SLOVENSKI STANDARD
SIST EN 2331:2001

01-junij-2001

Aerospace series - Textile glass fibre preimpregnates - Test methods for the determination of the resin and fibre content and mass of fibre per unit area

Aerospace series - Textile glass fibre preimpregnates - Test methods for the determination of the resin and fibre content and mass of fibre per unit area

Luft- und Raumfahrt - Glasfilament-Prepreg - Prüfmethode zur Bestimmung des Harz- und Faseranteils sowie der flächenbezogenen Fasermasse

Série aérospatiale - Préimprégnés de fibres de verre textile - Méthode d'essai pour la détermination des teneurs en résine et en fibres et de la masse surfacique des fibres

Ta slovenski standard je istoveten z: **EN 2331:1993**

ICS:

49.025.60 Tekstilije Textiles

SIST EN 2331:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 2331:1993

March 1993

UDC 677.521.074.077.62:620.1:543.7:629.7

Descriptors: Aircraft industry, glass-cloth, plastics, preimpregnated products, tests, determination of content, resins, incineration analysis, extraction

English version

Aerospace series - Textile glass fibre preimpregnates - Test method for the determination of the resin and fibre content and mass of fibre per unit area

Série aérospatiale - Préimprégnés de fibres de verre textile - Méthode d'essai pour la détermination des teneurs en résine et en fibres et de la masse surfacique des fibres

Luft- und Raumfahrt - Glasfilament- Prepreg - Prüfmethode zur Bestimmung des Harz- und Faseranteils sowie der flächenbezogenen Fasermasse

This European Standard was approved by CEN on 1993-03-01. 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.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

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

Contents list

Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has successively received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to CEN.

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 September 1993, and conflicting national standards shall be withdrawn at the latest by September 1993.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard :
Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

1.1 This standard specifies a method for determining the resin content (with or without volatiles), fibre content and mass of fibre per unit area of a textile glass fibre preimpregnate by ignition or solvent extraction, for aerospace use.

1.2 This standard does not give any directives necessary to meet the health and safety requirements. It is the responsibility of the user of this standard to adopt appropriate health and safety precautions.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 2329 Aerospace series - Textile glass fibre preimpregnates - Test method for the determination of mass per unit area

EN 2330 Aerospace series - Textile glass fibre preimpregnates - Test method for the determination of the content of volatile matter

EN 2743 Aerospace series - Reinforced plastics - Standard procedures for conditioning prior to testing [1)]

3 Definitions

A textile glass fibre preimpregnate with a thermosetting or thermoplastic resin is a material in the form of a synthetic resin impregnated textile glass fibre unidirectional sheet, tape or woven fabric and used for the manufacture of moulded components.

4 Principle

4.1 Ignition method

Determination of the difference in mass by means of weighing before and after removal of the resin by ignition at a temperature of 625 °C to constant mass.

If the material to be tested contains only glass and a resin which is completely combustible, the resin content is equal to the loss on ignition.

4.2 Solvent extraction method

Determination of the difference in mass by means of weighing before and after extraction of the resin with methyl-ethyl-ketone or other suitable solvent, as agreed between the purchaser and the supplier, to constant mass. The resin content is equal to the loss on solvent extraction. If the material to be tested contains fillers that lose mass at a temperature equal to or below 600 °C, only this method shall be employed. Two variants are possible :

4.2.1 a standard method of extraction using a Soxhlet ;

4.2.2 a faster method of extraction by soaking and decantation.

---

1) Published as AECMA pre-standard at the date of publication of this standard

5 Designation

EXAMPLE :

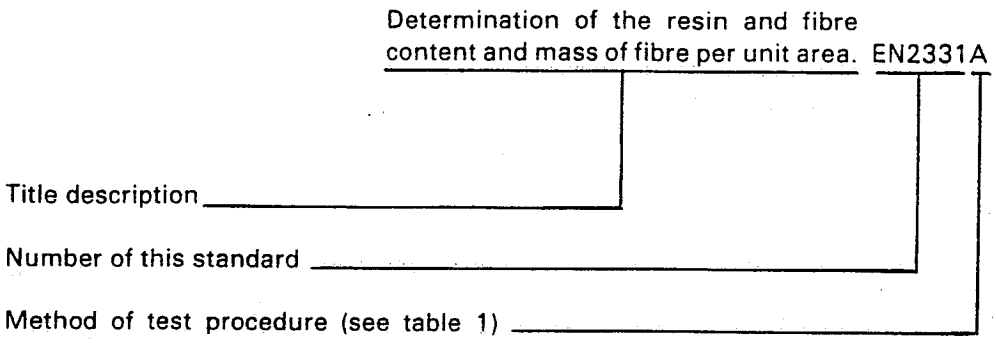

Table 1

Method	Principle	Procedure
A	Ignition (see 4.1)	See 9.1
B	Solvent extraction using a Soxhlet (see 4.2.1)	See 9.2
C	Solvent extraction by soaking and decantation (see 4.2.2)	See 9.3

6 Apparatus and chemicals

- Balance with an accuracy of 0,1 mg

- Template of standard specimen

- Ancillary items such as sharp knife and tweezers

6.1 Ignition method

- Laboratory burner of the Meker type or similar

- Container made of an appropriate material and of suitable dimensions (a porcelain or platinium crucible or porcelain boat may be used)

- Electric muffle furnace, capable of maintaining a temperature of 625 °C with an accuracy of ± 20 °C

- Desiccator containing a suitable drying agent (for example, silica gel, calcium chloride or phosphorus pentoxide)

6.2 Solvent extraction using a Soxhlet

- 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

- A suitable extraction apparatus of the Soxhlet type, comprising 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, as agreed between the purchaser and the supplier

6.3 Extraction by soaking and decantation

- Erlenmeyer flask or beaker

- Drying oven capable of maintaining a temperature of 105 °C with an accuracy of ± 5 °C

- Vacuum desiccator

- A suitable solvent for extraction, as agreed between purchaser and supplier

- Acetone (propanone)

7 Atmosphere for conditioning and testing

7.1 Conditioning

7.1.1 Conditioning of material stored at ambient temperature

For material stored at ambient temperature, the amount of material required for testing shall be sampled and conditioned in the test atmosphere (see 7.2.1) for a minimum of 2 h, unless otherwise specified.

7.1.2 Conditioning of material stored below ambient temperature

For material stored at temperatures lower than ambient temperature, the material, 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 according to the mass of the package. This time shall not be less than 8 h and the actual time shall be recorded in the report.

When the material has reached the ambient temperature, the amount required for testing shall be sampled and conditioned in the test atmosphere (see 7.2.1), for a minimum of 2 h, unless otherwise specified.

7.2 Testing

7.2.1 Atmosphere for testing

The tests shall be carried out at temperature and relative humidity conditions in accordance with EN2743B.

7.2.2 Time interval between conditioning and testing

Unless otherwise specified, the test shall be carried out within 6 h, after conditioning, the specimen being kept in the test atmosphere until the test is carried out.

8 Sampling and specimens

8.1 Specimen

The specimen has a square shape. The dimension of the sides shall be (100 ± 1) mm.

Other dimensions of the specimen may be used, subject to agreement between the purchaser and the supplier, but shall have a surface area of 100 cm² with a tolerance of ± 2 %.

8.2 Number and distribution of test specimens

At least three specimens shall be used.

These shall be evenly distributed and cut from the sample diagonally across the width or length, as shown in figure 1 and 2 for woven fabrics and in figure 3 for unidirectional sheet or tape.

NOTE : Specimens used for the determination of the mass per unit area (EN 2329) can then be used for the determination of resin content.

9 Procedure

9.1 Ignition method

9.1.1 Preparation of container

Before commencing each series of tests, a test with the empty container shall be performed, by heating in the muffle furnace, cooling in a dessicator, weighing and repeating these operations, until the mass is constant to 1 mg on two succesive weighings.

NOTE : The weighing of the container shall be performed after the container has been cooled to ambient temperature in a dessicator.

9.1.2 Weighing and ignition of the specimens

For each specimen, carry out the following sequence of operations :

9.1.2.1 Weigh the container to the nearest mg (m_1). Place the specimen, cut into pieces of convenient size, in the container, and weigh to the nearest mg (m_2).

Heat the container with the specimen in a flame until the contents ignite.

Maintain such a temperature that the specimen burns at a moderate rate until only ash and carbon remain when the burning ceases.

9.1.2.2 Heat the container and residue in the muffle furnace to a temperature of (625 ± 25) °C and maintain this until all carbon has disappeared.

9.1.2.3 Cool the container and the residue in a desiccator to ambient temperature and weigh to the nearest mg (m_3).

9.1.2.4 Repeat the operations specified in 9.1.2.2 and 9.1.2.3 until the difference in mass on two successive weighings is less than 1 mg.

9.2 Solvent extraction using a Soxhlet

9.2.1 Preparation of extraction thimble

Dry the extraction thimble in an oven at (105 ± 5) °C for 2 h, cool to ambient temperature in a desiccator and weigh, then repeat these for each test specimen, carry ou the following, until the mass is constant to 1 mg on two successive weighings.

9.2.2 Weighing of specimen and (solvent) extraction of resin

For each specimen, carry out the following sequence of operations :

9.2.2.1 Weigh the thimble to the nearest mg (m_4). Place the specimen, cut into pieces of convenient size, in the thimble, care being taken that no fragments are lost, and weigh to the nearest mg (m_5). Place the thimble and its contents in the siphon tube of the extraction apparatus. Fit the condenser, siphon tube and flask together and add a suitable quantity of methyl-ethyl-ketone (MEK) or other suitable solvent, as agreed between purchaser and supplier.

9.2.2.2 Regulate the heating of the mantle so that the siphoning rate is compatible with the total extraction of the resin within 1 h.

Carry out the process for 1 h $^{+\ 10}_{\ 0}$ min or for another period as agreed between the purchaser and the supplier.

9.2.2.3 Remove the thimble and contents, dry in an oven and then cool in a vacuum desiccator and weigh to the nearest mg (m_6).

9.2.2.4 Repeat the drying specified above until the difference in mass on two successive weighings is less than 1 mg.