SLOVENSKI STANDARD
oSIST prEN ISO 10352:2019

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Z vlakni ojačeni polimerni materiali - Zmesi za oblikovanje in preimpregniranje - Ugotavljanje mase na enoto površine in mase vlaken na enoto površine (ISO/DIS 10352:2019)

Fibre-reinforced plastics - Moulding compounds and prepregs - Determination of mass per unit area and fibre mass per unit area (ISO/DIS 10352:2019)

Faserverstärkte Kunststoffe - Formmassen und Prepregs - Bestimmung der flächenbezogenen Masse und flächenbezogenen Fasermasse (ISO/DIS 10352:2019)

Plastiques renforcés de fibres - Détermination de la masse surfacique et de la masse des fibres par unité de surface (ISO/DIS 10352:2019)

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17.060	Merjenje prostornine, mase, gostote, viskoznosti	Measurement of volume, mass, density, viscosity
83.120	Ojačani polimeri	Reinforced plastics

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Fibre-reinforced plastics — Moulding compounds and prepregs — Determination of mass per unit area and fibre mass per unit area

Plastiques renforcés de fibres — Mélanges à mouler et préimprégnés — Détermination de la masse surfacique

ICS: 83.120

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Contents

Page

Foreword

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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*.

This fourth edition cancels and replaces the third edition (ISO 10352:2010), which has been technically revised.

The main changes compared to the previous edition are as follows.

a) Determination of fibre mass per unit area by Method A, Method B, Method C, Method D and Method E have been added.

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.

Fibre-reinforced plastics — Moulding compounds and prepregs — Determination of mass per unit area and fibre mass per unit area

1 Scope

This International Standard specifies a method for the determination of the mass per unit area and five methods (Method A to Method E) for the determination of the fibre mass per unit area of moulding compounds and prepregs.

Method A: Extraction by soxhlet

Method B: Extraction by immersion in solvent in a beaker

Method C: Decomposition by loss ignition

Method D: Extraction by wet combustion

Method E: Method by calculation

This International Standard is applicable to the following types of material:

— moulding compound and preimpregnated unidirectional sheet, tape, fabric and mats.

— prepregs in which any type of reinforcement (aramid, carbon, glass, etc.) and any type of matrix (thermosetting or thermoplastic) has been used.

Typically, reinforcement fibres are coated with sizing or finishes. These normally dissolve with the resin and are, therefore, included in the resin content.

This International Standard is not applicable to the following types of prepregs:

— these containing reinforcements which are soluble (or partly soluble) in the solvents used to dissolve the resin.

2 Normative references

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 472, *Plastics — Vocabulary*

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

ISO 4602, *Reinforcements — Woven fabrics — Determination of number of yarns per unit length of warp and weft*

3 Terms and definitions

3.1
elementary unit
individual sample roll or sheet which is intended for the measurement of the mass per unit area using this International Standard

Note 1 to entry: prepregs are usually supplied in rolls or in packs of sheets. In this context, an individual roll or pack of sheets is an elementary unit.

3.2
laboratory sample
sample taken from an elementary unit

3.3
test specimen
specimen cut from a laboratory sample

4 Principle

4.1 Determination of mass per unit area

The mass of a test specimen of known area is determined. Two different specimen sizes are specified, depending on the type of material. If the material has been manufactured using a solvent or if the volatile-matter content of the material is not negligible, the sample is conditioned in a specified atmosphere before test specimens are taken. The result is expressed as the mass per unit area.

4.2 Determination of fibre mass per unit area

4.2.1 Method A: Extraction by soxhlet

Determination of mass by means of weighting to constant mass after extraction of the resin with suitable solvent. Solvent to use shall be able to extract all the resin component completely from the specimen.

4.2.2 Method B: Extraction by immersion in solvent in a beaker

Similar to 4.2.1 but faster. In case of dispute, 4.2.1 shall be applied.

4.2.3 Method C: Decomposition by loss on ignition

Determination of mass by means of weighting to constant mass after decomposition of the resin by ignition.

4.2.4 Method D: Extraction by wet combustion

Determination of mass by means of weighting to constant mass after extraction of the resin by acid digestion. Use a solution of concentrated sulphuric acid and hydrogen peroxide.

4.2.5 Method E: Method by calculation

If the linear density (in accordance with ISO 1889) and the number of yarns per unit (in accordance with ISO 4602) in use is known, the fibre mass per unit area can be simply calculated.

5 Apparatus and reagents

5.1 General

Normal laboratory equipment is required plus the following specific apparatus.

5.1.1 Balance, graduated in tenths of 0,1 mg and accurate to 0,5 mg.

5.1.2 Square template, with the dimensions given in Table 1 for the material being tested, with an accuracy of 0,1 mm on the length of each side.

5.1.3 Ancillary items, such as a sharp cutting tool and tweezers.

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

5.2 For method A

5.2.1 Single thickness extraction thimble, nominal diameter 20 mm to 22 mm, nominal length 60 mm to 80 mm.

5.2.2 Electric oven, capable of maintaining a temperature of 105 °C with an accuracy of 5 °C

5.2.3 Extraction apparatus of the Soxhlet type, comprising a condenser, siphon tube and flask and provided with an electric heating mantle

5.2.4 Suitable solvent for extraction, — analytical grade — solvent to use shall be able to extract all the resin component completely from the specimen.

NOTE 1 General solvent is methyl-ethyl-ketone (MEK), tetra-hydro-furan (THF), acetone, N-methyl-pyrrolidone (NMP), denatured ethanol and others.

NOTE 2 Other solvents or the combination of more than one solvent may be used in order to extract the full all of the resin component from the specimen.

5.3 For method B

5.3.1 Container 400 ml, Erlenmeyer flask or beaker

5.3.2 Electric oven, capable of maintaining a temperature of 105 °C with an accuracy of 5 °C

5.3.3 Suitable solvent for extraction, — analytical grade — solvent to use shall be able to extract all the resin component completely from the specimen

NOTE 1 General solvent is methyl-ethyl-ketone (MEK), tetra-hydro-furan (THF), acetone, N-methyl-pyrrolidone (NMP), denatured ethanol and others.

NOTE 2 Other solvents or the combination of more than one solvent may be used in order to extract the full all of the resin component from the specimen.

5.3.4 Acetone (propanone)

5.4 For method C

5.4.1 Crucible from porcelain or equivalent properties, with a capacity sufficient to completely contain the specimen

5.4.2 Electric oven, capable of maintaining a temperature of 105 °C with an accuracy of 5 °C

5.4.3 Muffle designed electric furnace, capable of maintaining temperature of 565°C with an accuracy of 30°**C**

5.4.4 Bunsen flame

5.4.5 Heatproof gloves and safety screen for eye protection