
**Paper and board — Compressive
strength — Short-span test**

*Papier et carton — Résistance à la compression — Essai à faible
écartement*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 9895:2008](https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-422d8a2a30fc/iso-9895-2008)

[https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-
422d8a2a30fc/iso-9895-2008](https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-422d8a2a30fc/iso-9895-2008)



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 9895:2008

<https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-422d8a2a30fc/iso-9895-2008>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions.....	1
4 Principle	2
5 Apparatus	2
6 Calibration	3
7 Sampling.....	3
8 Conditioning.....	3
9 Preparation of test pieces.....	3
10 Procedure	3
11 Calculation and expression of results.....	4
11.1 General.....	4
11.2 Compressive strength.....	4
11.3 Compressive index.....	4
12 Precision.....	5
12.1 General.....	5
12.2 Repeatability.....	5
12.3 Reproducibility.....	5
13 Test report	5
Annex A (normative) Specifications for the clamps.....	6
Annex B (informative) The reason for not measuring strain at break	7
Bibliography	8

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 2.

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

ISO 9895 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*.

This second edition cancels and replaces the first edition (ISO 9895:1989), which has been revised to insert a grammage range in the scope of this International Standard. Compared to the first edition, some editorial changes have also been made.

[ISO 9895:2008](https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-422d8a2a30fc/iso-9895-2008)

<https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-422d8a2a30fc/iso-9895-2008>

Introduction

This International Standard has been developed in order to specify the conditions for determining the compressive strength of paper and board used for the manufacture of containers and boxes.

In this International Standard, the same terminology and symbols are used as in general literature concerning materials physics and mechanics.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 9895:2008](https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-422d8a2a30fc/iso-9895-2008)

<https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-422d8a2a30fc/iso-9895-2008>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 9895:2008

<https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-422d8a2a30fc/iso-9895-2008>

Paper and board — Compressive strength — Short-span test

1 Scope

This International Standard specifies a method for determining the compressive strength in the machine and cross-directions of paper and board using a short-span compressive tester. It is intended for papers and boards used for the manufacture of containers and boxes.

This International Standard is recommended for papers and boards with a grammage from 100 g/m² to 400 g/m².

NOTE 1 The procedure specified in this International Standard should not be used for the determination of strain at break (see Annex B).

NOTE 2 For the determination of compressive strength of laboratory sheets, see instructions in ISO 5270^[1].

2 Normative references

The following referenced documents are indispensable for the application 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 9895:2008
<https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-14801346-8ad3-49c8-bcee>
ISO 186, *Paper and board — Sampling to determine average quality*

ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 536, *Paper and board — Determination of grammage*

3 Terms and definitions

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

3.1

compressive strength

maximum compressive force per unit width that a test piece of paper or board can withstand until the onset of failure

NOTE The compressive strength is expressed in kilonewtons per metre.

3.2

compressive index

compressive strength divided by the grammage

NOTE The compressive index is expressed in kilonewton metres per kilogram.

4 Principle

A test piece, 15 mm wide, is clamped between two clamps, spaced 0,70 mm apart, which are forced towards each other until a compressive failure occurs. The maximum force is measured and the compressive strength is calculated.

5 Apparatus

5.1 Compressive tester, with two clamps (see Figure 1), for holding a test piece 15 mm wide. Each clamp includes a stationary jaw (S_1, S_2) and a movable jaw (M_1, M_2). The clamps (C_1 and C_2) shall be 30 mm long and have a high-friction surface. The clamps shall be able to hold the test piece (T) in position with a constant clamping force of $2\,300 \pm 500$ N. The clamps shall be designed so that they grip the test piece firmly over its full width (see also Annex A).

The stationary jaws shall be in the same plane and on the same side of the test piece. The clamping surfaces of the movable jaws shall be in the same plane and parallel to those of the stationary jaws. For specifications, see Annex A.

At the start of the test, the free span between the clamps shall be $0,70 \text{ mm} \pm 0,05 \text{ mm}$. Once the test is started, the clamps shall move towards each other at a speed of $3 \text{ mm/min} \pm 1 \text{ mm/min}$.

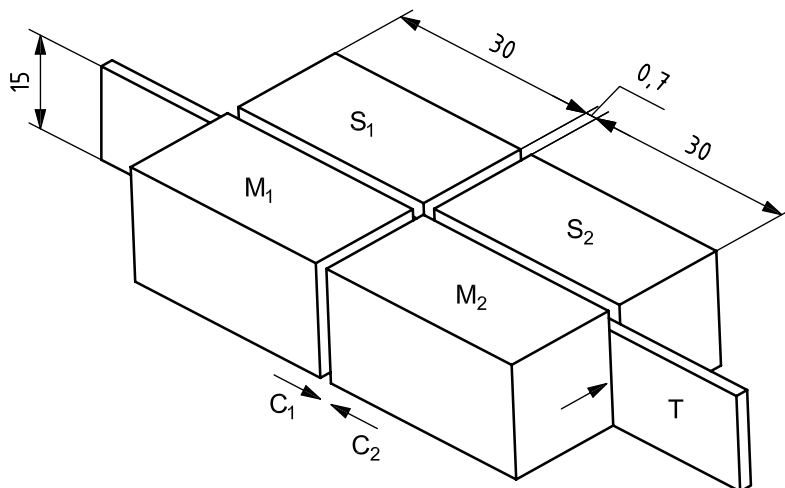
The tester shall have a measuring and display system so that the maximum compressive force can be determined with an error of less than $\pm 1 \%$ of the reading when this is within 10 % to 100 % of the full-scale range.

The tester shall be designed so that a device for calibrating the load cell using weights of known mass can be attached. Alternatively, calibrated strain gauges can be used.

The tester shall have a device showing the clamping force exerted by the jaws, expressed in newtons.

<https://standards.iteh.ai/catalog/standards/sist/14801346-8ad3-49c8-bcee-422d8a2a30fc/iso-9895-2008>

Dimensions in millimetres



Key

- C_1 and C_2 clamps
- M_1 and M_2 movable jaws
- S_1 and S_2 stationary jaws
- T test piece

Figure 1 — Clamping arrangement

5.2 Cutting device, designed to produce test pieces of the required dimensions with clean and parallel edges.

6 Calibration

Check the calibration of the compressive tester regularly using calibrated weights or strain gauges. Select calibration weights or strain gauges so that the entire measuring range is covered with checks at evenly spaced points. The error at any point shall not exceed $\pm 1\%$ of the reading within 10 % to 100 % of the full-scale range.

If the instrument is out of calibration, make adjustments as instructed by the manufacturer.

7 Sampling

If the tests are being performed to evaluate a lot, select the sample in accordance with ISO 186. If the tests are made on another type of sample, make sure that the test pieces used are representative of the sample received.

8 Conditioning

Condition the sample in accordance with ISO 187.

9 Preparation of test pieces

Prepare the test pieces in the same atmospheric conditions as used to condition the sample. From undamaged areas of the sample, cut test pieces in the form of strips of at least 70 mm in length and with a width of $15\text{ mm} \pm 0,1\text{ mm}$. Cut test pieces with the longer side parallel to the machine direction in order to determine the compressive strength in the machine direction. Cut test pieces with the longer side parallel to the cross-direction in order to determine the compressive strength in the cross-direction.

Cut a sufficient number of test pieces to allow at least 20 determinations in each required direction.

This test, like all other tests depending on resistance to compression, is very sensitive to change in the moisture content of the test piece. Handle the test pieces carefully and never touch the compressive zone with bare hands. Keep the test pieces away from moisture, heat, direct illumination, expiration air and other conditions that may change their moisture content. Ensure that the clamps are not exposed to heat from lamps, motors, etc.

The compressive strength is measured on a small area of $0,7\text{ mm} \times 15\text{ mm}$. In order to minimize the influence of local variations in the paper, at least 20 determinations are prescribed.

10 Procedure

Clamp the test piece in position in the jaws. Set the jaws in motion and read the maximum compressive force indicated. Test at least 20 test pieces in each required direction (machine direction and/or cross-direction).

If multiple tests are to be made on a single test piece, ensure that the test area is not a part of the test piece that has been in the clamping area during the previous test.

If required, determine the grammage of the conditioned sample (see Clause 8) in accordance with ISO 536.