INTERNATIONAL STANDARD

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Carbon fibre — Determination of the tensile properties of single-filament specimens

Fibres de carbone — Détermination des propriétés en traction sur éprouvette monofilament

Reference number
ISO 11566:1996(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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11566 was prepared by Technical Committee ISO/TC 61, *Plastics,* Subcommittee SC 13, *Composites and reinforcement fibres.*

Annex A forms an integral part of this International Standard.

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Carbon fibre — Determination of the tensile properties of single-filament specimens

1 Scope

This International Standard specifies a method of test for the determination of the tensile properties of a single-filament specimen.

The method is applicable to single filaments of carbon fibres, taken from multifilament yarns, strands, tows, staple fibres, staple yarns, woven fabrics, braids and knits.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard 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 291:1977, *Plastics — Standard atmospheres for conditioning and testing.*

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

ISO 10548:1994, *Carbon fibre — Determination of size content.*

ISO 10618:—[1], *Carbon fibre — Determination of tensile properties of resin-impregnated yarns.*

ISO 11567:1995, *Carbon fibre — Determination of filament diameter and cross-sectional area.*

1) To be published.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 527-1 apply, together with the following.

3.1 system compliance: That portion of the indicated extension contributed by the load train system and the specimen-gripping system.

3.2 specimen mounting: A thin sheet made of paper, metal or plastic with a slot whose length corresponds to the gauge length of a test specimen.

4 Principle

A single-filament specimen is loaded in tension at a constant speed by a suitable mechanical testing machine until failure and the force-extension curve recorded.

The tensile strength and tensile modulus of elasticity are calculated from the force-extension relationship and the specimen cross-sectional area.

The tensile modulus of elasticity is calculated by dividing the difference in stress at two defined points by the corresponding difference in strain at these points, which may be two stress levels (method A) or two strain levels (method B). The difference in strain is corrected for the system compliance. The cross-sectional area is determined independently.

The relationship between stress and strain may not be linear, hence a chord modulus has to be defined. The two methods (A and B) represent two distinct methods of defining the position of the chord and may not give identical results.