

Determination of the elasticity of fabrics —

Part 1: Strip tests

The European Standard EN 14704-1:2005 has the status of a
British Standard

ICS 59.080.30

National foreword

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The UK participation in its preparation was entrusted to Technical Committee TCI/24, Physical testing of textiles, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 20, an inside back cover and a back cover.

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Amendments issued since publication

Amd. No.	Date	Comments
16210 Corrigendum No. 1	March 2006	Addition of supersession details

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 27 October 2005

© BSI 17 March 2006

ISBN 0 580 46746 5

English version

Determination of the elasticity of fabrics - Part 1: Strip tests

Détermination de l'élasticité des étoffes - Partie 1: Essais
sur bande

Bestimmung der Elastizität von textilen Flächengebilden -
Teil 1: Streifenprüfungen

This European Standard was approved by CEN on 3 March 2005.

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Foreword

This document (EN 14704-1:2005) has been prepared by Technical Committee CEN/TC 248 "Textiles and textile products", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.

The reasons for the development of this document are because of technical advancements in yarn and fabric structures and properties, which increase product range and developments.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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 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.

EN ISO 139, *Textiles - Standard atmospheres for conditioning and testing (ISO 139:2005)*.

EN ISO 7500-1, *Metallic materials – Verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Verification and calibration of the force-measuring system (ISO 7500-1:2004)*.

EN ISO 10012:2003, *Measurement management systems - Requirements for measurement processes and measuring equipment (ISO 10012:2003)*.

ISO 4915, *Textiles – Stitch types – Classification and terminology*.

3 Terms and definitions

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

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

property of a material by virtue of which it tends to recover its original size and shape immediately after the removal of the force causing deformation

3.3

constant-rate-of-extension (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 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

- a) For strip tests, method A: distance between the two contact points of the line clamps
- b) For loop tests, method B: half of the circumference around the loop bar assembly

3.7**slack mounting**

insertion of a strip test specimen 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, before testing

3.9**extension**

increase in length of a test specimen produced by a force as a result of testing, expressed in units of length, millimetres

3.10**elongation**

ratio of the extension of the test specimen to its initial length, expressed as a percentage

3.11**maximum force**

force recorded in newtons at the position when a test specimen is taken to a fixed extension

3.12**maximum extension**

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

3.13**modulus**

force measured at a given elongation on either the load or unload curves

3.14**cycle**

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

3.15**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 The decay in force is expressed as a percentage of the original force recorded at the specified position (see Annex A).

3.16**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 zero and a specified elongation (see Annex A)

3.17

un-recovered elongation

ratio of un-recovered extension of the test specimen after cycling, to a specified force or extension, to its initial length, expressed as a percentage

3.18

recovered elongation

un-recovered elongation, expressed as a percentage, subtracted from 100 %

3.19

elastic recovery

recovered elongation expressed as a percentage of the total elongation

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 EN ISO 10012.

The constant-rate-of-extension 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 EN 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 to 500 mm per min with an accuracy of ± 10 %.
- d) The machine shall be capable of variable gauge length settings including 100 mm to 250 mm, to an accuracy of ± 1 mm.
- e) The clamping or holding devices shall be positioned with the centre in line with the applied force. The machine shall be calibrated with the grips in position and the jaw faces closed, where applicable.

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.