

---

---

**Textiles — Determination of the  
elasticity of fabrics —**

**Part 1:  
Strip tests**

*Textiles — Détermination de l'élasticité des étoffes —*

*Partie 1: Essais sur bande*

*iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview*

ISO 20932-1:2018

<https://standards.iteh.ai/catalog/standards/iso/a768f2cd-b73d-4f40-b305-ccc506b0d3be/iso-20932-1-2018>



**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

ISO 20932-1:2018

<https://standards.iteh.ai/catalog/standards/iso/a768f2cd-b73d-4f40-b305-ccc506b0d3be/iso-20932-1-2018>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b>	<b>iv</b>
<b>Introduction</b>	<b>v</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>1</b>
<b>4 Principle</b>	<b>3</b>
<b>5 Sampling</b>	<b>3</b>
<b>6 Apparatus</b>	<b>4</b>
<b>7 Atmosphere for conditioning and testing</b>	<b>5</b>
<b>8 Preparation of test specimens</b>	<b>5</b>
8.1 General	5
8.2 Test specimen preparation	5
8.2.1 Woven fabrics	5
8.2.2 Knitted fabrics	6
8.2.3 Nonwoven fabrics	7
<b>9 Procedure</b>	<b>8</b>
9.1 Woven and nonwoven fabrics (other than knitted)	8
9.1.1 Method A — Strip test specimens	8
9.1.2 Method B — Loop test specimens	8
9.2 Knitted fabrics	8
9.2.1 Method A — Strip test specimens	8
9.2.2 Method B — Loop test specimens	9
9.3 Operation	9
<b>10 Recording</b>	<b>10</b>
<b>11 Expressions and calculations of test results</b>	<b>10</b>
<b>12 Test report</b>	<b>11</b>
<b>Annex A (informative) Example of a typical cycling graph</b>	<b>13</b>
<b>Annex B (informative) Procedure for sampling</b>	<b>14</b>
<b>Annex C (informative) Clamping and holding devices</b>	<b>15</b>
<b>Annex D (informative) Example of a pattern for cutting test specimens from a laboratory sample</b>	<b>17</b>
<b>Bibliography</b>	<b>18</b>

## 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)).

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](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*.

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).

A list of all parts in the ISO 20932 series can be found on the ISO website.

## Introduction

This document was developed as a result of technical advancements in yarn and fabric structures and properties, which increase product range and developments.

This document is based on EN 14704-1<sup>[1]</sup>.

**iTeh Standards**  
(<https://standards.itih.ai>)  
**Document Preview**

ISO 20932-1:2018

<https://standards.itih.ai/catalog/standards/iso/a768f2cd-b73d-4f40-b305-ccc506b0d3be/iso-20932-1-2018>



# Textiles — Determination of the elasticity of fabrics —

## Part 1: Strip tests

### 1 Scope

This document describes the methods of test using strips of fabric in straight strip form or as loops, which can be used to measure elasticity and related properties of fabrics, excluding narrow 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*

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

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

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

### 3 Terms and definitions

ISO 20932-1:2018

<https://standards.iteh.ai/catalog/standards/iso/a768f2cd-b73d-4f40-b305-ccc506b0d3be/iso-20932-1-2018>

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 <http://www.electropedia.org/>

#### 3.1

##### **narrow fabric**

woven or knitted construction intended for use as a trim, binding, edging, strapping or harness, and designed to be used in its full width

#### 3.2

##### **elasticity**

<material> ability to recover original size and shape immediately after the removal of the force causing deformation

#### 3.3

##### **constant-rate-of-extension testing machine**

##### **CRE testing machine**

tensile testing machine provided with one clamp, which is stationary, and another clamp, which moves with a constant speed throughout the test, the entire testing system being virtually free from deflection

### 3.4

#### **strip test specimen**

test specimen in which the full width is gripped in the jaws of the testing machine

### 3.5

#### **loop test specimen**

test specimen in which a seam is made to create a loop of the full width of the specimen and which is placed around a loop bar assembly positioned on the testing machine

Note 1 to entry: This method of preparation is useful when any ageing or exposure testing is to be carried out on the specimens after measurement.

### 3.6

#### **gauge length**

distance between the two effective clamping or holding points of a testing device

Note 1 to entry: For strip tests, method A: distance between the two contact points of the line clamps.

Note 2 to entry: For loop tests, method B: half of the circumference around the loop bar assembly.

### 3.7

#### **slack mounting**

insertion of a *strip test specimen* (3.4) in the line clamps of the upper jaw, allowing it to hang freely under its own weight, guided by the hand to ensure perpendicular alignment to the line of pulling force, without any force being applied

### 3.8

#### **initial length**

length of the test specimen between the two effective clamping or holding points, at the beginning of the test (after *slack mounting* (3.7) or under specified pretension)

### 3.9

#### **pretension**

force applied to a test specimen at the beginning of certain tests

Note 1 to entry: Pretension is used to determine the initial length of the test specimen.

[SOURCE: ISO 13934-1:2013, 3.5, modified — References to 3.4 and 3.7 have been removed from Note 1 to entry.]

### 3.10

#### **extension**

increase in length of a test specimen during testing

Note 1 to entry: Extension is expressed in units of the length.

### 3.11

#### **elongation**

ratio of the *extension* (3.10) of the test specimen to its initial length

Note 1 to entry: Elongation is expressed as a percentage.

### 3.12

#### **maximum force**

force at the position when a test specimen is taken to a fixed *extension* (3.10)

Note 1 to entry: Maximum force is expressed in newtons.

### 3.13

#### **maximum extension**

*extension* (3.10) recorded in millimetres at the position when a test specimen is taken to a fixed load

Note 1 to entry: Maximum extension is expressed in units of the length.



**3.14****force at specified elongation**

force measured at a given *elongation* (3.11) on either the load or unload curves

**3.15****cycle**

process whereby a fabric is taken from the *gauge length* (3.6) to a fixed load or fixed extension or elongation and returned to gauge length

**3.16****force decay due to time**

loss of force measured over time when a test specimen is stretched to a specified elongation or force and held at this position for a given time period

Note 1 to entry: The decay in force is expressed as a percentage of the original force recorded at the specified position (see [Annex A](#), [Figure A.1](#)).

**3.17****force decay due to exercising**

loss of force, calculated and expressed as a percentage, as measured and recorded at the same elongation point on two different cycles when the test specimen is cycled several times between the *gauge length* (3.6) and a specified elongation

Note 1 to entry: See [Annex A](#), [Figure A.1](#).

**3.18****permanent deformation**

ratio of unrecovered extension of the test specimen after cycling (to a specified force or specified extension) to its initial length

Note 1 to entry: Permanent deformation is expressed as a percentage.

**3.19****recovered elongation**

complement of *permanent deformation* (3.18) to 100 %

Note 1 to entry: Recovered elongation is expressed as a percentage.

**3.20****elastic recovery**

*recovered elongation* (3.19) of the total elongation

Note 1 to entry: Elastic recovery is expressed as a percentage.

**4 Principle**

A fabric test specimen of specified dimensions is extended at a constant rate to either a specified force or elongation for an agreed number of cycles, and its elasticity determined by measuring certain characteristics.

**5 Sampling**

Fabric samples shall be selected in accordance with the product specification. In the absence of a product specification for the fabric, the sampling method given in [Annex B](#) may be used.

## 6 Apparatus

### 6.1 CRE testing machine.

Metrological confirmation system of the tensile testing machine shall be in accordance with ISO 10012.

The constant-rate-of-extension (CRE) testing machine shall conform to the following.

- a) The tensile testing machine shall be provided with the means for indicating or recording the force and elongation values when cycling between gauge length and either a fixed load or fixed extension. Under conditions of use, the accuracy of the apparatus shall be at least 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 1 %, and the error of the indicated or recorded jaw separation shall not exceed 1 mm.
- b) If recording of force or elongation is obtained by means of data acquisition boards and software, the frequency of data collection shall be at least eight per second.
- c) The machine shall be capable of constant rates of extension including 20 mm/min to 500 mm/min with an accuracy of  $\pm 10$  %.
- d) The machine shall be capable of variable gauge length settings including 100 mm to 250 mm, to an accuracy of  $\pm 1$  mm.
- e) The clamping or holding devices shall be positioned with their central point in line of the applied force. The machine shall be calibrated with the clamping or holding devices in position and the jaw faces closed, where applicable.

### 6.2 Line clamps (for method A).

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.

Line clamps, as shown in [Annex C, Figure C.1](#), shall consist of two jaws, one being of steel plate, the other having a convex 3 mm radius. The line of contact of the jaws shall be perpendicular to the line of increasing force. The clamping faces shall be in the same plane.

The line clamp jaws shall not be less than the width of the test specimen.

**NOTE** Significant levels of work have shown this type of line clamp is the preferred type for elastane/elastodiene containing fabrics as fabric slippage is insignificant. If a fabric slips, the elongation values are inaccurate.

Pneumatic operated grips are recommended as hand tightening of manual grips can cause distortion of the test specimen. The air pressure should be sufficient to prevent slippage when compensating the decreasing thickness of the fabric but should not cut or otherwise weaken the test specimen.

### 6.3 Loop bar assembly (for method B).

The loop bar assembly shall be as shown in [Annex C, Figure C.2 a\) or b\)](#) and typically comprises two steel bars of circular cross-section and the diameter between 4 mm and 8 mm. The specimen is looped over these bars and extended as the bars move apart. The axes of the bars shall be perpendicular to the line of increasing force. The steel bar holders shall have a minimum internal dimension of 80 mm.

**6.4 Equipment**, for cutting test specimens and for fraying, where applicable to the required dimensions.

**6.5 Sewing machine**, capable of producing a type 301 lockstitch as defined in ISO 4915, furnished with a medium ballpoint needle (90s SUK) and 470 decitex (ticket 75's) polyester core-spun thread.