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

**Part 2:  
Method of the vertically folded  
specimen**

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

*Partie 2: Méthode de l'éprouvette pliée verticalement*





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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](http://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](http://www.iso.org/patents)).

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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](http://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).

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](http://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 2: Method of the vertically folded specimen

### 1 Scope

This document specifies a method for determining crease recovery angle of fabric specimen while placing it in such a way that the folded line is vertical to horizontal plane for a specified time after removal of creasing load.

This document is applicable for all kinds of textile fabrics.

### 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

The folded specimen is maintained under a specified load for a specified time. After removal of creasing load, the specimen is placed in such a way that the folded line is vertical to horizontal plane for a specified time, and then the crease recovery angle is measured.

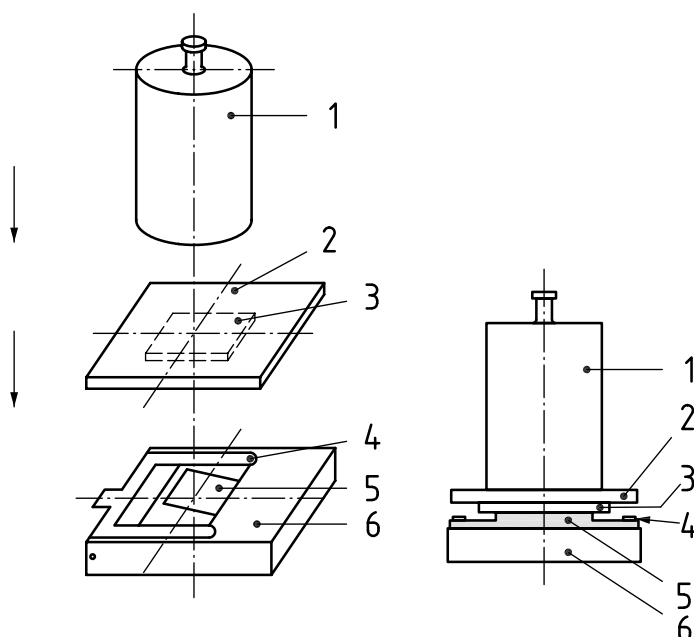
Attention is drawn to the fact that for some types of fabrics, the limpness, thickness and tendency to curl of the specimen can give rise to very ill-defined crease recovery angles, and therefore an unacceptable lack of precision in making measurements.

## 5 Apparatus

Use the test devices specified in 5.1 to 5.4, or the automatic tester. An example of an automatic tester is given in Annex A.

5.1 **Loading device**, conforming with the following requirements (see Figure 1):

- Weight-piece**, applying a total load of  $10,0 \text{ N} \pm 0,5 \text{ N}^{1)}$  on an area of  $15 \text{ mm} \times 18 \text{ mm}$  of the folded specimen. It shall be possible to complete the removal of the load within a period of less than 1 s.
- Specimen holder board**, fixing the two sides of specimen on the flat board by the clips; and folded line of specimen shall align with folded line mark of the board.
- Pressure board**, made of light and transparent flat board; a boss on lower surface directly presses on folded specimen, with the dimension of which shall comply with the requirement of the load applying on the folded specimen.



### Key

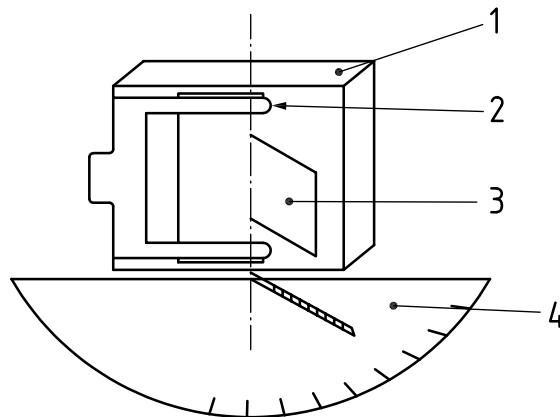
- 1 weight-piece
- 2 pressure board
- 3 boss
- 4 clip
- 5 specimen
- 6 specimen holder board

Figure 1 — Diagram of loading device

1) Weight of a body of mass 1,019 kg is approximately equal to a force of 10 N.



**5.2 Instrument of measuring crease recovery angle**, with a resolution of 0,5°, for example the protractor shown in [Figure 2](#) or the tester for measuring crease recovery angle described in [Annex A](#).



**Key**

- 1 specimen holder board
- 2 clip
- 3 specimen
- 4 protractor

**Figure 2 — Diagram of the protractor**

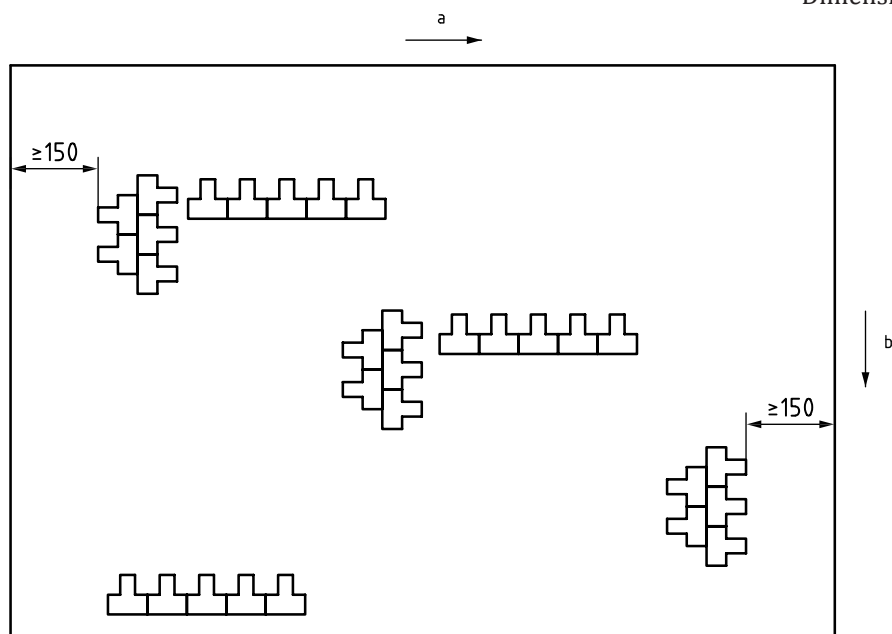
**5.3 Timer.**

**5.4 Holder with smooth edge**, or rubber glove.

## 6 Sampling and preparation of specimens

**6.1** Take representative specimens not less than 150 mm from the selvedge avoiding defective, creased, wrinkled or deformed parts. An example of sampling method is shown as [Figure 3](#).

Dimensions in millimetres



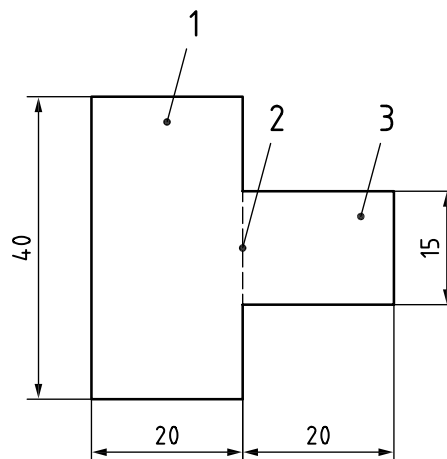
- a Transverse direction of sample.
- b Length direction of sample.

**Figure 3 — Example of sampling method**

**6.2** 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).

**6.3** Cut the specimen as shown in [Figure 4](#). Fold the specimen along the folded line (face to face or back to back).

Dimensions in millimetres

**Key**

- 1 fixed limb
- 2 folded line
- 3 recovery limb

**Figure 4 — Shape and dimension of specimen****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** During the test, screen the testing equipment from draught, from the operator's breath and from excessive heat radiation from light appliances. Touch specimen by using holder with smooth edge or rubber glove.

**8.2** Place fixed limb of conditioned specimen on the specimen holder board. The folded line on the specimen shall align with the folded mark on the specimen holder board. Fold the specimen along the folded line without any load on the folded line. Place the pressure board on the folded specimen, and then load the weight-piece as shown in [Figure 1](#).

**8.3** Fold half the number of specimens face to face, the other half back to back. Load the specimen for  $5 \text{ min} \pm 5 \text{ s}$ , then quickly remove the weight-piece. The specimen holder board together with pressure board overturns  $90^\circ$  to make folded line vertical to the horizontal plane, and then pressure board is removed. The operation during the load removal and the specimen overturn should be quick and smooth so that the free limb of specimen does not suddenly spring open.

**NOTE** Where the surface of the specimen shows any tendency to adhere, a sheet of paper or metal foil can be placed between the two limbs.

**8.4** Read crease recovery angle by the instrument for measuring crease recovery angle at  $15 \text{ s} \pm 1 \text{ s}$  after removal of the creasing load, expressed as rapid crease recovery angle; or read crease recovery angle by the instrument for measuring recovery angle at  $5 \text{ min} \pm 5 \text{ s}$  after removal of the creasing load, expressed as delay crease recovery angle.

If the free limb twists or curls slightly, measure the crease recovery angle based on the extension line along the flat straight part from the folded line.

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**8.5** Conduct testing the other specimens according to [8.1](#) to [8.4](#).

## **9 Expression of results**

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

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

## **10 Test report**

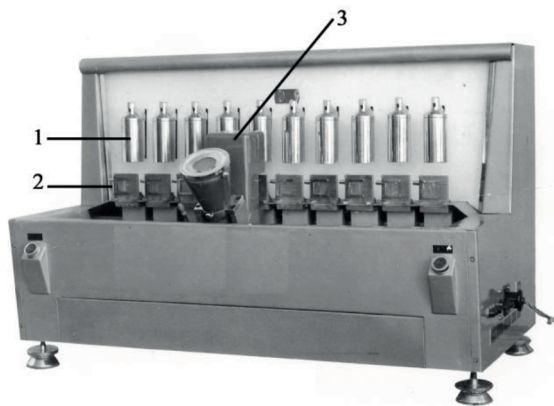
The test report shall include at least the following information:

- a) a reference to this document, i.e. ISO 2313-2:2021;
- 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) crease cross direction (length/warp, or transverse/weft);
- 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.

## Annex A (informative)

### Example of automatic tester

**A.1** The main test parameters of the tester are same as described in [5.1](#). The diagram of the tester is shown in [Figure A.1](#).



#### Key

- 1 weight-piece
- 2 specimen holder board
- 3 detector of crease recovery angle

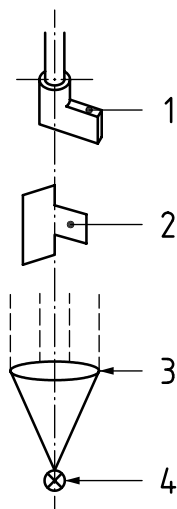
**Figure A.1 — Diagram of automatic tester**

**A.2 Weight-piece:** There are 10 weight-pieces for testing 10 specimens. They can move upward and downward.

**A.3 Specimen holder board:** In the test, the specimen holder board is placed in horizontal position, the weight-piece moves down to load on the board. When loading for 5 min, the weight-piece moves upward leaving from the board, and the board automatically overturns from horizontal position to vertical position.

**A.4 Detector of crease recovery angle:** Equip with image acquisition system to obtain the crease recovery angle (see [Figure A.2](#)). The detector can move along the alignment of the specimen holder

boards to adjust the position corresponding to the crease recovery angle between fixed limb and free limb.



**Key**

- 1 detecting head of image acquisition system
- 2 specimen
- 3 convex lenses
- 4 light source

**Figure A.2 — Diagram of detecting crease recovery angle with image acquisition system**



