 Injection moulded specimens are covered by ISO 527-2.

- combinations of the above with unidirectional reinforcements and multidirectional reinforced materials constructed from unidirectional layers, provided such laminates are symmetrical;

NOTE 3 Materials with completely or mainly unidirectional reinforcements are covered by ISO 527-5.

- finished products made from materials mentioned above.

The reinforcement fibres covered include glass fibres, carbon fibres, aramid fibres and other similar fibres.

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

ISO 1268 (all parts), *Fibre-reinforced plastics — Methods of producing test plates*

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

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.