International Standard ISO 3303

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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

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Foreword

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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.

International Standard ISO 3303 was developped by Technical Committee ISO/TC 45, *Rubber and rubber products,* and was circulated to the member bodies in September 1977.

It has been approved by the member bodies of the following countries :

Austria	Ireland	Sweden
Belgium	Korea, Rep. of	Switzerland
Canada	Mexico	Thailand
Czechoslovakia	Netherlands	Turkey
France	Poland	United Kingdom
Greece	Romania	USA
Hungary	South Africa, Rep. of	USSR
India	Spain	

No member body expressed disapproval of the document.

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

1 Scope and field of application

This International Standard specifies two methods for the determination of the bursting strength of fabrics coated with rubber or plastics, 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 the method of test to be employed.

NOTE — Values obtained using method A are not necessarily comparable with those obtained when using method B.

2 Reference

ISO 2231, *Fabric coated with rubber or plastics — 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.

NOTE — A pendulum-type inertia dynamometer may in fact give different results because of the effects or friction and inertia. When the use of an inertia dynamometer is unavoidable, information may 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.

Dimensions in millimetres

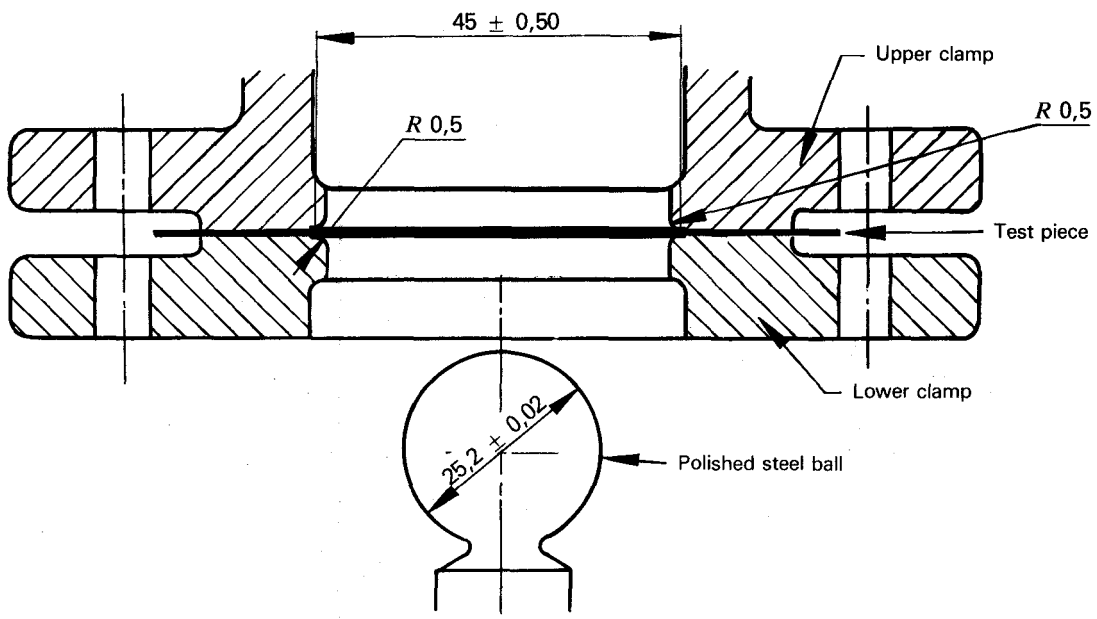

Figure 1 — Apparatus for method A

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 45 ± 0,50 mm, with the centre of the test piece pressed against a polished steel ball of diameter 25,2 ± 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.

3.1.3 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 31,0 ± 0,2 mm and 35,7 ± 0,2 mm respectively.

3.2.2 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 clamps.

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

3.2.3 Pressure gauge, of the maximum reading type, of appropriate capacity and graduated in kilopascals. It shall 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.

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 at least 100 mm from the selvedge 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.

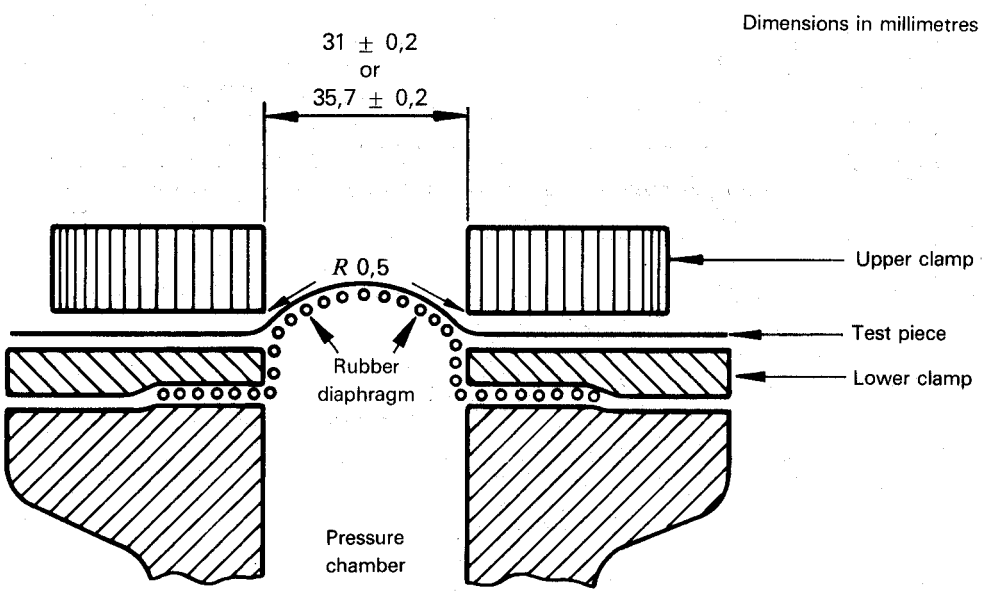

Figure 2 — Apparatus for method B

Take five test pieces equally spaced across the width of the sample. The smaller dimension of each test pieces 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 Conditioning of test pieces

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

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, should be carried out after the same time-interval.

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

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

NOTE — The standard atmospheres may be defined by two characteristics and three alternative conditions are permitted, viz. :

— temperature 20 ± 2 °C;
— relative humidity 65 ± 5 %;

— temperature 23 ± 2 °C;
— relative humidity 50 ± 5 %;

or for tropical climates only :

— temperature 27 ± 2 °C
— relative humidity 65 ± 5 %.

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 one of the standard laboratory temperatures. 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.

7 Procedure

7.1 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 5,0 ± 0,5 mm/s 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.

Calculate the bursting strength, in kilopascals, using the formula

$$\frac{F \times 10^6}{A}$$

where

F is the rupturing force, in kilonewtons;

A is the internal cross-sectional area, in square millimetres of the ring-clamp.

Record the median of the five results obtained.

7.2 Method B

7.2.1 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 form of bursting 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 the five results obtained for bursting pressure and then apply the diaphragm correction factor as given in 7.2.2.

7.2.2 With the same rate of liquid flow as that employed in the test, distend the diaphragm, without the presence of the specimen, 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 specimen at burst. This pressure is the "diaphragm correction factor" and is the value by which the mean bursting pressure should be reduced.

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

8 Test report

The test report shall indicate the following particulars :

a) reference to this International Standard;

b) the reference of the sample;

c) the conditioning method and time of exposure;

d) the conditions in which the test has been conducted;

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

f) the bursting strength, expressed in kilopascals;

g) for method B, the form of bursting obtained.