INTERNATIONAL STANDARD

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Third edition
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Paper and board — Testing of cores —

Part 5:
Determination of characteristics of concentric rotation

Papier et carton — Essais des mandrins —

Partie 5: Détermination des caractéristiques de rotation

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 6, *Paper, board and pulps*.

This third edition cancels and replaces the second edition (ISO 11093-5:2009), of which it constitutes a minor revision. It also incorporates the Technical Corrigendum ISO 11093-5:2009/Cor.1:2010.

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: Measurement of dimensions*

— *Part 5: Determination of characteristics of concentric rotation*

— *Part 6: Determination of bending strength by the three-point method*

— *Part 7: Determination of flexural modulus by the three-point method*

— *Part 8: Determination of natural frequency and flexural modulus by experimental modal analysis*

— *Part 9: Determination of flat crush resistance*

Paper and board — Testing of cores —

Part 5:
Determination of characteristics of concentric rotation

1 Scope

This part of ISO 11093 specifies a method for determining the characteristics of concentric rotation of cylindrical board cores which meet the following criteria:

— minimum wall thickness: 5 mm;

— minimum external diameter: 60 mm;

— maximum sample length: 3 200 mm.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11093–1, *Paper and board — Testing of cores — Part 1: Sampling*

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

3 Principles

3.1 Determination of roundness deviation (f_R) by three-point measurement

Measurement between three points in a plane perpendicular to the core axis where two points are fixed in predetermined positions and the third moves in the direction of the measurement.
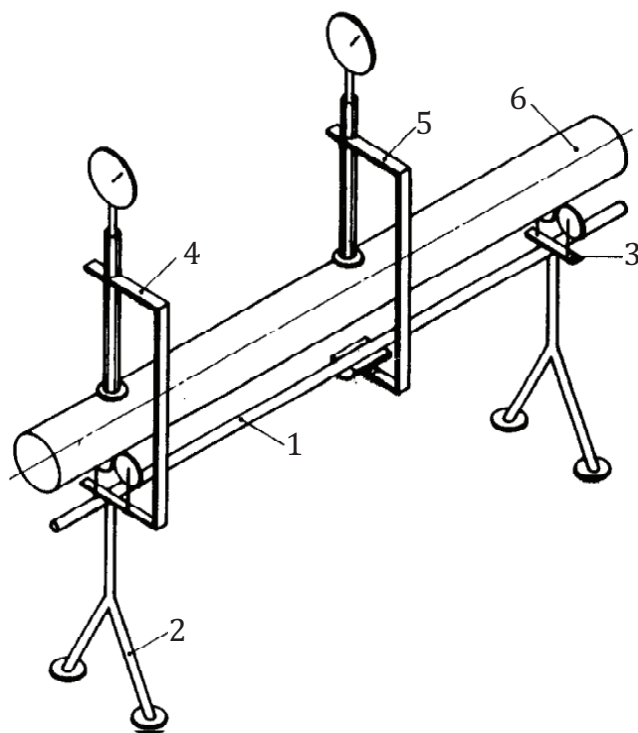
3.2 Determination of the straightness deviation (f_S) by five-point measurement

Measurement between five points in planes perpendicular to the core axis where four measuring points are fixed in pairs in predetermined positions in two planes perpendicular to the core axis, and the fifth in a central plane perpendicular to the core axis moves in the direction of the measurement.

4 Apparatus

The apparatus, shown in [Figure 1], consists of two supports (2), a rack (1), and two measuring heads (4 and 5). Each support consists of two free rotating support rollers mounted side by side (3) where the distance between the two can be adjusted. The diameter of each roller shall be (85 ± 1) mm and the width shall be (19 ± 1) mm. For example, a 6209 roller bearing can be used.

Each measuring head consists of a flat foot with a diameter of 10 mm, a rod which transmits the vertical movement of the foot to a dial gauge and a dial gauge graduated in 0,01 mm, accurate to at least 0,005 mm. The load exerted by each measuring foot on the test piece is approximately 1,2 N. One of the measuring heads (4) is fixed directly above the mid-point between one pair of support rollers. The other measuring head (5) is moveable parallel to the rack.

Key

1   rack
2   supports
3   support rollers
4   measuring head
5   measuring head, moveable
6   test piece

Figure 1 — Schematic representation of the apparatus

5   Preparation of test pieces

5.1   Sampling

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

5.2   Test pieces

For cores less than 3 200 mm long, the complete undamaged core shall be tested.

For cores more than 3 200 mm long, a test piece from 1 200 mm to 3 200 mm long shall be cut. If there is an obvious difference in warpage between various positions of the long core, the test piece shall be taken from where the warpage is greatest.

5.3   Conditioning of test pieces

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