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Textile-glass-reinforced plastics — Determination of compressive properties in the direction parallel to the plane of lamination

*Plastiques renforcés de fibres de verre textile — Détermination des
caractéristiques en compression parallèlement au plan de stratification*



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Foreword

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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.

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Textile-glass-reinforced plastics — Determination of compressive properties in the direction parallel to the plane of lamination

1 Scope

This International Standard specifies two methods for determining compressive properties, in the direction parallel to the plane of lamination of flat textile-glass-reinforced laminates.

Method A is applicable to laminates of 2 mm to 4 mm thickness.

Method B is applicable to laminates of 3 mm to 10 mm thickness.

The compressive properties are of interest for specifications and quality control.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 291:1977, *Plastics — Standard atmospheres for conditioning and testing*.

ISO 468:1982, *Surface roughness — Parameters, their values and general rules for specifying requirements*.

ISO 1268:1974, *Plastics — Preparation of glass fibre reinforced, resin bonded, low-pressure laminated plates or panels for test purposes*.

ISO 2602:1980, *Statistical interpretation of test results — Estimation of the mean — Confidence interval*.

ISO 9353:1991, *Glass-reinforced plastics — Preparation of plates with unidirectional reinforcements by bag moulding*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 modulus of elasticity in compression: Ratio of stress to corresponding strain within the range of proportionality between stress and strain. It is expressed in megapascals.

3.2 compressive stress in the direction parallel to the plane of lamination: Compressive force, carried by the test specimen at any particular moment, divided by the initial cross-sectional area of the parallel portion of the specimen. It is expressed in megapascals.

3.3 compressive strain: Ratio of the decrease in the distance between gauge marks on the parallel portion of the test specimen (due to a compressive force) to the initial distance between the gauge marks.

4 Principle

An axial force is applied to the two ends of a vertically held parallelepipedic bar by means of a ram moving at constant speed.

5 Apparatus

5.1 Method A

5.1.1 Test machine.

A properly constructed and calibrated test machine shall be used which can be operated at an approximately constant rate of relative movement of the members and in which the error for the indicated loads does not exceed $\pm 1\%$ and the error for the indicated strains does not exceed $\pm 2\%$.

Two flat steel platens at least 20 mm thick are attached to the test machine in such a way that one is

on top and the other on the bottom of the assembled test fixture.

5.1.2 Compression fixture.

A line drawing and a schematic of the compression fixture are given in figure 1 and figure 2, respectively. Referring to figure 2, the fixture has split collet-type grips, A, B and A', B', at both ends. The grip cavities have file face linings, alignment pins for proper closure, and a closed width and thickness of 7 mm and 3,6 mm, respectively. The grips have an outer 10° conical taper and fit into sleeves (C) with a matching inner taper. It is allowed to use other types of grip and sleeve (trapezoid, for example).

Dimensions in millimetres

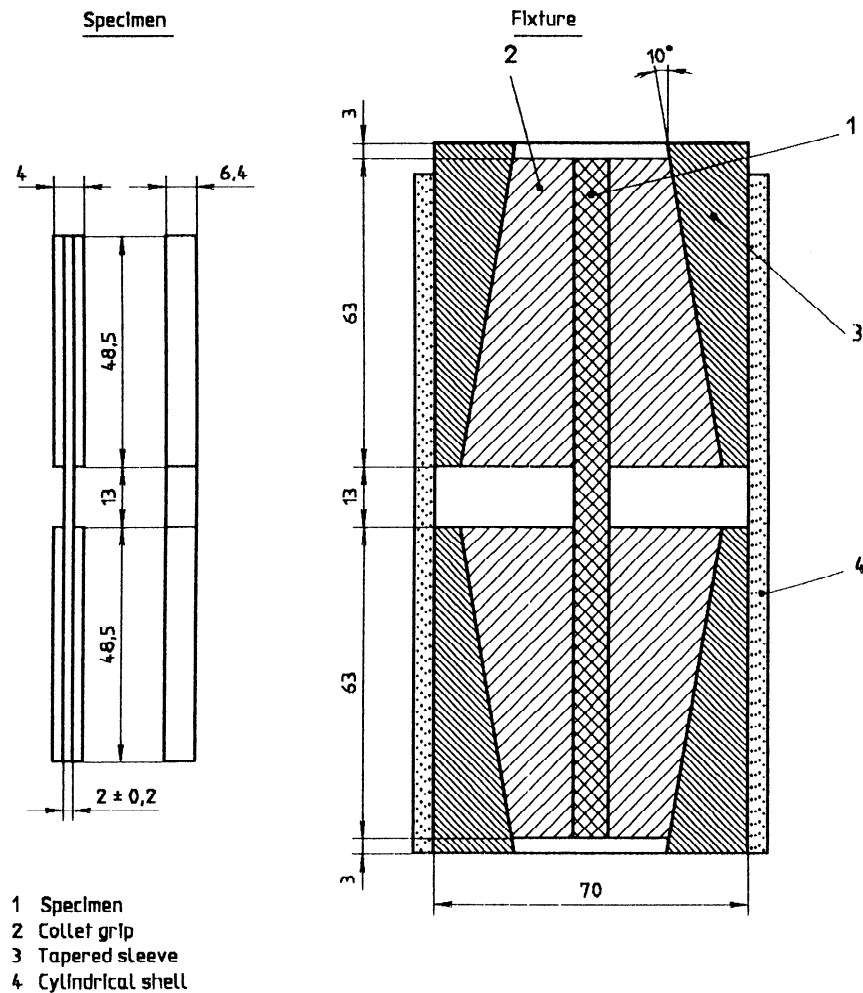


Figure 1 — Compression test specimen and fixture for method A