INTERNATIONAL STANDARD

ISO 11093-8

Third edition
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Paper and board — Testing of cores —

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

Papier et carton — Essais des mandrins —

Partie 8: Détermination de la fréquence propre et du module de flexion par analyse modale expérimentale

Reference number
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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 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 6, *Paper, board and pulps*.

This third edition cancels and replaces the second edition (ISO 11093-8:2012), of which it constitutes a minor revision with the following changes:

— correction to 8.1, Formula (1);

— editorial updates.

It also incorporates the Technical Corrigendum ISO 11093-8:2012/Cor 1:2013, which included updates to Figure 1 and Figure 2.

A list of all parts in the ISO 11093 series can be found on the ISO website.

Paper and board — Testing of cores —

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

1 Scope

This document specifies a method for the determination of the flexural modulus by using experimentally measured natural frequencies in the free-free mode of transverse vibration of cylindrical paper and board cores, which meet the following criteria:

— internal diameter: 50 mm to 350 mm;

— minimum wall thickness: 0,02 × internal diameter or not less than 2,0 mm;

— minimum length of core: 8 × internal diameter.

NOTE For the determination of the flexural modulus by the three-point method, see ISO 11093-7.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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*

ISO 11093-3, *Paper and board — Testing of cores — Part 3: Determination of moisture content using the oven drying method*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
natural frequency
f_1
first frequency which is the lowest frequency a structure vibrates in, depending on its material, shape and supporting system, when an impulse is applied to it