
**Fibre-reinforced plastics — Methods of
producing test plates —**

**Part 1:
General conditions**

*Plastiques renforcés de fibres — Méthodes de fabrication de plaques
d'essai —*
(Partie 1: Conditions générales)

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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 3.

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 part of ISO 1268 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 1268-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 13, *Composites and reinforcement fibres*.

Together with the other parts (see below), this part of ISO 1268 cancels and replaces ISO 1268:1974, which has been technically revised.

ISO 1268 consists of the following parts, under the general title *Fibre-reinforced plastics — Methods of producing test plates*:

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- *Part 1: General conditions*
 - *Part 2: Contact and spray-up moulding*
 - *Part 3: Wet compression moulding*
 - *Part 4: Moulding of prepregs*
 - *Part 5: Filament winding*
 - *Part 6: Pultrusion moulding*
 - *Part 7: Resin transfer moulding*
 - *Part 8: Compression moulding of SMC and BMC*
 - *Part 9: Moulding of GMT/STC*
 - *Part 10: Injection moulding of SMC and other long-fibre moulding compounds — General principles and moulding of multipurpose test specimens*
 - *Part 11: Injection moulding of SMC and other long-fibre moulding compounds — Small plates*

Fibre-reinforced plastics — Methods of producing test plates —

Part 1: General conditions

1 Scope

The various parts of ISO 1268 (see the foreword) describe methods used to prepare reinforced-plastics plates from which test specimens can be cut. This allows the properties of a composite, or the constituents of the composite, to be determined. The methods are intended to cover all the main types of reinforcement and resin matrix.

The choice of test plate preparation method depends on:

- a) the reinforcement:
 - its nature (glass, carbon, aramid, etc.);
 - its form (roving, mat, woven fabric, etc.);
 - its orientation with respect to the length, width and thickness of the plate;
 - its content in the reinforced plastic;
- b) the matrix (thermosetting or thermoplastic);
- c) the magnitude expected for the properties;
- d) the production process that is to be evaluated.

Since the mechanical properties of a reinforced plastic are known to be dependent on the process by which the plastic is produced, it is recommended that the test plates be prepared, if possible, by the same method that will be used to produce the plastic.

This part of ISO 1268 describes the general requirements common to all the methods.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 1268. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 1268 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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*

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ISO 1183 (all parts), *Plastics — Methods for determining the density of non-cellular plastics*

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

ISO 10724-2:1998, *Plastics — Injection moulding of test specimens of thermosetting powder moulding compounds (PMCs) — Part 2: Small plates*

3 Terms and definitions

For the purposes of this part of ISO 1268, the terms and definitions given in ISO 472 apply. Each subsequent part of ISO 1268 gives, where necessary, the definitions of specific terms it needs to introduce.

4 Health and safety

The various parts of ISO 1268 are limited to describing test plate preparation methods. The conditions under which the materials used are handled shall comply with the national regulations in force in each country and the staff shall be informed of the hazards involved and appropriate precautions taken.

5 Principle

Subsequent parts of this International Standard describe the basic methods utilized to produce test plates.

6 Raw materials and semi-finished products

All the materials used (reinforcements, resins, additives, SMC, BMC, prepregs, etc.) shall be identified in a precise manner. They shall be stored under the conditions recommended by the manufacturer and shall be used before the expiration date marked on the label.

7 Plate dimensions

The length, width and thickness of the plates produced will depend on the material being processed and the method used to produce them. The dimensions shall be as specified in the relevant part of this International Standard.

NOTE The plate dimensions will also depend on the test which will be conducted on the test specimens cut from the plates. For example, a square plate of side at least 250 mm is required to perform tensile tests in two perpendicular directions.

8 Reinforcement

The reinforcement content of the plate shall be the same as in the finished products whose properties are to be evaluated. In the absence of particular specifications, use the recommended content given in the relevant part of this International Standard.

9 General requirements for the laboratory/workshop apparatus

Unless otherwise specified, the apparatus used to produce the plates shall be capable of maintaining the required temperatures and pressures to within the accuracy prescribed for the chosen plate production method.

The laboratory/workshop shall be equipped with monitoring equipment which will enable the production temperature and pressure to be recorded as a function of time.

10 Procedure

The procedure used to prepare the test plates will differ depending on the process and materials used. The procedure to be followed for a particular plate production method is described in the relevant part of this International Standard.

11 Verification of the characteristics of the plates obtained

11.1 General

The plates obtained shall be inspected prior to cutting out test specimens. The criteria for acceptance or rejection of a plate shall be as defined in the materials specifications and in the plate production method, or as agreed between the interested parties.

11.2 Fibre content

The fibre content shall be determined in accordance with ISO 1172 for glass-reinforced plastics and by a method agreed on between the interested parties for carbon-reinforced plastics.

The lay-up sequence can be determined by examination of the residue.

11.3 Degree of porosity or void content

The degree of porosity, or void content, is a measure of the frequency of occurrence of open or closed cavities in the plate. Any of several methods may be used to determine it: visual examination, examination of a polished cross-section using a microscope (see ISO 7822), ultrasonic examination or X-ray examination.

11.4 Density

The density may be determined in accordance with the appropriate part of ISO 1183.

11.5 Dimensions

The thickness of the plates shall be measured and, where necessary, the other dimensions.

12 Marking

Each plate shall be marked to allow the identification of

- the mould or the mould cavity used;
- the side of the plate;
- the lay-up sequence, if required;
- the orientation of the plate with respect to the melt flow direction, or to any other direction specific to the material or the method of production.

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The system of lines (thin or broad, single or multiple) described in ISO 10724-2:1998, annex C, shall be used.

In addition, plates shall have markings enabling the plate preparation report to be easily traced.

13 Test plate preparation report

The test plate preparation report shall indicate the following information:

- a) a reference to the relevant part of this International Standard;
- b) the place and date of production of the plate or plates;
- c) a full description of the materials used, including details of resins, reinforcements, fillers, etc.;
- d) the composition of the resin system used, where applicable;
- e) a description of the equipment used;
- f) details of the operating conditions;
- g) details of the lay-up of the plate or plates;
- h) the values of the test plate characteristics (e.g. thickness, fibre content) which the relevant part of this International Standard requires to be determined and any other characteristics when applicable (see clause 11);
- i) any other information needed to reproduce the plates exactly;
- j) any deviations from the relevant part of this International Standard.

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