

**Plastid. Tõmbeomaduste määramine. Osa 5:
Orienteerimata kiudarmatuuriga
plastkomposiitide katsetingimused**

Plastics - Determination of tensile properties - Part 5:
Test conditions for unidirectional fibre-reinforced
plastic composites

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 527-5:2000 sisaldab Euroopa standardi EN ISO 527-5:1997 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 11.01.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 527-5:2000 consists of the English text of the European standard EN ISO 527-5:1997.</p> <p>This document is endorsed on 11.01.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: Standardi käesolev osa määrab kindlaks "orienteerimata kiudsarrusega plastkomposiitide tõmbeomaduste testimise meetodid", mis põhinevad üldpõhimõtetel, mis on esitatud käesoleva standardi 1. osas.</p>	<p>Scope:</p>
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ICS 83.120

Võtmesõnad: määramine, plastid, sarrusplastid, testimine, testimistingimused, testitavad proovikehad, tõmbeomadused, tõmbeteimid

ICS 83.120

Descriptors: Plastics, composites, testing, tensile strength.

English version

Plastics

Determination of tensile properties

**Part 5: Test conditions for unidirectional fibre-reinforced
plastic composites
(ISO 527-5:1997)**

Plastiques – Détermination des propriétés
en traction – Partie 5: Conditions d'essai
pour les composites plastiques renforcés
de fibres unidirectionnelles
(ISO 527-5:1997)

Kunststoffe – Bestimmung der Zugeigen-
schaften – Teil 5: Prüfbedingungen für
unidirektional faserverstärkte Kunststoff-
verbundwerkstoffe (ISO 527-5:1997)

This European Standard was approved by CEN on 1997-03-28.

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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

International Standard

ISO 527-5:1997 Plastics – Determination of tensile properties – Part 5: Test conditions for unidirectional fibre-reinforced plastic composites,

which was prepared by ISO/TC 61 'Plastics' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 249 'Plastics', the Secretariat of which is held by IBN, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by October 1997 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 527-5:1997 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

1 Scope

1.1 This part of ISO 527 specifies the test conditions for the determination of the tensile properties of unidirectional fibre-reinforced plastic composites, based upon the general principles given in part 1.

1.2 See ISO 527-1, subclause 1.2.

1.3 The test method is suitable for all polymer matrix systems reinforced with unidirectional fibres and which meet the requirements, including failure mode, set out in this part of ISO 527.

The method is suitable for composites with either thermoplastic or thermosetting matrices, including preimpregnated materials (prepregs). The reinforcements covered include carbon fibres, glass fibres, aramid fibres and other similar fibres. The reinforcement geometries covered include unidirectional (i.e. completely aligned) fibres and rovings and unidirectional fabrics and tapes.

The method is not normally suitable for multidirectional materials composed of several unidirectional layers at different angles (see ISO 527-4).

1.4 The method is performed using one of two different types of test specimen, depending on the direction of the applied stress relative to the fibre direction (see clause 6).

1.5 See ISO 527-1, subclause 1.5.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 527. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 527 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 527-1:1993, *Plastics — Determination of tensile properties — Part 1: General principles*.

ISO 527-4:1997, *Plastics — Determination of tensile properties — Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites*.

ISO 1268:1974, *Plastics — Preparation of glass fibre reinforced, resin bonded, low-pressure laminated plates or panels for test purposes.*

ISO 2818:1994, *Plastics — Preparation of test specimens by machining.*

ISO 3534-1:1993, *Statistics — Vocabulary and symbols — Part 1: Probability and general statistical terms.*

ISO 9291:1996, *Textile-glass-reinforced plastics — Rovings — Preparation of unidirectional panels by winding.*

3 Principle

See ISO 527-1, clause 3.

4 Definitions

For the purposes of this part of ISO 527, the following definitions apply.

4.1 gauge length: See ISO 527-1, subclause 4.1.

4.2 speed of testing: See ISO 527-1, subclause 4.2.

4.3 tensile stress, σ (engineering): See ISO 527-1, subclause 4.3, except that σ for type A specimens is defined as σ_1 and for type B specimens as σ_2 (see clause 6 for details of type A and B specimens).

4.3.1 tensile strength, σ_M : See ISO 527-1, subclause 4.3.3, except that σ_M for type A specimens is defined as σ_{M1} and for type B specimens as σ_{M2} .

4.4 tensile strain, ε : The increase in length per unit length of the original gauge length.

For type A specimens, ε is defined as ε_1 and for type B specimens as ε_2 .

It is expressed as a dimensionless ratio or in percent.

4.5 tensile strain at tensile strength; tensile failure strain, ε_M : The tensile strain at the point corresponding to the tensile strength of the specimen.

For type A specimens, ε_M is defined as ε_{M1} and for type B specimens as ε_{M2} .

It is expressed as a dimensionless ratio or in percent.

4.6 modulus of elasticity in tension; Young's modulus, E : See ISO 527-1, subclause 4.6, except that E for type A specimens is defined as E_1 and for type B specimens as E_2 .

The strain values used are as given in ISO 527-1, subclause 4.6, i.e. $\varepsilon' = 0,000\ 5$ and $\varepsilon'' = 0,002\ 5$ (see figure 1), unless alternative values are given in the material or technical specifications.

4.7 Poisson's ratio, μ : See ISO 527-1, subclause 4.7, except that for type A specimens μ_b is defined as μ_{12} and μ_h as μ_{13} , using the coordinates shown in figure 2. For type B specimens, μ_b is defined as μ_{21} and μ_h as μ_{23} .

4.8 specimen coordinate axes: The coordinate axes for the material under test are defined in figure 2. The direction parallel to the fibres is defined as the "1"-direction and the direction perpendicular to them (in the plane of the fibres) as the "2"-direction.

NOTE — The "1"-direction is also referred to as the 0° or longitudinal direction and the "2"-direction as the 90° or transverse direction.