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Third edition
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Rubber- or plastics-coated fabrics — Low-temperature bend test

Supports textiles revêtus de caoutchouc ou de plastique — Essai de flexion à basse température

Reference number
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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 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 third edition cancels and replaces the second edition (ISO 4675:1990), which has been technically revised.

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

— a WARNING has been inserted before the scope;

— Clause 3 has been added;

— in Figure 2, the dimension of *H* has been corrected.

Rubber- or plastics-coated fabrics — Low-temperature bend test

WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This document specifies a method for determining the ability of fabrics coated with rubber or plastics to resist the effect of low temperature when subjected to bending at specified temperatures after definite periods of exposure. This method is applicable to material with a thickness within the range 0,1 mm to 2,2 mm. For materials of greater thickness than this, modifications to the standard equipment apply (see 9.2, third paragraph).

Because fabrics coated with rubber or plastics are used in different applications requiring low temperature flexing, no general relationship between this test and service performance can be given or implied.

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*

ISO 2286-3, *Rubber- or plastics-coated fabrics — Determination of roll characteristics — Part 3: Method for determination of thickness*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

Test pieces, after conditioning, are exposed to low temperature for a predetermined period. Subsequently, the chilled test piece is subjected to a bending test, followed by examination.

5 Apparatus

5.1 Cold chamber, in which the test pieces are exposed to low temperature, sufficient in size to contain the bending fixture used for testing the test pieces and to permit the operation of the fixture to bend the test piece without removal from the chamber.

The cold chamber shall also have sufficient work space to permit the conditioning of test pieces as outlined in Clause 8. It shall be capable of maintaining a uniform atmosphere of cold air or any other suitable gas at specified temperatures to within a tolerance of ±1 °C.

5.2 Bending jig, for bending the test pieces, as shown in Figure 1 and Figure 2.

Masses, mass tolerances and dimensions shall be as specified in Figure 2.

5.3 Glass plates, of sufficient number, having dimensions of approximately 125 mm × 175 mm, for use when conditioning all test pieces.

The thickness of the glass plates shall be such as to permit easy handling.

5.4 Gloves, for handling test pieces within the cold chamber.

The gloves will be conditioned at the same temperature as the test pieces. A second pair of gloves at room temperature shall therefore be available for wearing within the cold gloves as protection for the operator.

6 Test pieces

Take three test pieces, each measuring 25 mm × 100 mm, equally spaced across the working width of the sample and with their lengths parallel to the longitudinal direction of the coated fabric, unless otherwise specified.

7 Time-interval between manufacture and testing

7.1 For all test purposes, the minimum time between manufacture and testing shall be 16 h.

7.2 For non-product tests, the maximum time between manufacture and testing shall be 4 weeks; for evaluations intended to be comparable, each test, as far as possible, shall be carried out after the same time-interval.

7.3 For product tests, whenever possible, the time between manufacturing and testing shall not exceed 3 months. In other cases, tests shall be made within 2 months of the date of receipt of the products by the customer.

8 Conditioning of test pieces

Immediately prior to testing, condition the test pieces in one of the standard atmospheres defined in ISO 2231.

9 Procedure

9.1 Measure the thickness of each test specimen in accordance with ISO 2286-3. Place the three conditioned test pieces between glass plates (5.3), with sufficient space between each test piece to permit the passage of air during the conditioning period. Place the glass plates with the test pieces held

in position, the bending jig (5.2) and the cold gloves (5.4) in the cold chamber (5.1). Unless otherwise specified, expose them for 4 h to the specified test temperature.

9.2 At the termination of the exposure period and without taking them out of the test chamber, remove the test pieces from between the glass plates one at a time (CAUTION, see below) and place in the bending jig with the flexing plate held in the open position by the trigger pin. Unless otherwise specified, in the case of substrates coated on one side only, place the coated side away from the mandrel. In the case of double-coated fabrics, either or both surfaces may be evaluated unless otherwise specified.

CAUTION — Gloves shall be worn at all times when handling test pieces prior to making the bend test.

When materials greater than 2,2 mm in thickness are to be tested, it can be necessary to increase the mass of the steel top bar G (see Figure 2) and increase the clearance between the back plate and mandrel to enable the specimen to be inserted. In this case, report the deviation in the test report.

9.3 As soon as the test piece is in position in the bending jig, release the trigger and permit the flexing plate to make a free fall.

9.4 After all the test pieces have been tested, remove them from the test chamber and examine each test piece for fractures or cracks in their coating under a magnification of ×5. During the examination, fold all test pieces through 180° in the same direction as the bend made during the test.

10 Assessment of damage

10.1 Depth of crack

Grade the cracking, if any, according to the following five-part scale:

— A: surface or finish crack not exposing the cellular layer, middle layer or substrate;

— B: cracking into but not through the middle layer;

— C: cracking through to the substrate or base fabric;

— D: cracking completely through the material;

— O: no cracking.

10.2 Number of cracks

Record the number of cracks of greatest severity, up to 10. If there are more than 10, record “over 10”.

10.3 Length of crack

Record the length, in millimetres, of the largest crack of greatest severity.

11 Test report

The test report shall include the following particulars:

a) a reference to this document, i.e. ISO 4675;

b) the conditioning atmosphere used (see Clause 8);

c) the thickness of the coated fabric and the pressure at which it was measured;

d) the temperature at which the test pieces were tested;

e) the duration of the exposure period;

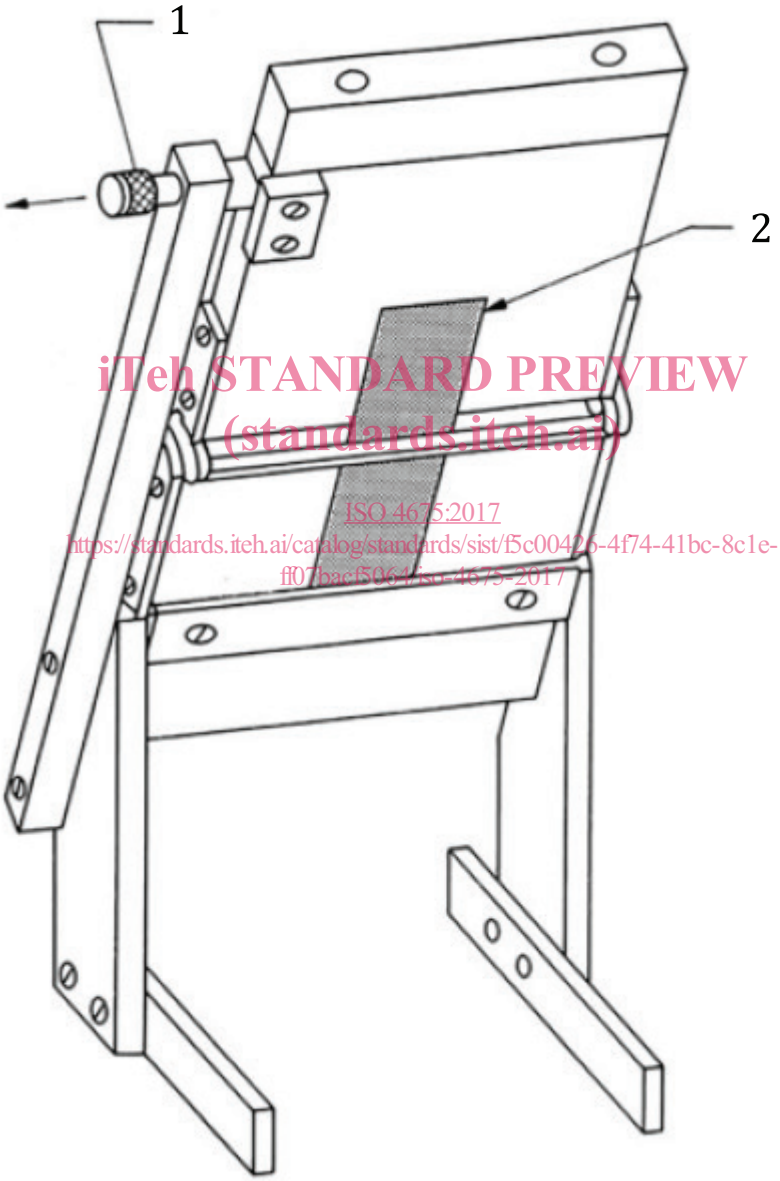
f) the surface(s) tested;

g) the depth of crack in accordance with the five-part scale in 10.1, the number of cracks and the length of the largest crack in each test piece;

h) details of any deviations from the standard test;

i) all details necessary for the identification of the coated fabric, including, if possible, the date of manufacture;

j) the date of the test.

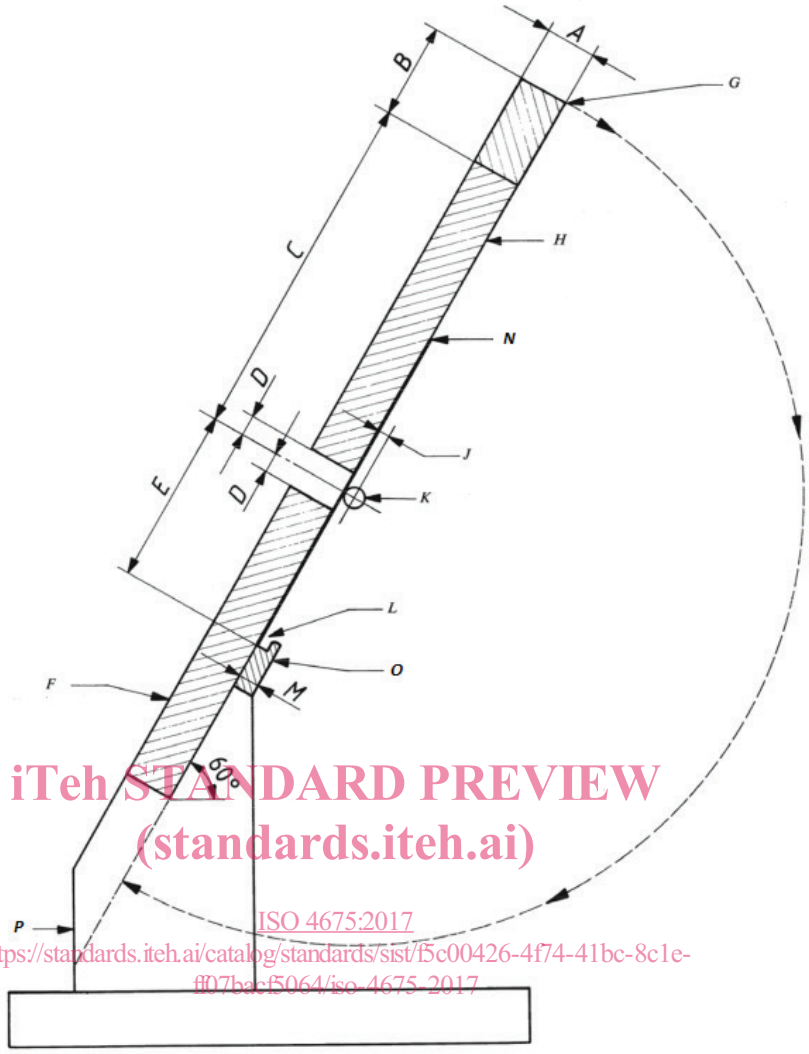


Key

1 trigger pin to release

2 test piece

Figure 1 — Bending jig for coated fabrics



Key

A thickness of steel top bar (13 mm)
B length of steel top bar (25 mm)
C length of flexing plate (100 mm)
D distance between bending centre and edge of flexing plate (5 mm)
E distance between bending centre and bottom of the groove of cleat (48 mm)
F aluminium stationary bending plate (100 mm × 110 mm × 13 mm)
G steel top bar and its mass (100 mm × 25 mm × 13 mm) (250 g ± 5 g)
H flexing plate/aluminium bending plate (100 mm × 95 mm × 13 mm) (375 g ± 2,5 g including hinge)
J offset (3 mm)
K mandrel (hinge pin) (⌀3 mm)
L groove of cleat (3 mm x 3 mm)
M thickness of cleat (6 mm)
N test piece
O cleat
P support base

Figure 2 — Dimensions of bending jig