

STN	Plastové kompozity vystužené vláknami Určovanie šmykového napätia/krivky pretvorenia v šmyku a modulu šmyku skúškou pomocou šmykového rámu v rovine uloženia (ISO 20337: 2018)	STN EN ISO 20337 64 5040
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Fibre-reinforced plastic composites - Shear test method using a shear frame for the determination of the in-plane shear stress/shear strain response and shear modulus (ISO 20337:2018)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 03/20

Obsahuje: EN ISO 20337:2019, ISO 20337:2018

130456

EUROPEAN STANDARD

EN ISO 20337

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2019

ICS 83.120

English Version

**Fibre-reinforced plastic composites - Shear test method
using a shear frame for the determination of the in-plane
shear stress/shear strain response and shear modulus
(ISO 20337:2018)**

Composites plastiques renforcés de fibres - Méthode
d'essai de cisaillement à l'aide d'un châssis de
cisaillement pour la détermination de la contrainte de
cisaillement /déformation au cisaillement dans le plan
et du module de cisaillement (ISO 20337:2018)

Faserverstärkte Kunststoffe - Schubversuch mittels
Schubrahmen zur Ermittlung der Schubspannungs-
/Schubverformungskurve und des Schubmoduls in der
Lagenebene (ISO 20337:2018)

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

EN ISO 20337:2019 (E)

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European foreword

The text of ISO 20337:2018 has been prepared by Technical Committee 61 "Plastics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 20337:2019 by Technical Committee CEN/TC 249 "Plastics" the secretariat of which is held by NBN.

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INTERNATIONAL STANDARD

ISO
20337

First edition
2018-11

Fibre-reinforced plastic composites — Shear test method using a shear frame for the determination of the in-plane shear stress/shear strain response and shear modulus

*Composites plastiques renforcés de fibres — Méthode d'essai
de cisaillement à l'aide d'un châssis de cisaillement pour la
détermination de la contrainte de cisaillement /déformation au
cisaillement dans le plan et du module de cisaillement*



Reference number
ISO 20337:2018(E)

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CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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ISO 20337:2018(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).

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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 13, *Composites and reinforcement fibres*.

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

The test method described in this document uses a shear frame fixture in order to introduce a pure shear loading throughout the free area of the test specimens. The edges of the test specimens are uniformly clamped during the test procedure avoiding fibre rotation and load re-distribution effects. This allows for the ultimate shear strength of high shear-elongation materials to be obtained even at shear strains higher than 5 % which is a limitation when using ISO 14129 or other standards regarding in-plane shear test methods for fibre reinforced plastic composites.

Fibre-reinforced plastic composites — Shear test method using a shear frame for the determination of the in-plane shear stress/shear strain response and shear modulus

1 Scope

This document specifies a method using a shear test apparatus for measuring the in-plane shear stress/shear strain response, shear modulus and shear strength of continuous-fibre-reinforced plastic composite materials with fibre orientations of 0° and 0°/90°.

This method is applicable to thermoset and thermoplastic matrix laminates made from unidirectional layers/non-woven fabrics and/or fabrics including unidirectional fabrics, with the fibres oriented at 0° and 0°/90° to the specimen axis, where the lay-up is symmetrical and balanced about the specimen mid-plane.

The method is suitable for determining shear properties in both the linear and nonlinear load-deformation range even at shear strains greater than 5 %.

Short and long fibre-reinforced plastic composites can also be tested using this document.

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

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

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 12781-1, *Geometrical product specifications (GPS) — Flatness — Part 1: Vocabulary and parameters of flatness*

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