SLOVENSKI STANDARD
oSIST prEN 2559:2021

01-julij-2021

Aeronavtika - Predimpregnirana oglena, steklena in aramidna vlakna - Ugotavljanje deležev smole in vlakna in masa vlakna na enoto površine

Aerospace series - Carbon, glass and aramid fibre preimpregnates - Determination of the resin and fibre content and the mass of fibre per unit area

Luft- und Raumfahrt - Kohlenstoffaser-Prepregs - Bestimmung des Harz- und Fasermasseanteils und der flächenbezogenen Fasermasse

Série aérospatiale - Préimprégnés de fibres de carbone - Détermination des teneurs en résine et en fibres et de la masse surfacique de la fibre

Ta slovenski standard je istoveten z: **prEN 2559**

ICS:

49.025.40	Guma in polimerni materiali	Rubber and plastics

oSIST prEN 2559:2021 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 49.025.40

Will supersede EN 2559:1997

English Version

Aerospace series - Carbon, glass and aramid fibre preimpregnates - Determination of the resin and fibre content and the mass of fibre per unit area

Série aérospatiale - Préimprégnés de fibres de carbone - Détermination des teneurs en résine et en fibres et de la masse surfacique de la fibre

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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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

European foreword

This document (prEN 2559:2021) has been prepared by the Aerospace and Defence Industries Association of Europe — Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 2559:1997.

prEN 2559:2021 is a technical revision of EN 2559:1997.

1 Scope

This document specifies methods for determining the resin content, fibre content and mass of fibre per unit area of fibre preimpregnates for aerospace use.

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.

EN 2558, *Aerospace series - Carbon fibre preimpregnates - Determination of the volatile content*

EN 2743, *Aerospace series - Fibre reinforced plastics - Standard procedures for conditioning prior to testing unaged materials*

3 Terms and definitions

No terms and definitions are listed in this document.

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

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

4.1 Wet extraction (Method A)

Determination of the difference in mass by means of weighing to constant mass before and after extraction of the resin by acid digestion. Use a solution of concentrated sulfuric acid and hydrogen peroxide. Nitric or other suitable acids can be used depending on the matrix that is to be dissolved.

4.2 Soxhlet extraction (Method B)

Determination of the difference in mass by means of weighing to constant mass before and after extraction of the resin with methyl-ethyl-ketone or other suitable solvent agreed between the user and manufacturer.

4.3 Extraction by soaking and decantation (Method C)

Similar to 4.2 but faster. In case of dispute, 4.2 shall be applied.

4.4 Information on the use of the methods

4.4.1 Method A

If the preimpregnate contains only fibre and a resin which is completely “digestible”, the resin content is equal to the loss on wet digestion.

The fibre used as a reinforcement may be coated with a resin size, which is normally removed during wet digestion. The size is therefore included in the resin content.

Where undissolved fillers are lost by filtering, they are thus included in the resin content.

NOTE There may be a partial loss of undissolved fillers, one part being counted with the resin and the rest being counted with the fibres.

4.4.2 Method B

Size normally removed during Soxhlet extraction is included in the resin content.

If the resin contains fillers which do not dissolve in the solvent, the resin content does not include these fillers.

4.4.3 Method C

If the fibre contains a size, this is normally removed during solvent extraction's included in the resin content.

Where undissolved fillers are lost by decantation, they are thus included in the resin content.

NOTE There may be a partial loss of undissolved fillers, one part being counted with the resin and the rest being counted with the fibres.

5 Apparatus and reagents

5.1 For all methods

— balance with an accuracy of 0,1 mg;

— cutting template to dimensions in 6.1;

— ancillary items such as a sharp knife and tweezers.

NOTE Automated methods are permitted as long as all the necessary requirements called out in this specification are met

5.2 Method A

— Erlenmeyer 250 ml double necked pear-shaped flask with 50 ml dropping funnel equipped with air inlet and a water pump;

— heat source with suitable temperature control, capable of temperatures within range depicted in 7.4.2.1;

— 400 ml beaker;

— 20 ml sintered glass crucible (nº 2 porosity) and suitable filtration assembly;

— desiccator containing a suitable drying agent (for example silica gel, calcium chloride or phosphorus pentoxide);

— electric oven capable of maintaining a temperature of 120 °C with an accuracy of ± 5 °C;

— protective clothing and rubber gloves resistant to hydrogen peroxide and sulfuric acid solutions, safety screen for eye protection;

— concentrated sulfuric acid (specific gravity: 1,84 to 1,89);

— hydrogen peroxide solution (concentration: 300 g/l to 500 g/l);

— acetone (propanone);

— distilled water.

5.3 Method B

— single thickness extraction thimble, nominal diameter 20 mm to 22 mm, nominal length 60 mm to 80 mm;

— electric oven capable of maintaining a temperature of 105 °C with an accuracy of ± 5 °C;

— an extraction apparatus of the Soxhlet type, comparing a condenser, siphon tube and flask and provided with an electric heating mantle;

— vacuum desiccator;

— Methyl-ethyl-ketone (MEK: butanone 2) — analytical grade — or other suitable solvent agreed between the user and manufacturer.

5.4 Method C

— container 400 ml (Erlenmeyer flask or beaker);

— electric oven capable of maintaining temperatures of 105 °C with an accuracy of ± 5 °C;

— vacuum desiccator;

— a suitable solvent for extraction, as agreed between the user and manufacturer;

— acetone (propanone).

6 Specimens

6.1 Shape and dimensions

The specimen shall have an area of 100 cm^2 with a tolerance of ± 2 %. The most common specimen shape, and the norm unless otherwise quoted, will be square, but circular and rectangular are permitted.

The figures on the following pages show the square specimen as an example.

6.2 Number and distribution

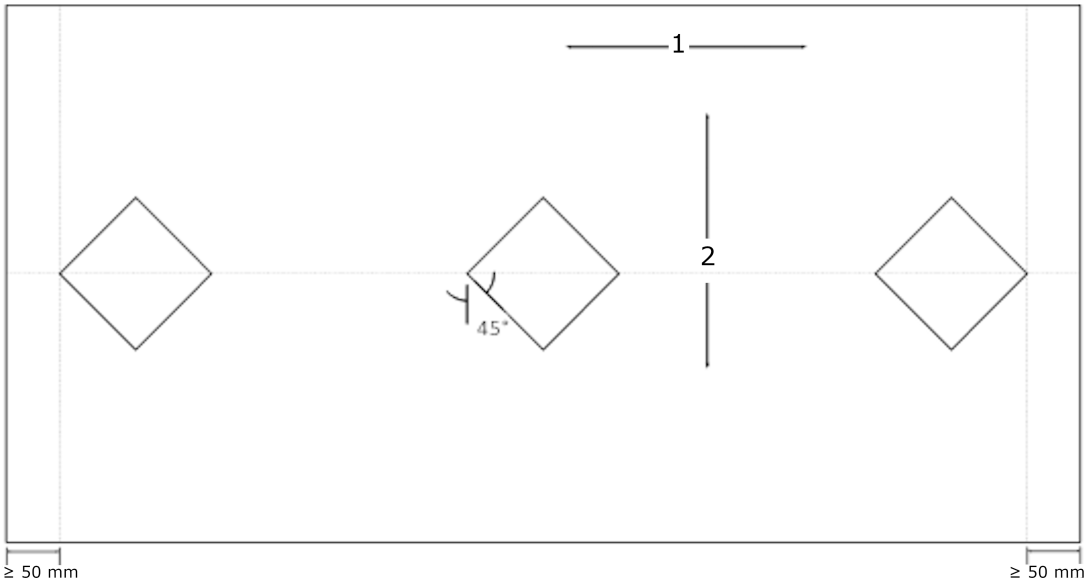
A minimum of three specimens shall be used.

They shall:

— be evenly distributed across the width of the sample;

— have their centres positioned along a straight line, perpendicular to the manufacture run direction (typically fibre/warp direction) or as close to as possible

See Figure 1 for wide woven fabrics, Figure 2 for narrow woven fabrics and Figure 3 for unidirectional sheet or tape.

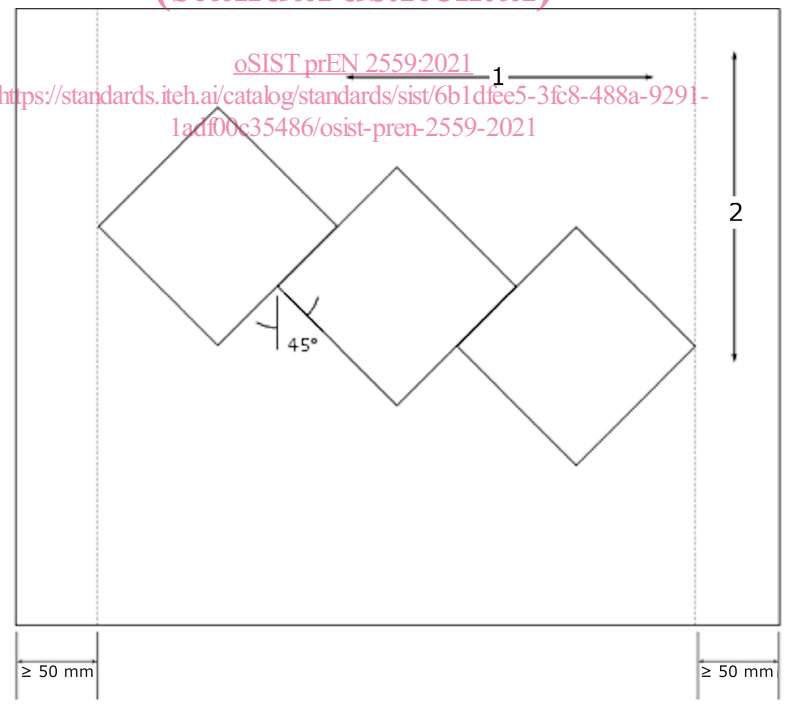


Key

1 Weft (fill) direction

2 Warp direction

Figure 1 — Example of positioning of specimens on woven carbon fibre fabrics sample across the width

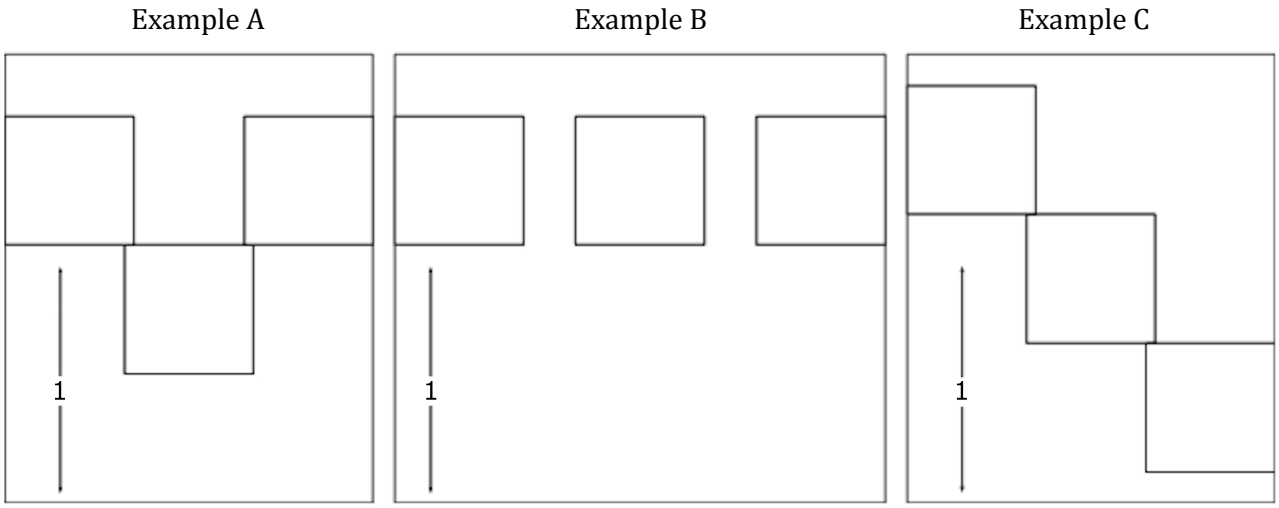


Key

1 Weft (fill) direction

2 Warp direction

Figure 2 — Example of positioning of specimens on woven carbon fibre fabric sample along an axis inclined at an angle as close as possible to the weft direction



Key

1 Fibre direction

Figure 3 — Examples of possible positioning of specimens on carbon fibre unidirectional sheet or tape sample

7 Procedure

7.1 Conditioning

7.1.1 Preimpregnates stored at ambient temperature

The amount of preimpregnate required for testing shall be sampled and then conditioned in the test atmosphere (see 7.2) for a minimum of 2 h, unless otherwise specified.

7.1.2 Preimpregnates stored below ambient temperature

The preimpregnate, suitably packed in an airtight and solvent resistant bag to prevent moisture pick-up, shall be allowed to reach ambient temperature over a period of time depending on its mass. This time shall be the point at which no condensation is observed on the poly bag. An alternative to this varying duration being not less than 8 h.

When the material has reached ambient temperature, the amount required for testing shall be sampled and then conditioned in the test atmosphere (see 7.2) for a minimum of 2 h, unless otherwise specified.

7.2 Atmosphere for testing

According to EN 2743, condition class B.

7.3 Time interval between conditioning and testing

The sample shall be maintained in the test atmosphere. Unless otherwise specified, once removed from the test atmosphere, tests shall be carried out within 6 h.