BS EN ISO 5402-2:2015

BSI Standards Publication

Leather — Determination of flex resistance

Part 2: Vamp flex method

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN ISO 5402-2:2015. It supersedes BS EN ISO 22288:2009 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee TCI/69, Footwear, leather and coated fabrics.

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.

Published by BSI Standards Limited 2015

ISBN 978 0 580 78900 7

ICS 59.140.30

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 October 2015.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 5402-2

October 2015

ICS 59.140.30

Supersedes EN ISO 22288:2009

English Version

Leather - Determination of flex resistance - Part 2: Vamp flex method (ISO 5402-2:2015)

Cuir - Détermination de la résistance à la flexion - Partie 2: Méthode de flexion d'empeigne (ISO 5402-2:2015)

Leder - Bestimmung der Dauerbiegefestigkeit - Teil 2: Blattbiege-Verfahren (ISO 5402-2:2015)

This European Standard was approved by CEN on 8 August 2015.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

This document (EN ISO 5402-2:2015) has been prepared by Technical Committee CEN/TC 289 “Leather”, the secretariat of which is held by UNI, in collaboration with IULTCS "International Union of Leather Technologists and Chemists Societies".

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 April 2016, and conflicting national standards shall be withdrawn at the latest by April 2016.

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.

This document supersedes EN ISO 22288:2009.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 5402-2:2015 has been approved by CEN as EN ISO 5402-2:2015 without any modification.

Contents

Page

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).

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).

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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO 5402-2, formerly ISO 22288, was prepared by the Physical Test Commission of the International Union of Leather Technologists and Chemists Societies (IUP Commission, IULTCS) in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 289, *Leather*, the secretariat of which is held by UNI, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement). It was published as EN 13335.

It is based on IUP 39 published in *J. Soc. Leather Tech. Chem.*, **84** (7), p. 381, 2000, and declared an official method of the IULTCS in March 2001. The title was changed, Clause 4 revised in 2013, and the standard re-numbered as ISO 5402-2.

IULTCS, originally formed in 1897, is a world-wide organization of professional leather societies to further the advancement of leather science and technology. IULTCS has three Commissions, which are responsible for establishing international methods for the sampling and testing of leather. ISO recognizes IULTCS as an international standardizing body for the preparation of test methods for leather.

This first edition cancels and replaces ISO 22288:2006 which has been technically revised.

ISO 5402 consists of the following parts, under the general title *Leather — Determination of flex resistance*:

— *Part 1: Flexometer method*

— *Part 2: Vamp flex method*

INTERNATIONAL STANDARD

ISO 5402-2:2015(E)
IULTCS/IUP 39-2:2015(E)

Leather — Determination of flex resistance —

Part 2:
Vamp flex method

1 Scope

This part of ISO 5402 specifies a method for determining the wet or dry flex resistance of leather and finishes applied to leather. It is applicable to all types of leather below 3,0 mm in thickness.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2418, *Leather — Chemical, physical and mechanical and fastness tests — Sampling location*

ISO 2419, *Leather — Physical and mechanical tests — Sample preparation and conditioning*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Principle

A test piece is folded with the surface to be tested outwards over two inverted "V" shaped clamps. Relative movement of the clamps flexes the sample producing one downward crease surrounded by four upward creases. The test piece is examined periodically for damage.

4 Apparatus

4.1 Test machine, incorporating the following.

4.1.1 Two inverted "V" shaped clamps (Figures 1 and 2), aligned parallel to one another, centred on the same axis and with a minimum separation between the clamps of (9,5 ± 1,0) mm.

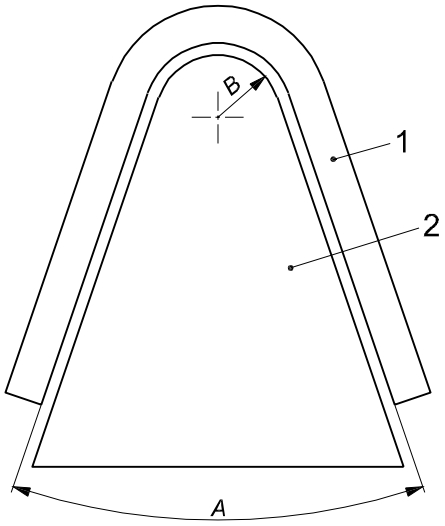
Each clamp shall have two parts.

4.1.1.1 An outer part comprising a "V" form with an internal angle of (40 ± 1)° and a truncated tip radius of (6,4 ± 0,5) mm.

4.1.1.2 An inner part having the shape and size that shall complement the outer part.

4.1.2 A means of applying a simple harmonic reciprocating motion between the two clamps, to move them apart by (19,0 ± 1,5) mm and return them to the minimum separation (4.1.1) at a rate of oscillation of (300 ± 30) cycles/min.

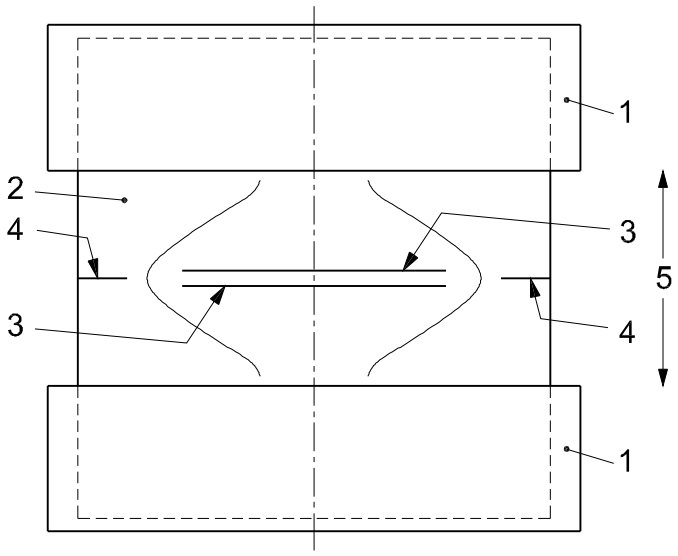
4.1.3 Counter, to indicate the number of complete cycles.



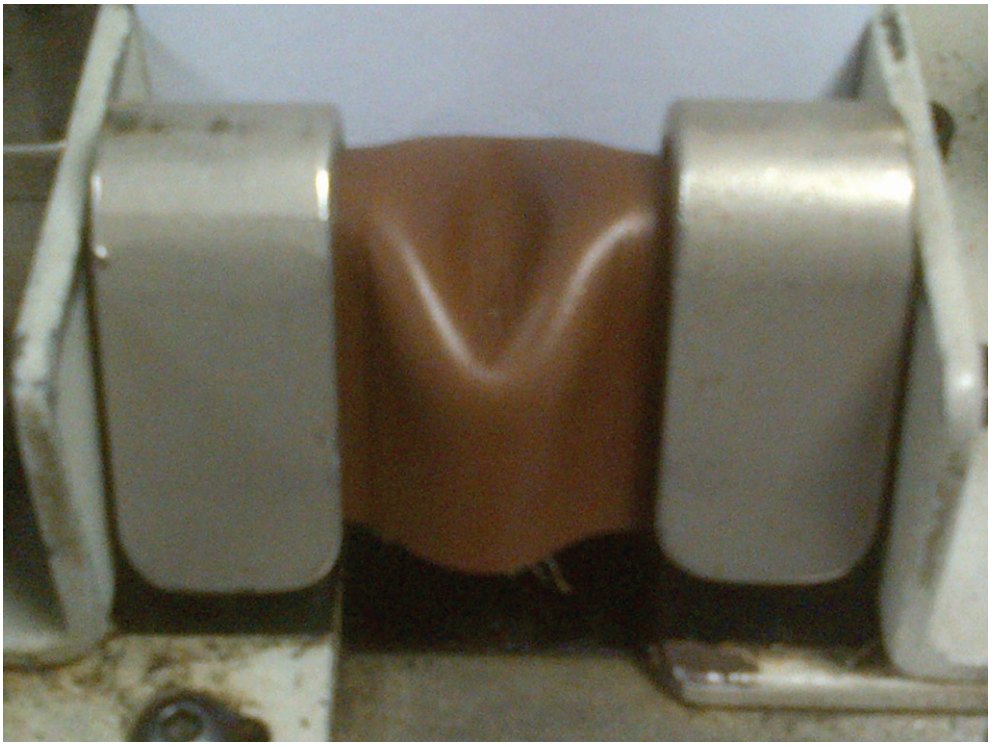
Key

1 clamp, outer part
2 clamp, inner part
A internal angle, (40 ± 1)°
B radius, (6,4 ± 0,5) mm

Figure 1 — Inverted "V" shaped clamp



a) Plan view — Crease pattern formed by flexing



b) Side view — Crease pattern in example test piece

Key

1 inverted “V” shaped clamps
2 test piece
3 folds with surface to be tested inwards
4 folds with surface to be tested outwards
5 oscillation (9,5 mm to 19,0 mm)

Figure 2 — Crease patterns

4.2 **Press knife**, conforming to the requirements of ISO 2419, the inner wall of which is a square of side 64 mm ± 1 mm.

4.3 **Magnifier**, with a magnification of four to six times.

4.4 **Distilled or deionized water**, conforming to the requirements of grade 3 of ISO 3696.

5 Sampling and sample preparation

5.1 Sample in accordance with ISO 2418. Cut four test pieces parallel to the backbone and four test pieces perpendicular to the backbone by applying the press knife (4.2) to the surface to be tested. Use two test pieces parallel to and two test pieces perpendicular to the backbone for dry tests and two test pieces parallel to and two test pieces perpendicular to the backbone for wet tests.

If there is a requirement for more than two hides or skins to be tested in one batch, then only two samples in each direction need be taken from each hide or skin, giving one sample in each direction for both dry and wet, provided that the overall total is not less than four test pieces in each direction.

5.2 For dry flex testing, condition the test pieces in accordance with ISO 2419 and perform the test in the conditioned atmosphere.

5.3 For wet flex testing, the test pieces can be wetted by rubbing approximately 1 ml of distilled or deionized water into the flesh surface of the leather. The wetting should be repeated every 25,000 flexes during the test. Carry out wet flexing without delay.

6 Procedure

6.1 Remove the upper parts of the clamps (4.1.1) and adjust the test machine so that the clamps are at their maximum separation.

6.2 Fold the test piece evenly over the “V” shaped clamps with the surface to be tested uppermost and hold in place by replacing the upper parts of the clamps, ensuring that there is no slack in the test piece. Position two test pieces so that the direction of the backbone is along the axis of movement of the clamps and two so that it is perpendicular to the axis.

6.3 Slowly move the clamps together and observe the test pieces to ensure that the centre of each test piece folds downwards (Figure 2). If this is not the case, apply gentle pressure to the centre of the ridge as the clamps move together to make a downward fold form.

6.4 Run the machine for the required number of flex cycles selected from the following list:

— Dry flex: 50 000; 100 000; 250 000; 500 000; 1 000 000 cycles;

— Wet flex: 50 000; 100 000 cycles.

In addition to the above inspection points, remove the wet test pieces from the machine every 25 000 cycles and examine them for spue before re-wetting and replacing in the test machine.

NOTE Other inspection points are considered if required.

6.5 Stop the test machine and remove the test piece. Examine visually in good light using the naked eye and with the magnifier (4.3). Examine the test piece with it both lying flat and folded. Record any damage

in the flexed area, ignoring damage in the clamped area. Cut through the flexed area if required to assist identification of loose leather structure.

Cutting through the test piece damages it too severely to allow further testing and may only be carried out after the final inspection.

The damage can include the following:

a) creasing in the central inward fold;

b) cracking in the central inward fold;

c) cracking in the outward folds;

d) delamination or flaking of the surface finish;

e) cracking extending to the edge of the test piece;

f) onset of appearance of spue (wet flex only) when examined both wet (immediately after completion of the test) and after allowing to completely dry at standard room temperature as prescribed in ISO 2419.

6.6 If required, replace the test piece in the clamps using the marks produced by the clamps as a guide to ensure that the test piece is returned to its original position in the clamps.

6.7 Restart the machine and continue to the next required number of cycles. Repeat the inspection given in 6.5.

6.8 Repeat 6.6 and 6.7 if required for other numbers of flex cycles.

6.9 After the final wet inspection, allow to completely dry at standard room temperature as prescribed in ISO 2419.

NOTE The actual number of cycles chosen depends on the specification, the end use of the leather, and the expected performance.

7 Test report

The test report shall include the following:

a) a reference to this part of ISO 5402, i.e. ISO 5402-2;

b) full details for identification of the sample;

c) whether the leather was tested wet or dry;

d) the number of flex cycles and damage at each inspection stage;

e) the standard atmosphere used for conditioning and testing as given in ISO 2419;

f) any deviations from the method specified in this part of ISO 5402.

Annex A
(informative)

Sources of apparatus

Examples of sources of suitable apparatus available commercially are given below. This information is given for the convenience of users of this part of ISO 5402 and does not constitute an endorsement by ISO of these products.

— SATRA Technology Centre, Wyndham Way, Telford Way, Kettering, Northants, NN16 8SD England, www.satra.co.uk

— Muver - Francisco Muñoz Irles, Avda Hispanoamerica 42, E-03610 Petrer (Alicante), Spain, www.muver.com

— PFI, Test and Research Institute, Marie-Curie-Straße 19, D-66953 Pirmasens, Germany, www.pfi-germany.de

This page deliberately left blank

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.™