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Ugotavljanje elastiļ nosti ploskovnih tekstilij - 3. del: Ozki trakovi

Determination of the elasticity of fabrics - Part 3: Narrow fabrics

Bestimmung der Elastizität von Flächengebilden - Teil 3: Schmaltextilien

Détermination de l'élasticité des étoffes - Partie 3 : Etoffes étroites

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Foreword

This document (EN 14704-3:2006) 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of an identical text or by endorsement, at the latest by June 2007, and conflicting national standards shall be withdrawn at the latest by June 2007.

The reasons behind developing this standard are due to technical advancement in yarn and fabric structures and properties, which increases 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This standard describes the test methods which can be used to measure the elasticity and related properties of narrow fabrics. Two methods are itemised: one for the purpose of product quality assurance (method A), and the other for product performance when in use (method B).

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

3 Terms and definitions

For the purposes of this European standard 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 removing 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
gauge length
distance between the two effective clamping points of a testing device, for this method where line clamps are employed, it is the distance between the two contact points

3.6
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

3.7
initial length
length of the test specimen between the two effective clamping points, before testing

3.8
extension
increase in length of a test specimen produced by a force as a result of testing, expressed in mm

3.9
elongation
ratio of the extension of the test specimen to its initial length, expressed as a %

3.10
maximum force
force recorded in N at the position when a test specimen is taken to a fixed extension

3.11
maximum extension
extension recorded in mm at the position when a test specimen is taken to a fixed load

3.12
modulus
force measured at a given elongation on either the load or unload curves

3.13
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

3.14
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 in this position for a given time period

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

3.15
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)

3.16
un-recovered elongation
ratio of the unrecovered extension of the test specimen after cycling, to a specified force or extension, to its initial length, expressed as a %

3.17
recovered elongation
unrecovered elongation, expressed as a %, subtracted from 100 %

3.18
elastic recovery
recovered elongation expressed as a % of the total elongation

4 Principle

4.1 Method A

A narrow test specimen of specified length dimensions is extended at a constant rate to a specified force for an agreed number of cycles. Several characteristics can be measured to determine the performance and profile of the narrow fabric.

4.2 Method B

A narrow test specimen of specified length dimensions is extended at a constant rate to a specified force and elongation for 1 cycle of a specified sequence. Characteristics are measured to show the performance of the narrow fabric in use.

5 Sampling

Narrow 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) 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 8/sec.

c) Machine shall be capable of constant rates of extension including 20 mm/min to 500 mm/min with an accuracy of (±) 10 %.

d) Machine shall be capable of variable gauge length settings including 100 mm to 250 mm, to an accuracy of (±) 1 mm.

e) Clamping or holding devices shall be positioned with the centre in line with the applied force. The machine shall be calibrated, where applicable, with the grips in position and the jaw faces closed.

   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.

6.2 Line clamps

Line clamps, as shown in 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 and preferably have a width of (70 ± 6) mm.

NOTE 1 Significant levels of work have shown this type of line clamp is the preferred type for elastane/elastodiene containing fabrics as fabric slippage is eliminated. If a fabric slips the elongation values are inaccurate.

NOTE 2 Pneumatic operated grips are recommended as hand tightening or manual grips can cause distortion of the test specimen. The air pressure should be sufficient to prevent slippage but should not cut or otherwise weaken the test specimen.

6.3 Equipment, for cutting test specimens to the required dimensions.

6.4 Calibrated metal rule, graduated in mm.

7 Atmosphere for conditioning and testing

The atmospheres for pre-conditioning, conditioning and testing shall be as specified in EN ISO 139.

The narrow fabric samples shall be conditioned for a minimum of 20 h in a tension free state.

8 Preparation of test specimens

8.1 General

A set of test specimens from each laboratory sample, shall be cut in the length direction.

A set shall consist of a minimum of five test specimens. If the sample is supplied on role and of sufficient length, remove and discard the first 500 mm. Cut the required number of specimens to the correct length, rejecting a minimum of 300 mm in between each of the specimens.

8.2 Test specimen preparation

For method A and method B, each test specimen shall be cut to a length of 150 mm.

NOTE If for method A unrecovered elongation is determined at the end of the test, place (100 ± 1) mm reference (bench) marks centrally and perpendicular to the specimen length.

9 Procedure

9.1 Method A

9.1.1 General

9.1.1.1 Locate the line clamps in the jaws of the tensile testing machine and set the gauge length to (100 ± 1) mm. Check this gauge length setting using carbon paper and paper which will generate gauge (bench) marks on the paper. The distance is measured with the calibrated rule.