SLOVENSKI STANDARD
SIST EN ISO 9163:2005

01-julij-2005

Nadomeġļa:
SIST EN ISO 9163:2000

Steklene tkanine - Snopiļi i steklenih vlaken (rovings) - Priprava preskuġancev in ugotavljanje natezne trdnosti impregniranih snopiļ ev steklenih vlaken (rovings) (ISO 9163:2005)

Textile glass - Rovings - Manufacture of test specimens and determination of tensile strength of impregnated rovings (ISO 9163:2005)

Textilglas - Rovings - Herstellung von Probekörpern und Bestimmung der Zugfestigkeit von imprägnierten Rovings (ISO 9163:2005)

Verre textile - Stratifils - Fabrication d'éprouvettes et essai de traction sur stratifil imprégné (ISO 9163:2005)

Ta slovenski standard je istoveten z: **EN ISO 9163:2005**

ICS:

59.100.10 Materiali iz steklenih vlaken Textile glass materials

SIST EN ISO 9163:2005 **en**

EUROPEAN STANDARD

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EN ISO 9163

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ICS 59.100.10

Supersedes EN ISO 9163:1998

English version

Textile glass - Rovings - Manufacture of test specimens and determination of tensile strength of impregnated rovings (ISO 9163:2005)

Verre textile - Stratifils - Fabrication d'éprouvettes et essai de traction sur stratifil imprégné (ISO 9163:2005)

This European Standard was approved by CEN on 15 March 2005.

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This European Standard exists 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN ISO 9163:2005: E

Foreword

This document (EN ISO 9163:2005) has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

This document supersedes EN ISO 9163:1998.

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of an identical text or by endorsement, at the latest by October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 9163:2005 has been approved by CEN as EN ISO 9163:2005 without any modifications.

INTERNATIONAL STANDARD

ISO 9163

Second edition
2005-04-01

Textile glass — Rovings — Manufacture of test specimens and determination of tensile strength of impregnated rovings

Verre textile — Stratifils — Fabrication d'éprouvettes et essai de traction sur stratifil imprégné

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 9163 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 13, *Composites and reinforcement fibres*.

This second edition cancels and replaces the first edition (ISO 9163:1996), which has been technically revised, as follows:

- The reference method remains essentially the same, with a few corrections, as in ISO 9163:1996.
- The so-called “fast method” described in ISO 9163:1996 has been deleted because it was no longer used. It has been replaced by a method which needs far less time and gives results consistent with the reference method.

Textile glass — Rovings — Manufacture of test specimens and determination of tensile strength of impregnated rovings

1 Scope

This International Standard specifies two methods for the determination of the tensile stress at break of an impregnated roving:

— a reference method using test specimens produced with moulded epoxy tabs;

— a short method using test specimens with no tabs or simple cardboard or composite tabs.

The methods are applicable to both assembled (multistrand) and direct (multifilament) rovings; nevertheless the reference method may be used for various linear densities, but the short method is described for 1 200 tex rovings only, which is the linear density that allows the fibres in the roving to spread out most easily during impregnation.

2 Normative references

The following referenced documents are indispensable for the application 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 472, *Plastics — Vocabulary*

ISO 1172, *Textile-glass-reinforced plastics — Prepregs, moulding compounds and laminates — Determination of the textile-glass and mineral-filler content — Calcination methods*

ISO 1887, *Textile glass — Determination of combustible-matter content*

ISO 1889, *Reinforcement yarns — Determination of linear density*

ISO 2078, *Textile glass — Yarns — Designation*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 3951-1, *Sampling procedures for inspection by variables — Part 1: Specification for single sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection for a single quality characteristic and a single AQL*

ISO 7822, *Textile glass reinforced plastics — Determination of void content — Loss on ignition, mechanical disintegration and statistical counting methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 and the following apply.

3.1
breaking force
force or load required to rupture a test specimen in a tensile test, usually expressed in newtons

3.2
gauge length
nominal length between the spines of contact of an extensometer (expressed in millimetres), by reference to which the length increase due to a tensile force is determined

3.3
relative elongation
ratio of the increase in length (expressed in millimetres) between the spines of contact of an extensometer, resulting from application of a tensile force, to the gauge length of the extensometer (also expressed in millimetres)

3.4
breaking stress
ratio (expressed in megapascals) of the breaking force (expressed in newtons) to the cross-sectional area of a roving (expressed in square millimetres)

3.5
loading stress
ratio (expressed in megapascals) of the tensile force applied to a roving during a tensile test (expressed in newtons) to the cross-sectional area of the roving (expressed in square millimetres)

NOTE The force experienced by the resin can be neglected.

3.6
cross-sectional area
S
area of the cross-section of a roving given, in square millimetres, by the formula:

$$\frac{\rho_l \times 10^{-3}}{\rho_g} \quad (1)$$

where

ρ_l is the exact linear density of the unsized roving, in tex;

ρ_g is the density of the glass constituting the roving, in grams per cubic centimetre.

3.7
proportional limit
greatest stress (expressed in megapascals) for which the relative elongation is proportional to the applied force

4 Principle

A specimen of impregnated roving is subjected to tensile loading to rupture using a suitable mechanical apparatus, and the breaking stress of the specimen determined.

5 Sampling and conditioning

Carry out sampling in accordance with ISO 2859-1, using the “inspection by attributes” method, or in accordance with ISO 3951-1, using the “inspection by variables” method in order to minimize the number of elementary units (packages) to be selected.

Condition the packages selected for at least 12 h in one of the standard atmospheres given in ISO 291.

6 Production of test specimens — Reference method

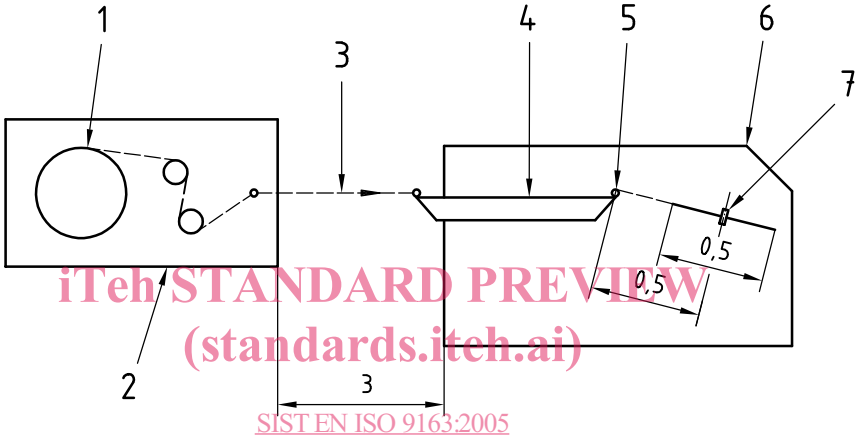
6.1 Apparatus

Ordinary laboratory apparatus, plus the following:

6.1.1 Impregnation apparatus (see Figure 1), including the following elements:

6.1.1.1 Reel, equipped with a tension-regulating system capable of maintaining the roving under a tension between 0,2 N and 20 N by positioning the tensioning bars (see Figure 2) to obtain a correct level of impregnation. The tension can be adjusted by measuring it with a tension-measuring instrument between the reel and the entrance guide.

Dimensions in metres



Key

1 reel
2 tension-regulating system
3 roving
4 impregnation vat
5 die
6 winding system
7 former

Figure 1 — General layout of impregnation apparatus

6.1.1.2 Impregnation vat, equipped with yarn guides (see Figure 2).

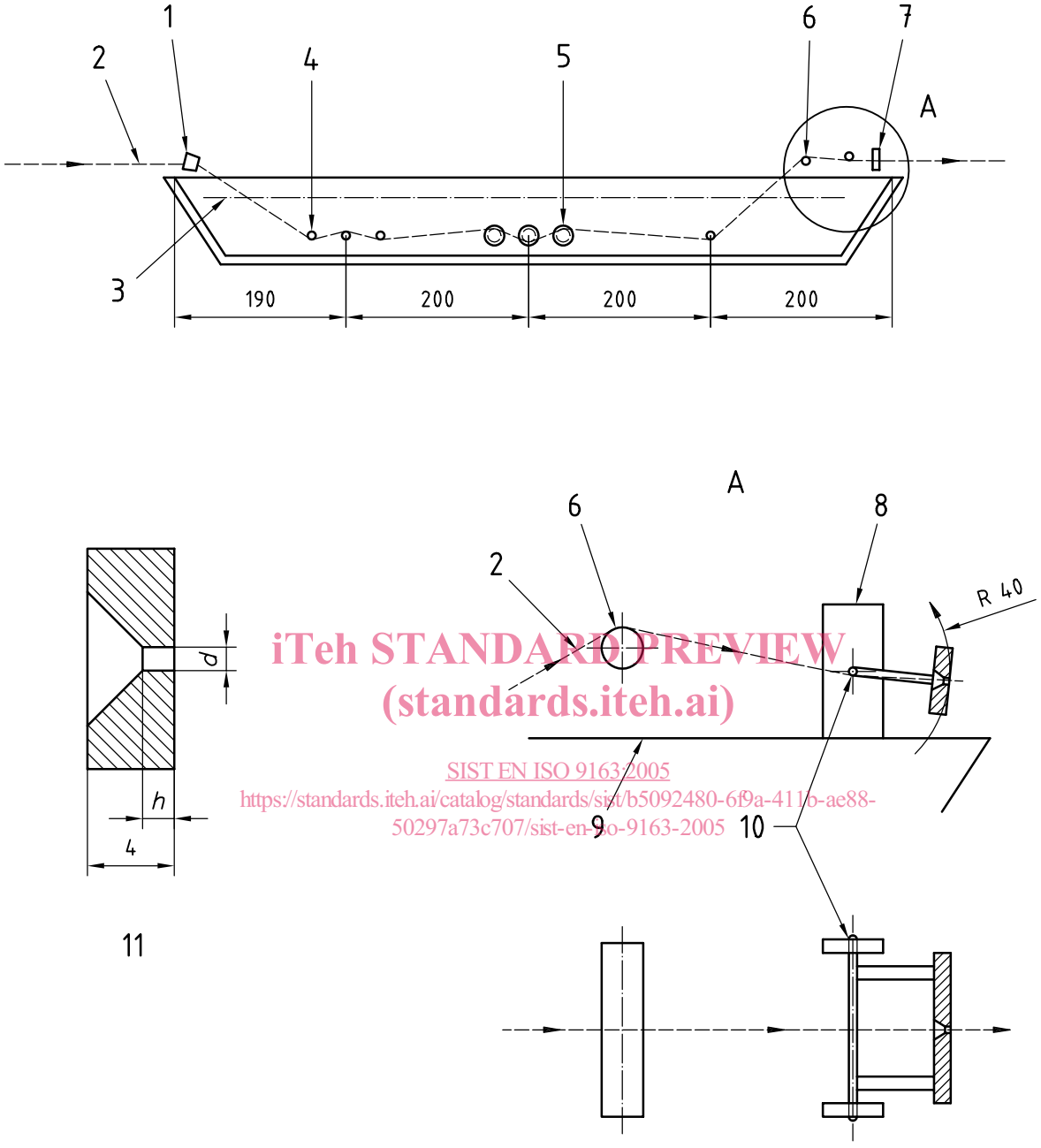
It shall be capable of maintaining a temperature of up to 130 °C with a precision of ± 5 °C (the actual temperature set will depend on the resin system).

The use of a double-walled vat, with heating fluid circulating between the walls, is recommended. If a vat of this kind is not available, a hotplate may be used.

6.1.1.3 Stainless-steel die, designed to give the impregnated roving a defined circular cross-section.

The die shall be mounted on a spindle, permitting it to align itself automatically with the roving during reeling (see Figure 2).

Dimensions in millimetres



Key

1 entrance guide (eye type)
2 roving
3 resin level
4 tensioning bars (smooth)
5 tensioning bars (grooved)
6 exit tensioning bar
7 die
8 die support
9 impregnation vat
10 rotating spindle of die, Ø 3 mm

NOTE Any equipment which is equivalent to the one illustrated above may be used, provided satisfactory impregnation is obtained. Nevertheless, it is recommended that a die diameter given in Table 1 be used, in order to obtain a reproducible impregnation ratio.

Figure 2 — Vat and die