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STANDARD

ISO
11093-9

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1994-12-15

Paper and board — Testing of cores —

Part 9:

Determination of flat crush resistance

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Papier et carton — Essais des mandrins —

Partie 9: Détermination de la résistance à l'écrasement à plat
ISO 11093-9:1994

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Reference number
ISO 11093-9:1994(E)

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.

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.

International Standard ISO 11093-9 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 3, *Dimensions and grammage of paper, board and pulp products*.

ISO 11093 consists of the following parts, under the general title *Paper and board — Testing of cores*:

- Part 1: *Sampling*
- Part 2: *Conditioning of test samples*
- Part 3: *Determination of moisture content using the oven drying method*
- Part 4: *Dimensional measurements*
- Part 5: *Determination of characteristics of concentric rotation*
- Part 8: *Machine test for dynamic cleavage*
- Part 9: *Determination of flat crush resistance*

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Paper and board — Testing of cores —

Part 9:

Determination of flat crush resistance

1 Scope

This part of ISO 11093 specifies a method for determining the maximum flat crush resistance of wound paper and board cores.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 11093. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 11093 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 11093-1:1994, *Paper and board — Testing of cores — Part 1: Sampling*.

ISO 11093-2:1994, *Paper and board — Testing of cores — Part 2: Conditioning of test samples*.

3 Definitions

For the purposes of this part of ISO 11093, the following definition applies.

3.1 flat crush resistance: Quantity expressed in kilonewtons per metre, calculated from the load acting at right angles to the axis of the test piece 100 mm long at the first maximum of the compressive force or levelling off of the load deformation curve.

4 Principle

The test piece is placed between pressure plates arranged in parallel so that its axis is parallel with the

plane of the pressure plates and compressed at a constant feed rate until the first maximum of the flat crush resistance has been exceeded.

5 Apparatus

5.1 Compression testing machine, with flat upper and lower platens held rigidly parallel during testing, permitting movement in a vertical direction only. The speed of the moving platen is the actual rate of travel of the platen while under the load. The compression machine shall be accurate to $\pm 1\%$ of the minimum crushing load used. The platens shall remain parallel to within 2% throughout the test.

5.2 Cutting device for making test pieces, capable of producing a cut $90^\circ \pm 1^\circ$ to the axis of the core.

6 Preparation of test pieces

6.1 Sampling

Sampling shall be carried out in accordance with ISO 11093-1.

6.2 Number of test pieces

One test piece shall be taken from each specimen, at least 100 mm from the core ends using the cutting device (5.2).

6.3 Shape of test piece

Test pieces cut from cores of nominal diameter ≤ 300 mm shall be $100 \text{ mm} \pm 1,5 \text{ mm}$ long at all points.

Test pieces cut from cores of nominal diameter > 300 mm shall be $300 \text{ mm} \pm 1,5 \text{ mm}$ long at all points.

6.4 Conditioning of test pieces

The test pieces shall be conditioned in accordance with ISO 11093-2.

7 Test procedure

Testing shall be carried out in a standard atmosphere identical to that used for conditioning the test pieces (see 6.4).

Place the test piece centrally between the pressure platens so that its longitudinal axis is parallel to the platens. Crushing shall be accomplished by evenly moving one platen towards the other or both platens simultaneously in opposite directions at a constant relative speed between 50 mm/min and 65 mm/min.

Subject the test piece to a load until the first maximum of the flat crush resistance is markedly exceeded, unless otherwise provided (for example when determining the flat crush resistance for a specified crushing path).

8 Test report

The test report shall include the following particulars:

- a) reference to this part of ISO 11093;
- b) type and designation of the cores tested;
- c) place and date of sampling;
- d) place and date of test;
- e) length and number of test pieces;
- f) individual values and statistical mean (rounded to 1 %) of the flat crush resistance, in kilonewtons per metre length of core;
- g) deviations, if any, from the method specified;
- h) date and signature.

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