
**Textiles — Determination of the
recovery from creasing of a folded
specimen of fabric by measuring the
angle of recovery —**

**Part 1:
Method of the horizontally folded
specimen**

*Textiles — Détermination de l'auto-défroissabilité d'une éprouvette
d'étoffe pliée, par mesurage de l'angle rémanent après pliage —*

Partie 1: Méthode de l'éprouvette pliée horizontalement





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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 of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 24, *Conditioning atmospheres and physical tests for textile fabrics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 248, *Textiles and textile products*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition of ISO 2313-1 cancels and replaces ISO 2313:1972, which has been technically revised.

The main changes compared to the previous edition are as follows:

- changing the normative reference ISO/R 139 to ISO 139;
- adding the tolerance of the load on the specimen in [5.1 a](#));
- redrafting the description about "Sampling and preparation of specimens" to improve clarity of meaning in [Clause 6](#) (former Clause 6 and Clause 7);
- revising the distance from the selvedge while taking the specimen, i.e. from "not less than 50 mm" to "not less than 150 mm" in [6.2](#) (former 7.1);
- revising the requirement of atmosphere for conditioning and testing according to ISO 139 in [Clause 7](#) (former 7.4);
- giving two crease recovery angles, i.e. "rapid crease recovery angle" obtained at 15 s after removal of the creasing load, and "delay crease recovery angle" obtained at 5 min after removal of the creasing load in [Clause 3](#) and in [8.3](#).
- revising result expression from "Calculate the mean value to the nearest degree" to "Calculate the mean value rounded off to one decimal place" in [Clause 9](#).

A list of all parts in the ISO 2313 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Creases in textile fabrics diminish at varying rates on the removal of the creasing forces. The magnitude of the crease recovery angle is an indication of the ability of a fabric to recover from accidental creasing.

The suitable method can be chosen according to the type or end-use of textile fabrics. The test results obtained by different methods are not comparable.

Textiles — Determination of the recovery from creasing of a folded specimen of fabric by measuring the angle of recovery —

Part 1: Method of the horizontally folded specimen

1 Scope

This document specifies a method for determining the angle of recovery of fabrics from creasing. The results obtained by this method for textile fabrics of very different kinds cannot be compared directly.

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 139, *Textiles — Standard atmospheres for conditioning and testing*

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 <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

crease recovery angle

angle formed between the two limbs of fabric specimen previously folded under prescribed conditions, at a specified time after removal of the creasing load

Note 1 to entry: In this method, rapid crease recovery angle is obtained at 15 s after removal of the creasing load.

Note 2 to entry: In this method, delay crease recovery angle is obtained at 5 min after removal of the creasing load.

4 Principle

A rectangular specimen of prescribed dimensions is horizontally placed in the flat surface and folded by means of a suitable device and maintained in this state for a specified time under a specified load. This creasing load is removed, the specimen is allowed to recover for a specified time, and then the crease recovery angle is measured.

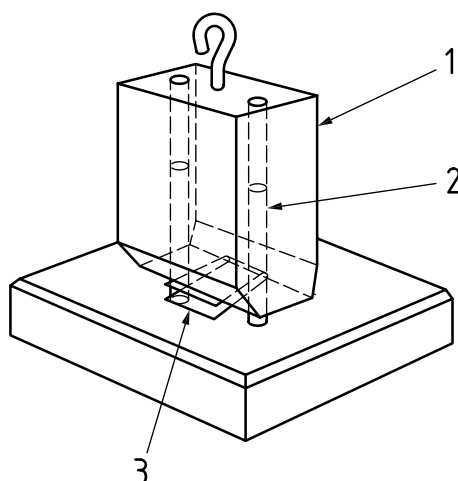
Attention is drawn to the fact that for some types of fabrics, the limpness, thickness and tendency to curl of the specimen can give rise to very ill-defined crease recovery angles, and therefore an unacceptable lack of precision in making measurements. Many wool and wool mixture fabrics come under this heading.

5 Apparatus

5.1 Apparatus for loading the specimen (press), consisting of the following parts:

- a) A press to apply a total load of $10,0 \text{ N} \pm 0,5 \text{ N}^1$ on an area of $15 \text{ mm} \times 15 \text{ mm}$ of the folded specimen. It shall be possible to complete the removal of the load within a period of less than 1 s.
- b) Two flat pressure plates which remain parallel to one another throughout the period of the application of the load to the specimen. On the lower plate an area of $15 \text{ mm} \times 20 \text{ mm}$ shall be marked or other provisions made to facilitate correct placement of the specimen.

An example of a loading apparatus is shown in [Figure 1](#).



Key

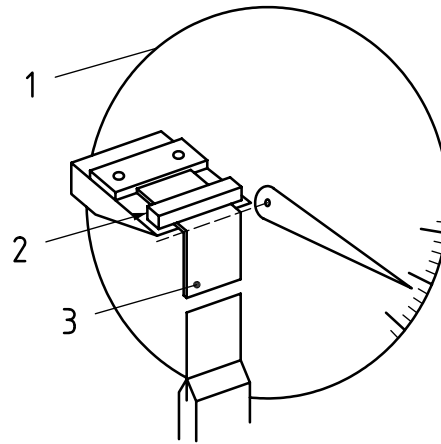
- 1 press
- 2 guide
- 3 folded specimen

Figure 1 — Apparatus with vertical guides for loading the specimen

5.2 Instrument for measuring the crease recovery angle, consisting of the following parts.

- a) A circular scale divided in degrees and correct to $\pm 0,5^\circ$. It shall be possible to read the angle correct to the nearest degree without parallax error.
- b) A specimen grip to hold the specimen in such a manner that the fold lies in a horizontal line through the centre of the circular scale. The edge of the grip shall lie 2 mm from the centre of the scale, as shown in [Figure 2](#). The specimen grip shall be rotatable about this axis to keep the free limb of the specimen in a vertical position.

A suitable device is shown in [Figure 2](#).



Key

- 1 circular scale
- 2 specimen grip
- 3 specimen

Figure 2 — Instrument for measuring the crease recovery angle

5.3 Stop-watch.

5.4 Tweezers with broad, spade shaped jaws.

5.5 Paper or metal foil, not thicker than 0,02 mm.

6 Sampling and preparation of specimens

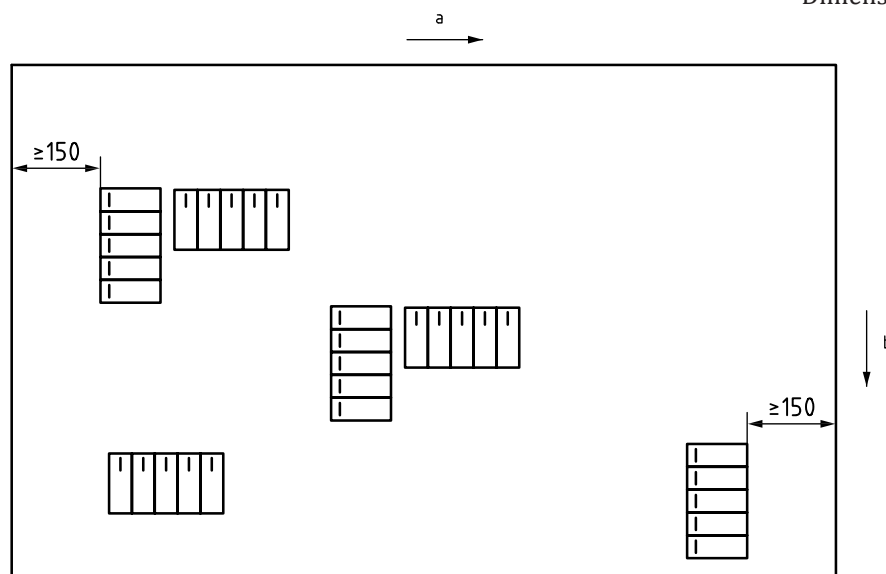
6.1 Cut the samples so as to be as representative as possible of the whole delivery.

NOTE 1 Newly finished fabrics and fabrics that have been subject to washing, dry cleaning or pressing treatments can show a gradual improvement increase recovery. Store samples from such fabrics for at least 6 days under room conditions before specimens are taken.

NOTE 2 The creasing propensity for cellulosic and protein fibre materials varies with time over a much longer period than 6 days, and to cancel any ageing effects, soak these fabrics in water at 20 °C for 30 min, centrifuge and steam press while still damp before conditioning as in [Clause 7](#).

6.2 In order to ensure a representative average for the fabric to be tested, take specimens in the manner shown in [Figure 3](#), and ensuring that specimens are taken not less than 150 mm from the selvedge. Do not take specimens from creased, wrinkled, bent, or deformed parts. Mark the length, for example (warp) direction on the face side of the fabric.

Dimensions in millimetres



a Transverse direction of sample.

b Length direction of sample.

Figure 3 — Example of sampling method

6.3 Cut rectangular specimens each 40 mm long and 15 mm wide.

6.4 Unless otherwise agreed by the interested parties, prepare not fewer than 20 specimens for each test, half of them taken with their short sides parallel to the warp (woven fabric) or wales (knitted fabric) or the direction marked “length” (non-woven fabric) and the other half with their short sides parallel to the weft (woven fabric) or courses (knitted fabric) or at right angles to the length direction (non-woven fabric).

7 Atmosphere for conditioning and testing

The standard atmosphere for conditioning and testing shall be as specified in ISO 139.

8 Test procedure

8.1 General conditions

Conduct all testing in the standard atmosphere according to ISO 139. Screen the testing equipment from draughts, from the operator’s breath and from excessive heat radiation from lighting appliances.

8.2 Loading

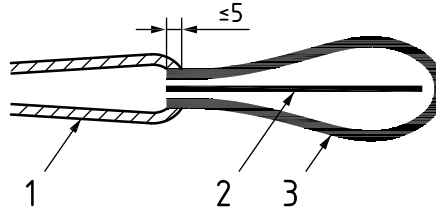
Fold the specimen end to end and hold in this position by tweezers, gripping no more than 5 mm from the ends. Where the surfaces of the specimens show any tendency to adhere, place a sheet of paper or metal foil 18 mm × 15 mm between the limbs of the specimen (see [Figure 4](#)). Then place the specimen on the marked area of the lower plate of the loading device, and apply the load gently, without delay.

Fold half the number of specimens face to face, the other half back to back. Load the specimens for 5 min ± 5 s. Thereafter, remove the load quickly but smoothly so that the specimen does not suddenly spring open, completing the removal in less than 1 s. By means of tweezers, transfer the specimen

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directly to the specimen holder of the measuring instrument. To make the transfer, hold in the flat of the forceps that arm of the specimen which is to hang down and gently introduce the other arm between the two parts of the grip as far as, but no farther than, the back stop, taking care not to disturb the existing crease formation.

Dimensions in millimetres



Key

- 1 tweezers
- 2 paper or metal foil
- 3 specimen

Figure 4 — Folding of specimen

8.3 Measurement of the crease recovery angle

While the specimen is in the holder, adjust the instrument continuously to keep the suspended free limb always in a vertical position.

Read the crease recovery angle at $15 \text{ s} \pm 1 \text{ s}$ after the removal of the load (and the paper or metal foil, if necessary) from the folded specimen, expressed as rapid crease recovery angle; or read the crease recovery angle at $5 \text{ min} \pm 5 \text{ s}$ after the removal of the load (and the paper or metal foil, if necessary) from the folded specimen, expressed as delay crease recovery angle.

If the free limb twists or curls slightly, use a vertical plane through its centre and the axis of the circular scale to serve as a basis for reading the crease recovery angle.

9 Expression of results

Calculate the mean value rounded off to one decimal place for the following:

- 1) crease across length (for example, warp) direction
 - a) face to face, or
 - b) back to back;
- 2) crease across transverse (for example, weft) direction
 - a) face to face, or
 - b) back to back.

10 Test report

The test report shall include at least the following information:

- a) a reference to this document, i.e. ISO 2313-1:2021;
- b) all details necessary for the identification of the sample tested;
- c) number of specimens evaluated;

- d) folded surface (face to face, or back to back);
- e) creasing direction (warp/length, or weft/transverse);
- f) the mean value of rapid crease recovery angle or delay crease recovery angle;
- g) any deviation from the procedure specified;
- h) the date of the test.

