INTERNATIONAL STANDARD

ISO 13936-2

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Textiles — Determination of the slippage resistance of yarns at a seam in woven fabrics —

Part 2: Fixed load method

Textiles — Détermination de la résistance au glissement des fils de couture dans les tissus —

Partie 2: Méthode de la charge fixe

Reference number
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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

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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.

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 13936-2 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 24, *Conditioning atmospheres and physical tests for textile fabrics*.

ISO 13936 consists of the following parts, under the general title *Textiles — Determination of the slippage resistance of yarns at a seam in woven fabrics*:

— *Part 1: Fixed seam opening method*

— *Part 2: Fixed load method*

— *Part 3: Needle clamp method*

Textiles — Determination of the slippage resistance of yarns at a seam in woven fabrics —

Part 2:
Fixed load method

1 Scope

This part of ISO 13936 is intended for the determination of the resistance offered by thread systems of woven fabric, to slippage at a sewn seam.

This method is suitable for all apparel and upholstery woven fabrics, stretch fabrics (including those containing elastomeric yarn). It is not suitable for industrial fabrics, e.g. beltings.

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

ISO 4915:1991, *Textiles — Stitch types — Classification and terminology*

ISO 7500-1:—[1)], *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 10012:2003, *Measurement management systems — Requirements for measurement processes and measuring equipment*

3 Terms and definitions

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

3.1

constant rate of extension (CRE) testing machine

tensile testing machine where one clamp is fixed whilst the other is moving with a constant speed throughout the test and where the entire testing system is virtually free from deflection

3.2

grab test

tensile test in which only the centre part of the specimen is gripped in the jaws

1) To be published.

3.3
yarn slippage, seam slippage
movement, in a woven fabric of weft yarns over warp yarns (or warp yarns over weft yarns) as a result of a pulling action

NOTE Seam slippage is a fabric property and should not be confused with seam strength.

3.4
warp slippage
warp yarns slipping over weft yarns, i.e. the warp yarns are at right angles to the direction of pull

3.5
weft slippage
weft yarns slipping over warp yarns, i.e. the weft yarns are at right angles to the direction of pull

3.6
seam allowance
distance between the seam line and the adjacent edges of the material

3.7
seam opening
distance between the yarns which have been displaced on either side of the seam line

4 Principle

A strip of fabric is folded and stitched across its width. The strip is cut near the fold and a force is applied to the strip at right angles to the seam using grab-test jaws. The extent to which the seam opens is measured.

5 Sampling

Select samples either in accordance with the procedure laid down in the material specification for the fabric, or as agreed between the interested parties.

In the absence of specification, an example of a suitable sampling procedure is given in Annex A.

An example of a pattern for cutting test specimens is given in Annex B. Avoid test specimens from folded or creased areas, selvedges and areas not representative of the fabric.

6 Apparatus and materials

6.1 CRE Machine

6.1.1 Metrological confirmation system of the tensile-testing machine shall be in accordance with ISO 10012. The constant-rate-of-extension (CRE) machine shall have the general characteristics given in 6.1.2 to 6.1.7.

6.1.2 The tensile-testing machine shall be provided with means for indicating or recording the force applied to the test specimen in extending it. Under conditions of use, the accuracy of the apparatus shall be class 1 of ISO 7500-1:—. The error of the indicated or recorded maximum force at any point in the range in which the machine is used shall not exceed $\pm$ 1 %, and the error of the indicated recorded jaw separation shall not exceed $\pm$ 1 mm.

6.1.3 If recording of force is obtained by means of data acquisition boards and software, the frequency of data collection shall be at least 8 s^{-1}.

6.1.4 The machine shall be capable of constant rate of extension of 50 mm/min, with an accuracy of $\pm$ 10 %.

6.1.5 The machine shall be capable of setting the gauge length to 100 mm.

6.1.6 The clamping device of the machine shall be positioned with the central point of the two jaws in the line of the applied force, the front edges shall be at right angles to the line of applied force and their clamping faces shall be in the same plane.

The jaws shall be capable of holding the test specimen without allowing it to slip and designed so that they do not cut or otherwise weaken the test specimen.

The faces of the jaws shall be smooth and flat, except that when, even with packing, the test specimen cannot be held satisfactorily with flat-faced jaws, engraved or corrugated jaws can be used to prevent slippage. Other auxiliary materials for use with either smooth or corrugated jaws to improve specimen gripping include paper, leather, plastics or rubber.

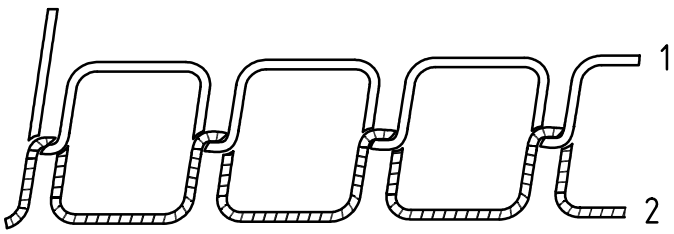
6.1.7 The area of the fabric clamped during the test shall be $(25\ \text{mm} \pm 1\ \text{mm}) \times (25\ \text{mm} \pm 1\ \text{mm})$. This area can be achieved by either method a) or method b) as described below.

a) The rear clamp shall be 25 mm × 40 mm min (preferably 50 mm), positioned with the wider direction of the clamp perpendicular to the line of the application of the force; the front clamp shall be of the same dimensions positioned perpendicular to the first so that the wider direction of the clamp is parallel to the direction of the application of the force.

b) The rear clamp shall be 25 mm × 40 mm min (preferably 50 mm), positioned with the wider direction of the clamp perpendicular to the line of application of the force; the front clamp shall be 25 mm × 25 mm.

6.2 Equipment for cutting test specimens

6.3 Sewing machine, electrically operated, single needle, lock stitch, capable of producing stitch type 301 as described in ISO 4915:1991 (see Figure 1).



Key

1 needle thread

2 bobbin thread

Figure 1 — Stitch type 301

This stitch type is formed with two threads: one needle thread and one bobbin thread. A loop of thread 1 is passed through the material from the needle side and is interlaced with thread on the other side. Thread 1 is pulled back so that the interlacing comes midway between the surfaces of the material being sewn.

This stitch type is sometimes produced from a single thread, in which case the first stitch differs from subsequent stitches.

A minimum of two stitches describes this stitch type.

6.4 Needles, throat-plate and feed-dog, see Table 1 and 9.1.

6.5 Sewing thread, suitable, as specified in Table 1.

6.6 Calibrated rule, graduated in 0,5 millimetres divisions.

7 Conditioning and testing atmosphere

The standard atmosphere for conditioning and testing textiles as defined in ISO 139 shall be used.

8 Pretreatment

If a pre-treatment is required, launder or dry clean the sample using a method agreed between the interested parties. The procedures described in ISO 6330 or ISO 3175-2 may be suitable.

9 Preparation of test specimens

9.1 Adjustment of sewing machine

Insert the needle together with the corresponding throat-plate and feed-dog, and set the machine to give stitch density for the fabric under test as indicated in Table 1, by sewing a double thickness piece of the test fabric.

Table 1 — Requirements for stitching

Class of fabric	Sewing thread	Needle size		Stitches/100 mm
	100 % polyester core spun (filament core, staple sheath) of approximate resultant linear density tex	metric	mm	
Apparel fabric	45 ± 5	90	0,90	50 ± 2
Furnishing fabric	74 ± 5	110	1,10 [a]	32 ± 2
NOTE Ensure the needle is undamaged by examining under magnification.				
[a] Use round point needle for upholstery fabrics.				

Adjust the thread tension as follows: with the lower thread bobbin in its case removed from the machine, hold the thread issuing from the bobbin case so as to allow the case to run down the thread as it unwinds. Adjust the tension spring on the bobbin case so that the case runs down the thread at a slow uniform speed. Replace the bobbin case in the machine and adjust the tension of the thread feed to the needle so that when a double thickness of the fabric under test is stitched the cross-over between the needle thread and the bobbin or shuttle thread is located midway between the upper and lower surfaces of the seam (see Figure 1).

9.2 Cutting and sewing of test specimens

9.2.1 Cut rectangular specimens of length 200 mm and width 100 mm. Unless otherwise agreed by the parties concerned, cut five specimens with their long sides parallel to the weft of the fabric which will be used to determine warp slippage. Also cut five specimens with their long sides parallel to the warp of the fabric which will be used to determine weft slippage.

In accordance with Clause 5 and Annex B no test specimen shall be cut from within 150 mm of either edge of the laboratory sample. Wherever possible, no two specimens in any group of five should contain the same warp or weft threads.

9.2.2 Fold the specimen (with the face inwards) in half by putting the two shorter edges together and stitch a seam parallel to and at a distance of 20 mm from the fold. Increase the speed of the sewing machine as quickly as possible and maintain it at that speed until the seam has been completed. If necessary, tie the threads at each end of the seam.

9.2.3 Cut each specimen 12 mm from the sewn seam line, cutting through both layers of the fabric. The seam allowance shall be the same on each side of the cut.

10 Test procedure

10.1 Condition the test specimens in accordance with Clause 7.

10.2 Set the clamps of the tensile testing machine a distance of (100 ± 1) mm apart, taking care that the clamps are properly aligned and parallel to each other.

10.3 Secure the specimen symmetrically in the clamps with the seam midway between, and parallel to, the edges of the two clamps.

10.4 Gradually increase the load on the specimen to the appropriate force (see Table 2) at a constant rate of extension of (50 ± 5) mm/min.

Table 2 — Force applied

Class of fabric	Load applied N
Apparel $\leqslant$ 220 g/m^2	60
Apparel $>$ 220 g/m^2	120
Furnishing	180

10.5 When the maximum force is achieved, immediately reduce the load on the test specimen to 5 N at a constant rate of extension of (50 ± 5) mm/min.

10.6 Immediately measure the width of the seam opening at the widest place to the nearest millimetre. Measure at right angles to the seam from the edge of the undistorted fabric on one side of the seam to the edge of the undistorted fabric on the other side of the seam as shown in Figure 2.

10.7 Repeat this procedure with the remaining test specimens so that five separate results are obtained for the warp direction and five for the weft direction.

11 Calculation and expression of results

Calculate to the nearest millimetre the mean warp slippage and the mean weft slippage values of the measured seam opening.

If the fabric or the seam breaks down and the slippage cannot be measured, this shall be recorded as a failure.

12 Test report

The test report shall include the following information:

a) reference to this part of ISO 13936, i.e. ISO 13936-2, and the date of test;

b) identification of test sample and sampling procedure;

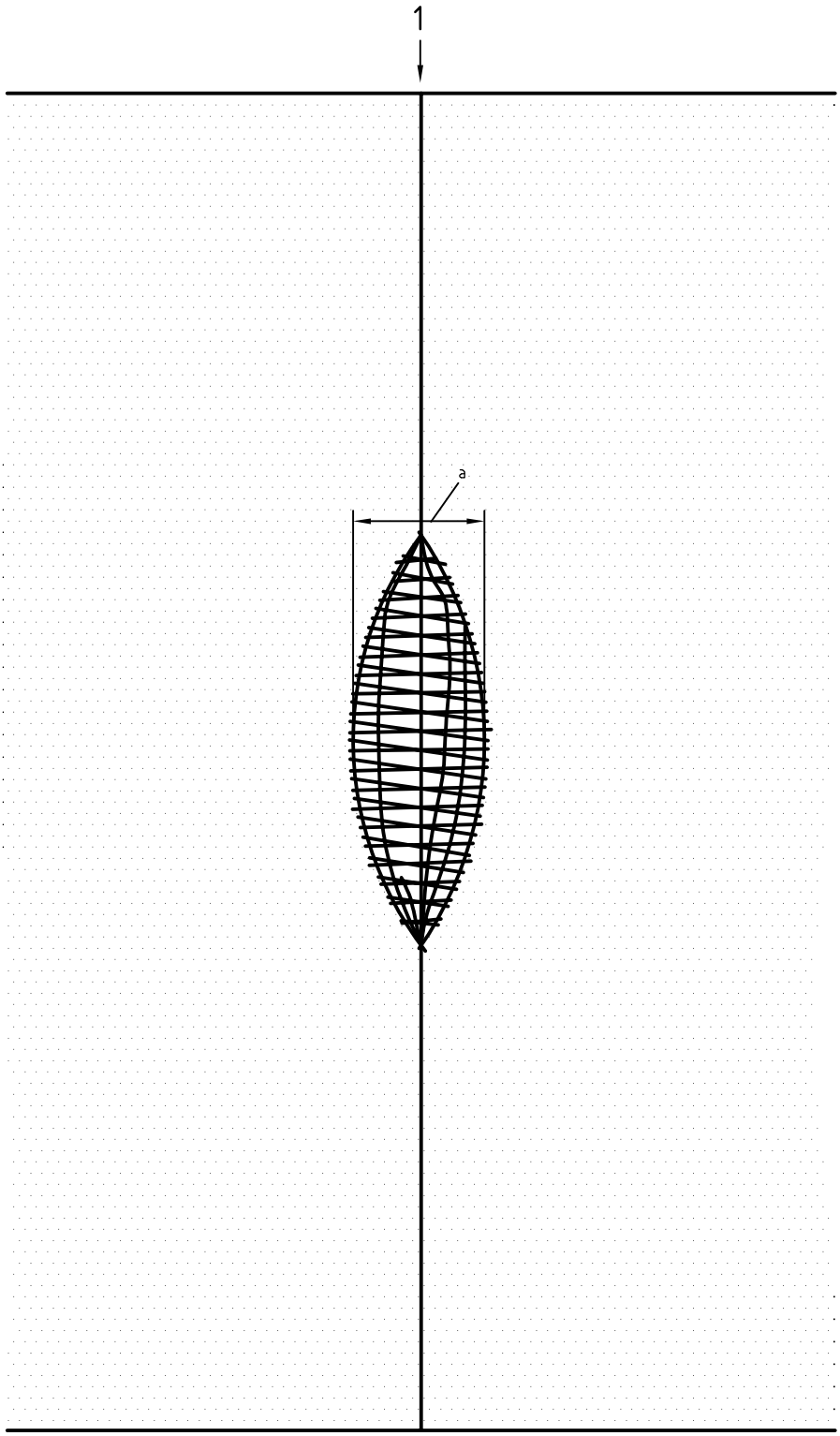
c) maximum force applied to the specimen, in newtons;

d) mean warp seam opening and the mean weft seam opening, in millimetres;

e) state the number of fabric or seam breaks, if applicable;

f) end use of the fabric under test (if known);

g) any deviation from the given procedure.



Key

1 seam

[a] Maximum seam opening.

Figure 2

Annex A
(informative)

Suggested procedure for sampling

A.1 Bulk Sampling (number of pieces taken from a shipment or lot)

Take at random from the shipment or lot the appropriate number of pieces shown in Table A.1. Ensure that no piece that shows signs of damage or dampness incurred during transit is included in the bulk sample.

Table A.1 — Bulk sampling

Number of pieces in shipment or lot	Number of pieces comprising bulk sample, minimum
3 or less	1
4 to 10	2
11 to 30	3
31 to 75	4
76 or more	5

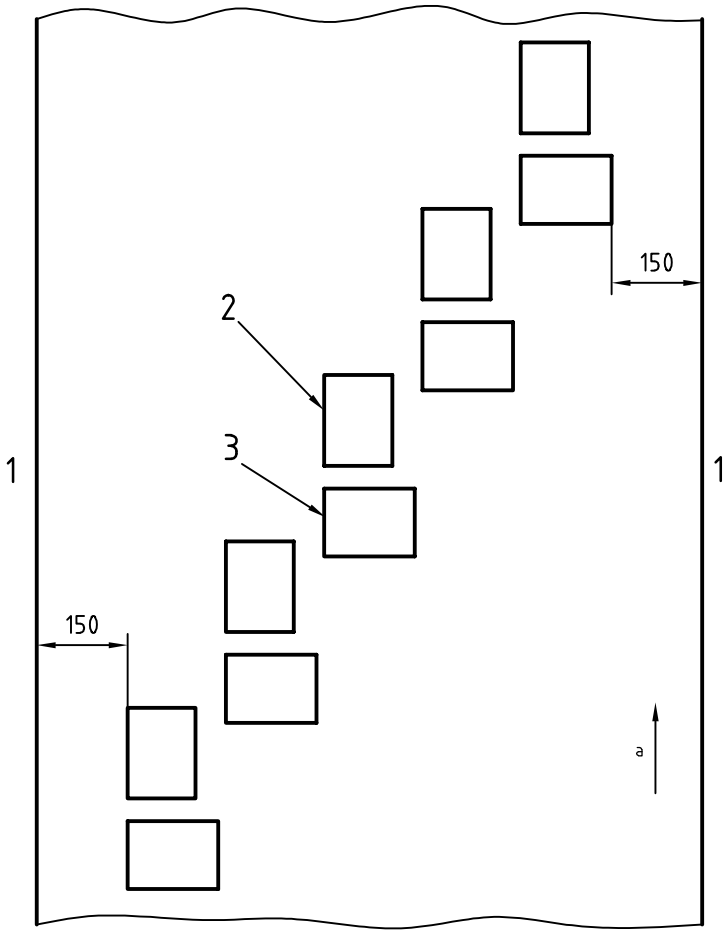
A.2 Number of laboratory samples

From each piece in the bulk sample, cut (from a position taken at random but at least 3 m from the end of a piece) a laboratory sample of length at least 1 m and of full width. Ensure that areas that are creased or that have a visible fault or faults, are not included in the laboratory sample.

Annex B
(informative)

Example of pattern for cutting out test specimens from the laboratory sample

Dimensions in millimetres



Key

1 edge

2 specimen for slippage of weft yarns over warp yarns

3 specimen for slippage of warp yarns over weft yarns

[a] Warp direction.

Figure B.1

Bibliography

[1] ISO 3175-2, *Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments — Part 2: Procedure for testing performance when cleaning and finishing using tetrachloroethene*

[2] ISO 6330, *Textiles — Domestic washing and drying procedures for textile testing*

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