INTERNATIONAL STANDARD

ISO 32100

Second edition
2018-10

Rubber- or plastics-coated fabrics — Physical and mechanical tests — Determination of flex resistance by the flexometer method

Supports textiles revêtus de caoutchouc ou de plastique — Essais physiques et mécaniques — Détermination de la résistance à la flexion à l'aide d'un flexomètre

Reference number
ISO 32100:2018(E)

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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
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword

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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).

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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.

This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products other than hoses*.

This second edition cancels and replaces the first edition (ISO 32100:2010), which has been technically revised:

The main changes compared to the previous edition are as follows:

— the list of apparatus has been updated;

— the procedure has been amended;

— in 7.12, an additional procedure has been added;

— the Bibliography has been updated.

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.

Rubber- or plastics-coated fabrics — Physical and mechanical tests — Determination of flex resistance by the flexometer method

1 Scope

This document specifies a test method for determining the flex resistance of rubber- or plastics-coated fabrics in the folded condition. The test method is applicable only to products which can be clamped in the test apparatus used and to products with which the fold made in the test specimen can be caused to move back and forth along the specimen during the test.

The appearance of the test specimen, after completion of either the flex number (see 3.1) or a specified number of flex cycles, is taken as a measure of the flex resistance in the folded condition.

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 2231, *Rubber- or plastics-coated fabrics — Standard atmospheres for conditioning and testing*

3 Terms and definitions

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
flex number
number (agreed between the interested parties) of *flex cycles* (3.2) to which the test specimen is subjected, the specimen being subsequently examined using a magnifying lens with ×6 magnification to determine whether any damage or other visible change is observable

3.2
flex cycle
cycle comprising one forward and one backward (i.e. a complete to-and-fro) movement of the moveable clamp of the test apparatus

4 Principle

One end of a test piece is folded with the surface to be tested facing inwards and clamped in an upper (moveable) clamp and the other end of the test piece is folded with the surface to be tested facing outwards and clamped in a lower (fixed) clamp. The upper clamp is then moved in such a way that the fold is caused to run along the test piece. The test piece is examined periodically for damage or any other visible change.

5 Apparatus

5.1 Test machine, consisting of a movable upper clamp, a fixed lower clamp and a counter as described in 5.1.1 to 5.1.3 and as shown in Figure 1 as an example.

5.1.1 Upper clamp, consisting of a pivoting pair of flat plates of 4 mm thickness as shown in Figure 1. The small plate (H) has the basic shape of a trapezium but with a radius of 2 mm at the acute corner. It has a ledge (G) to support the folded test piece. The larger plate (I) has a shape as shown in figure 1. The clamp tightening screw (F) is tightening the plates together and also acts as a stop to prevent the test piece from being incorrectly positioned. The design of the clamp should ensure the two faces of the clamp remain parallel when clamping the test piece. The upper clamp is reciprocated by a motor about a horizontal axle, descending through an angle (A) of 22,5 ° ± 0,5 ° at a frequency of 100 cycles/min ± 5 cycles/min.

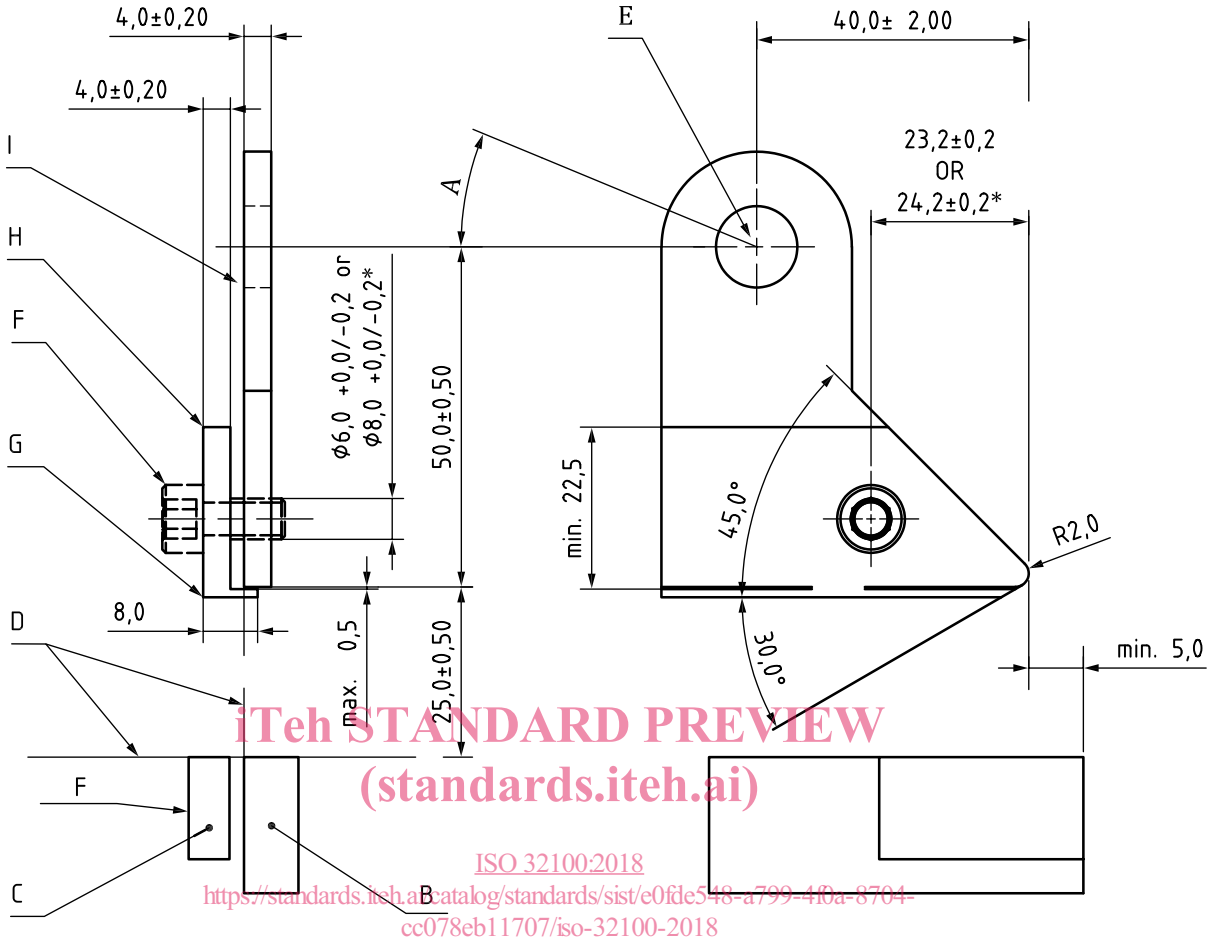
5.1.2 Lower clamp, fixed and lying directly beneath (planar to) the upper clamp and consisting of a pair of flat plates (B and C) to hold the test piece. The position of the lower clamp is such that the vertical distance (D) between the upper side of the ledge (G) of the upper clamp and the upper edge of the fixed lower clamp, when the upper clamp is horizontal, is 25,0 mm ± 0,5 mm.

5.1.3 Counter, to indicate the number of cycles.

5.2 Magnifier, with a magnification of 6 times.

5.3 Mandrel, having a diameter of 10 mm and minimum length of 70 mm.

Dimensions in millimetres
General tolerances in accordance with ISO 2768-1, tolerance class m



Key

A flexing angle 22,5° ± 0,5°
B fixed part of fixed lower clamp
C movable part of fixed lower clamp
D vertical positioning of fixed part of movable upper clamp and fixed part of fixed lower clamp
E horizontal axle (pivot point)
F clamp tightening screws
G ledge (For testing of thick test pieces the ledge can be increased to more than 8 mm)
H small part of upper clamp with ledge (G)
I large part of upper clamp
* Values for devices with 8 mm bolt.

Figure 1 — Example of an upper (moveable) and a lower (fixed) clamp

6 Test specimens

6.1 Sampling

From the product to be tested, take test specimens either of dimensions 70 mm × 45 mm or, in certain cases as described in 7.9, in accordance with Figure 2.

Dimensions in millimetres
General tolerances in accordance with ISO 2768-1, tolerance class m

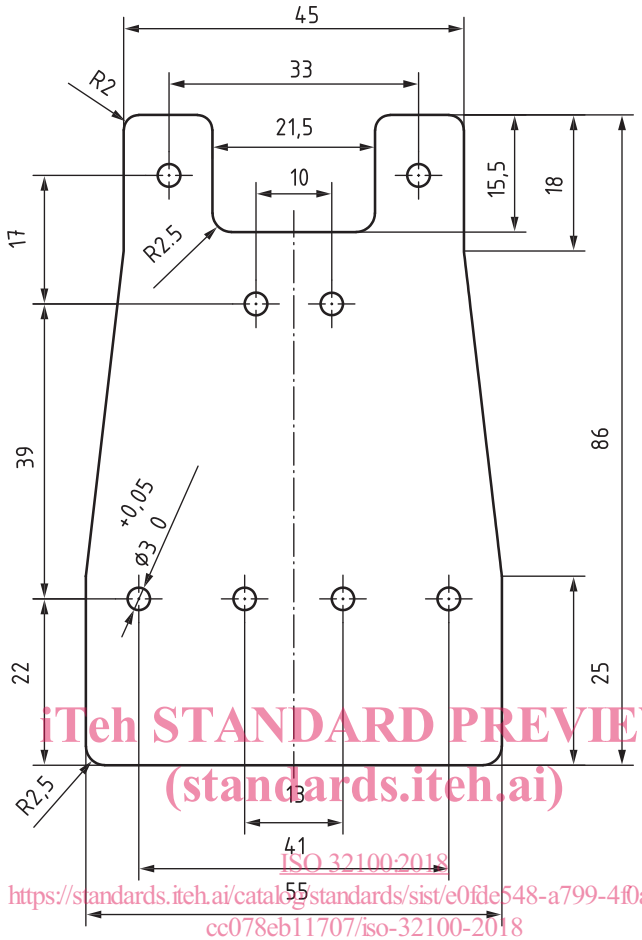


Figure 2 — Test specimen for special cases (see 7.9)

6.2 Number of test specimens

Cut at least three test specimens from the sheet longitudinal to the direction of manufacture and at least another three test specimens perpendicular to the direction of manufacture.

6.3 Conditioning of the test specimens

Prior to testing, condition the test specimens in standard atmosphere B as defined in ISO 2231 (23 °C and 50 % r.h.) for the length of time specified in ISO 2231.

7 Procedure

7.1 Unless otherwise specified, carry out the test in standard atmosphere B as defined in ISO 2231.

7.2 Open the upper and lower clamps (5.1.1 and 5.1.2) so that the gap is at least twice the thickness of the test piece.

7.3 Turn the motor until the lower side of the upper clamp (5.1.1) is parallel to the upper edge of the fixed lower clamp (5.1.2) as shown in Figure 1 (the point at which the direction of rotation of the horizontal axle changes).

7.4 Fold the test piece in half lengthwise such that the two long edges are brought together exactly and the surface to be tested meets face to face. Clamp the folded test piece as shown in Figure 3 a) with the folded edge parallel to, and positioned against, the ledge and with the end of the test piece against the stop formed by the clamping screw. It has to be ensured that the corners of the test piece within the upper clamp are securely fixed and cannot slip during the test.

7.5 Draw the free corners of the test piece outward and downward around the clamp as shown in Figure 3 b).

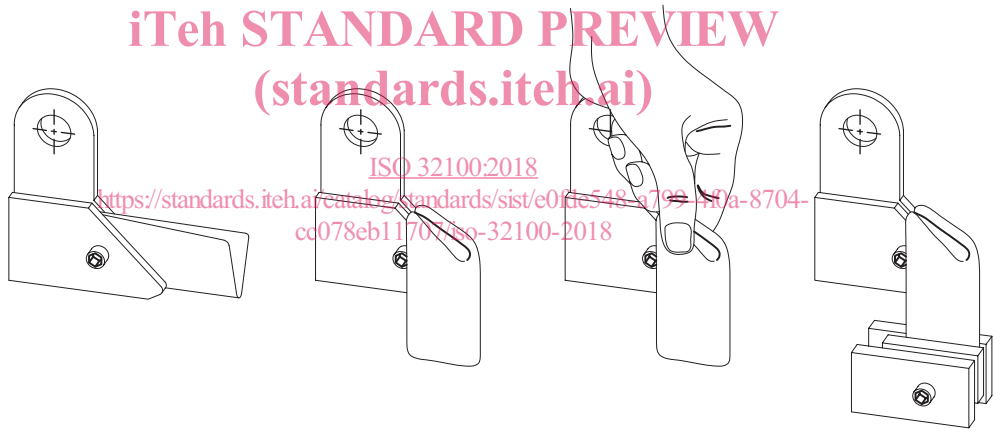
Bring the inner surfaces together and place the free end in the opened lower clamp.

7.6 Press the test piece against the outer surfaces of the upper clamp as shown in Figure 3 c). It is important to ensure that the test piece is in contact with the 45 ° sloping face of the clamp. This ensures that the lower part of the test piece is perpendicular to the lower clamp. Fix the test piece in this position in the lower clamp [see Figure 3 d)].

NOTE 1 The procedure ensures that no elongation is applied to the test piece by clamping.

NOTE 2 Flexible (soft) materials will show a direct contact of their backing on the outer face of the upper clamp. For stiffer materials ballooning of the materials in this area is unavoidable. See Annex A.

7.7 Inspect the vertical orientation of the test piece (rear edge). If the rear edge is not perpendicular to the lower clamp repeat 7.5 and 7.6.



a) b) c) d)

a) sample in upper clamp

b) sample folded back

c) sample fixed with two fingers in on upper clamp

d) sample fully clamped

Figure 3 — Loading of the test piece

7.8 Programme the test rig to carry out either an agreed number of flex cycles (the flex number — see 3.1) or the intervals as agreed between the interested parties. Set the upper clamp in motion. During the swivelling motion, the fold shall run up and down along the test specimen. After completion of the