INTERNATIONAL STANDARD

ISO 3303

Second edition
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Rubber- or plastics-coated fabrics — Determination of bursting strength

Supports textiles revêtus de caoutchouc ou de plastique — Détermination de la résistance à l'éclatement

INTERNATIONAL ISO

Reference number
ISO 3303 : 1990 (E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 3303 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products.*

This second edition cancels and replaces the first edition (ISO 3303 : 1979), of which it constitutes a minor technical revision.

International Organization for Standardization
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Introduction

The bursting strength of coated fabrics is often used as a measure of the multidirectional modulus of the material, as opposed to tensile properties which only provide guidance to the coated-fabric strength in one plane. In addition, bursting strength is more appropriate for testing materials prone to necking, such as coated fabrics with knitted substrates.

Method B, which employs an elastic diaphragm, is the more common type of instrument used in burst testing and is more suitable for the testing of the lighter and middle range of coated-fabric weights. Two aperture sizes are specified to allow the use of commercially available instruments, although results from the different machines may not be comparable.

Method A is included in order to extend the range of bursting strength to materials of higher modulus and to some extent simulate practical situations of mechanical damage.

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Rubber- or plastics-coated fabrics — Determination of bursting strength

1 Scope

This International Standard specifies two methods for the determination of the bursting strength of rubber- or plastics-coated fabrics, one using a tensile testing machine with a ring clamp and steel ball (method A) and the other using a diaphragm bursting tester operated by hydraulic pressure (method B). When specifying a coated fabric for which a bursting strength requirement applies, the customer and supplier should agree mutually upon the method of test to be employed.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

3 Apparatus

3.1 Method A (see figure 1)

3.1.1 Testing machine, power-driven and equipped with a suitable dynamometer. It shall be capable of maintaining a substantially constant rate of traverse of the moving head during the test and be fitted with an autographic recorder. An inertialess dynamometer (of electrical or optical type, for example) should preferably be used.

Dimensions in millimetres

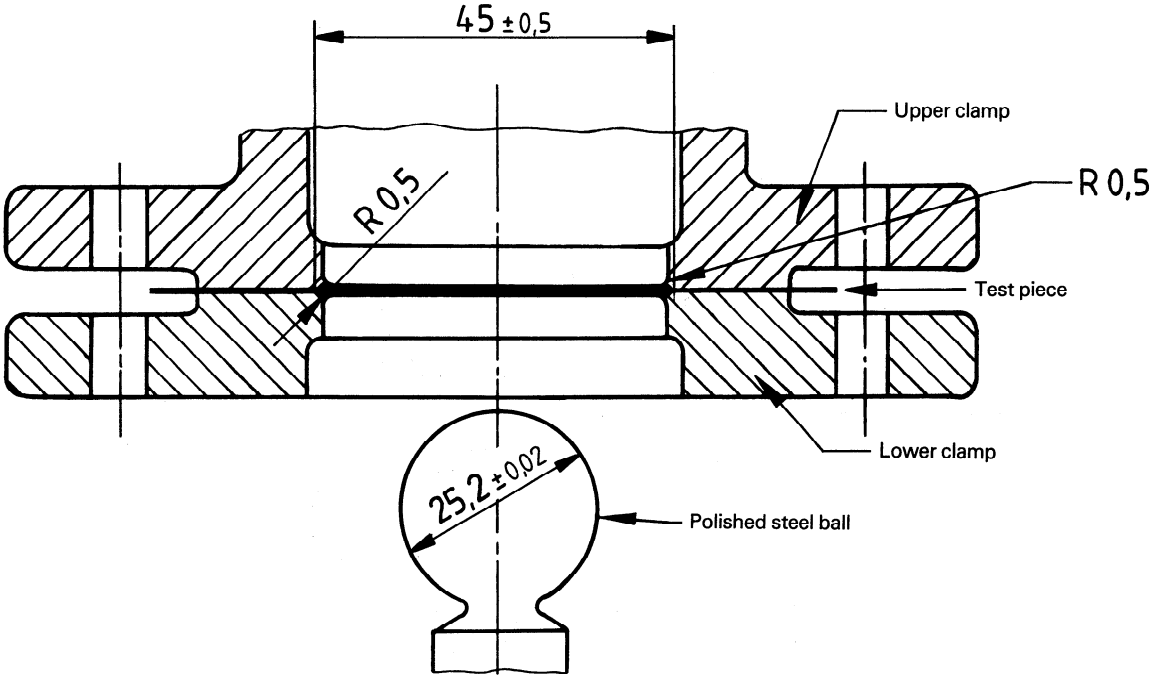

Figure 1 — Apparatus for method A

A pendulum-type inertia dynamometer may in fact give different results because of the effects of friction and inertia. When the use of an inertia dynamometer is unavoidable, information shall be obtained in the following way. The capacity of the machine or the measuring scale selected, when a variable-range machine is involved, shall be such that the bursting force is between 15 % and 85 % of the rated capacity.

The accuracy of the machine shall be such that the error in the force measurement as shown and recorded does not exceed 2 % of the force or 0,5 % of the maximum of the scale, whichever is the greater.

3.1.2 Bursting attachment, such that the test piece is held securely by a ring mechanism of internal diameter 45mm ± 0,5mm, with the centre of the test piece pressed against a polished steel ball of diameter 25,2 mm ± 0,02 mm until the test piece ruptures. The direction of motion of the ring-clamp or steel ball shall be at right angles to the plane of the fabric.

The clamping surfaces of the upper and lower clamps shall be grooved concentrically such that the crowns of the grooves of one plate fit the grooves of the other. The grooves shall be not less than 0,8 mm apart and not less than 0,15 mm deep. The grooves shall start no further than 3 mm from the edge of the aperture and shall be rounded to a radius of not greater than 0,4 mm. The lower inner edge of the upper clamp and the upper inner edge of the lower clamp shall be rounded off to a radius of 0,5 mm.

3.2 Method B (see figure 2)

3.2.1 Testing machine, either mechanically or manually operated, which permits the clamping of the test piece between two circular clamps of diameter not less than 55 mm and having coaxial apertures of 7,5 cm^2 or 10,0 cm^2 in their centres; these apertures are of diameter 31 mm ± 0,5 mm and 35,7 mm ± 0,5 mm respectively.

The clamping surfaces of the upper and lower clamps shall be grooved concentrically such that the crowns of the grooves of one plate fit the grooves of the other. The grooves shall be not less than 0,8 mm apart and not less than 0,15 mm deep. The grooves shall start no further than 3 mm from the edge of the aperture and shall be rounded to a radius of not greater than 0,4 mm. The bottom inner edge of the upper clamp shall be rounded to a radius of 0,5 mm. The lower clamp shall be integral with the chamber in which liquid is introduced at a uniform rate of approximately 1,6 ml/s in the case of the 31 mm aperture and 2,5 ml/s in the case of the 35,7 mm aperture. The chamber shall be covered with a rubber diaphragm fitted to expand through the aperture and exerting pressure on the coated fabric between the clamps.

NOTE — A testing machine having an aperture of diameter 31 mm ± 0,5 mm will not necessarily give the same results as a testing machine having an aperture of diameter 35,7 mm ± 0,2 mm.

3.2.2 Pressure gauge, of the maximum-reading type, of appropriate capacity and graduated in kilopascals. It should preferably be used within the range from 25 % to 75 % and in no case outside the range from 15 % to 85 % of the maximum capacity of the scale. It shall at any point within the working range be accurate to within 1,0 % of the maximum capacity of the scale. The pressure gauge shall be calibrated at sufficiently frequent intervals to maintain the specified accuracy.

Dimensions in millimetres

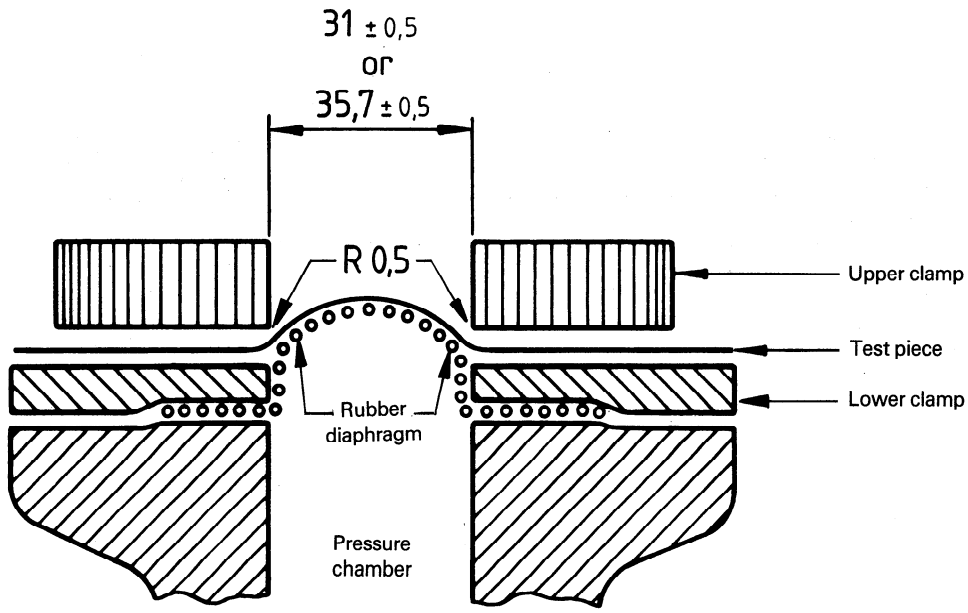

Figure 2 — Apparatus for method B

4 Sampling

The sample shall be taken so that it is as representative as possible of the whole consignment. The test pieces shall be taken from the working width of the sample and at least 1 m from the extremity of the piece.

5 Preparation of test pieces

Cut across the full width of the sample a rectangular strip not less than 100 mm wide so that its sides make an angle of 45° ± 15° with the longitudinal direction.

Take five test pieces equally spaced across the width of the sample. The smaller dimension of each test piece shall be at least 12 mm greater than the outside diameter of the ring clamp mechanism of the test machine. Alternatively, the sample may be tested at the requisite location across its width.

6 Time-interval between manufacture and testing

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

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

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

7 Conditioning of test pieces

Condition the test pieces in one of the standard atmospheres for testing as defined in ISO 2231.

When it is required to determine the properties of wet material, immerse the test piece for 24 h in distilled water containing 1 % ethanol at the chosen standard temperature. The test piece shall be cut prior to this immersion. Immediately after removal from the water, blot the test piece between two sheets of absorbent paper and test at once.

8 Procedure

8.1 Method A

Secure the conditioned test piece in the ring-clamp and move the test piece and steel ball towards each other at a rate of 300 mm/min ± 30 mm/min until the test piece ruptures under the pressure being applied by the steel ball.

For each test, read from the scale of the tensile testing machine the force, in newtons, required to cause the rupture of the test piece.

Record the median of the five results obtained.

8.2 Method B

8.2.1 Increase the pressure on the rubber diaphragm by introducing liquid into the chamber as specified in 3.2.1 until the test piece bursts. Note the pressure required as shown by the maximum indicator and return the pointer to zero.

For each test piece, record the bursting pressure and note the type of burst obtained (i.e. cross or slit).

Ignore any burst which occurs at or near the edge of the clamp and repeat the test on another test piece.

Calculate the mean of the five results obtained for bursting pressure and then apply the diaphragm correction factor as given in 8.2.2.

8.2.2 With the same rate of liquid flow as that employed in the test, distend the diaphragm, without the presence of the test piece, but with the clamping ring in position, and note the pressure required to distend it by an amount equal to the average distension of the test piece at burst. This pressure is the "diaphragm correction factor" and is the value by which the mean bursting pressure should be reduced.

8.2.3 Report the corrected mean bursting pressure as the bursting strength.

9 Test report

The test report shall indicate the following particulars:

a) a reference to this International Standard;

b) all details necessary for the identification of the sample;

c) the conditioning method, atmosphere and time of exposure;

d) the conditions in which the test was conducted;

e) the method of test, i.e. method A or B, and, in the latter case, the aperture used;

f) for method A, the rupturing force, expressed in newtons; for method B, the bursting strength, expressed in kilopascals;

g) for method B, the type of burst obtained.

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Descriptors : coated fabrics, fabrics coated with plastics, fabrics coated with rubber, tests, burst tests, test equipment.

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