BS EN 15977:2011

BSI Standards Publication

Rubber or plastic coated fabrics — Mechanical properties — Determination of the elongation under load and the residual deformation

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 15977:2011.

The UK participation in its preparation was entrusted to Technical Committee TCI/24, Physical testing of textiles.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 67968 1

ICS 59.080.40

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2011.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15977

February 2011

ICS 59.080.40

English Version

Rubber or plastic coated fabrics - Mechanical properties - Determination of the elongation under load and the residual deformation

Supports textiles revêtus de caoutchouc ou de plastique - Propriétés mécaniques - Détermination de l'allongement sous charge et de la déformation résiduelle

Mit Kautschuk oder Kunststoff beschichtete Textilien - Mechanische Eigenschaften - Bestimmung der Dehnung unter Last und der verbleibenden Verformung

This European Standard was approved by CEN on 8 January 2011.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 15977:2011: E

Contents

Page

Foreword

This document (EN 15977:2011) 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of an identical text or by endorsement, at the latest by August 2011, and conflicting national standards shall be withdrawn at the latest by August 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, 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 the United Kingdom.

Introduction

This European Standard has been developed from the normative Annex C of EN 15619.

1 Scope

This European standard describes the method of determination of the elongation under load and the residual deformation of coated 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 12280-1:1997, *Rubber- or plastics- coated fabrics — Accelerated ageing tests — Part 1: Heat ageing*

EN ISO 2231, *Rubber- or plastics-coated fabrics — Standard atmospheres for conditioning and testing (ISO 2231:1989)*

3 Principle

Marked strips of coated fabric are loaded for a specified duration; then after relaxation, the residual deformation is calculated based on the measurements of the distance between the marks of the strip before and after the loading stage. The appropriate testing parameters are based on the use of the coated fabrics.

Test specimen can be aged by heat exposure prior to the loading stage.

4 Apparatus

4.1 Ruler, calibrated metal ruler with 0,5 mm graduated marks.

4.2 Calliper, calibrated to 0,1 mm.

4.3 Loading device

Only a manual loading device shall be used. An automatic device shall be avoided because of the force regulation of the machine.

The clamping devices shall be positioned with the centre in line with the applied force.

The clamps 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 clamps shall consist of two jaws of steel plate. The clamping faces shall be in the same plane. Jaws shall preferably be (70 ± 6) mm wide, but not less than the width of the test specimen.

The loads consist of calibrated masses ensuring the achievement of the determined load.

4.4 Hot air oven, according to EN 12280-1.

5 Preparation of test specimens

Three strips of 50 mm width shall be tested in both directions (for example: in warp and weft direction for woven coated fabric).

The length of the strips shall be at least 200 mm or 400 mm, according to the selected testing parameters as determined in Table 1.

Each strip shall be prepared as follows (in order to be sure that the final strips follow exactly the direction of the yarn):

Cut a strip of:

a) directly (50 ± 1) mm width for coated fabrics other than woven coated fabrics, or

b) 55 mm width as precisely as possible in the direction of the yarns for woven coated fabrics; then, reduce the width of the strips from 55 to (50 ± 1) mm, by removing some yarns on both sides in order to be sure that the yarns follow continuously the length of the sample on both sides.

Two small lines (perpendicular to the length of sample) shall be marked on each strip at a distance of (100 ± 1) mm or (200 ± 1) mm — according to the selected testing parameters as determined in Table 1. The distance between these lines shall be measured at ± 0,1 mm (4.2) or at ± 0,5 mm (4.1) — see instruction in Clause 6.

6 Mechanical loading test

Tests shall be carried out in atmosphere B according to EN ISO 2231.

Place the test specimen in the jaws so that the distance between each marked line and its respective clamp of the loading device is 50 mm.

Set the testing parameters according to Table 1.

Each specimen shall be loaded under the determined load during the determined load time.

Just before removing the load, the length under load shall be measured between the two marks at ± 0,1 mm, when using the calliper (4.2), or at ± 0,5 mm, when using the ruler (4.1) in order to calculate the elongation under load.

Choose the length measurement devices (4.1 or 4.2) such as the resolution represents $1/10^{th}$ of the measurement of the elongation.

After removing the load, each specimen shall be left on a flat surface for the determined relaxation time without any effort before measuring the residual length between the two marks.

Table 1 — Testing parameters

Testing parameters	**Coated fabrics intended for architectural structure, for example**	**Coated fabrics intended for upholstery, for example**
Mark distance	(200 ± 1) mm	(100 ± 1) mm
Length of the strips	at least 300 mm, plus the length in relation to the type of the clamps	at least 200 mm, plus the length in relation to the type of the clamps
Determined load	(10,00 ± 0,01) daN	(5,00 ± 0,01) daN
Load time	(24 h ± 30) min	(30 ± 3) min
Relaxation time	2 h ± 5 min	(30 ± 3) min
Residual deformation and under load deformation	Required	Required
Residual deformation and under load deformation after heat exposure and mechanical loading	Optional (Clause 7)	Not required

7 Residual deformation after heat exposure and mechanical loading (optional)

After the preparation of the test specimens (Clause 5) and before mechanical loading test (Clause 6), the samples shall be exposed 24 h ± 30 min at (80 ± 2) °C in a hot air oven according to EN 12280-1:1997, method 1.

After removing from the oven, each sample shall be left on a table for 2 h in order to stabilize at atmospheric conditions before testing according to Table 1.

Calculation of the residual deformation after heat exposure and mechanical loading shall be carried out in accordance with formula (2) in Clause 8.

The test report shall mention that the sample has been exposed to heat before testing according to the present clause of this standard.

8 Calculation

The elongation under load is calculated according the following to the formula.

$$E_{ul} = 100 \times \frac{(L_{ul} - L_0)}{L_0}$$, expressed in percentage (%) at the closest 0,1 % (1)

where

E_{ul} is the elongation under load,

L_{ul} is the length of the coated fabric before removing the determined load,

L_0 is the initial length.

The residual deformation is calculated according the following formula.

$$R = 100 \times \frac{(L_{residual} - L_0)}{L_0}$$, expressed in percentage (%) at the closest 0,1 % (2)

where

R is the residual deformation,

$L_{residual}$ is the length of the coated fabric after determined relaxation time,

L_0 is the initial length.

9 Test report

The test report shall include the following information:

a) reference to this document;

b) date of the test;

c) identification of the product under test;

d) if the tests specimens have been aged;

e) testing parameters applied (mark distance, length, load, loading time, relaxation time);

f) results of the test (individuals and mean values of the elongation under load, of the residual deformation);

g) if required, the result of the test of the residual deformation after heat exposure and mechanical loading;

h) details of any deviation that may have influenced the results.

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™