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

**Part 1:
Steel-ball method**

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

Partie 1: Méthode utilisant une bille d'acier





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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 3303-1 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products (other than hoses)*.

Together with Part 2, it cancels and replaces ISO 3303:1990, which has been split into two parts and at the same time technically revised.

ISO 3303 consists of the following parts, under the general title *Rubber- or plastics-coated fabrics — Determination of bursting strength*:

- *Part 1: Steel-ball method*
- *Part 2: Hydraulic method*

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.

The method described in this part of ISO 3303, which employs a steel ball, is useful as it represents an impact failure typical of one which would be experienced in service.

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

Part 1: Steel-ball method

1 Scope

This part of ISO 3303 specifies a method for the determination of the bursting strength of rubber- or plastics-coated fabrics, using a mechanically operated steel ball.

2 Normative references

The following referenced documents are indispensable for the application 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 Principle

A test piece is securely clamped between rigid coaxial apertures. A polished steel ball traversing at a fixed speed is pressed against the test piece until failure occurs. The force required to cause failure and the displacement of the polished steel ball at failure are recorded.

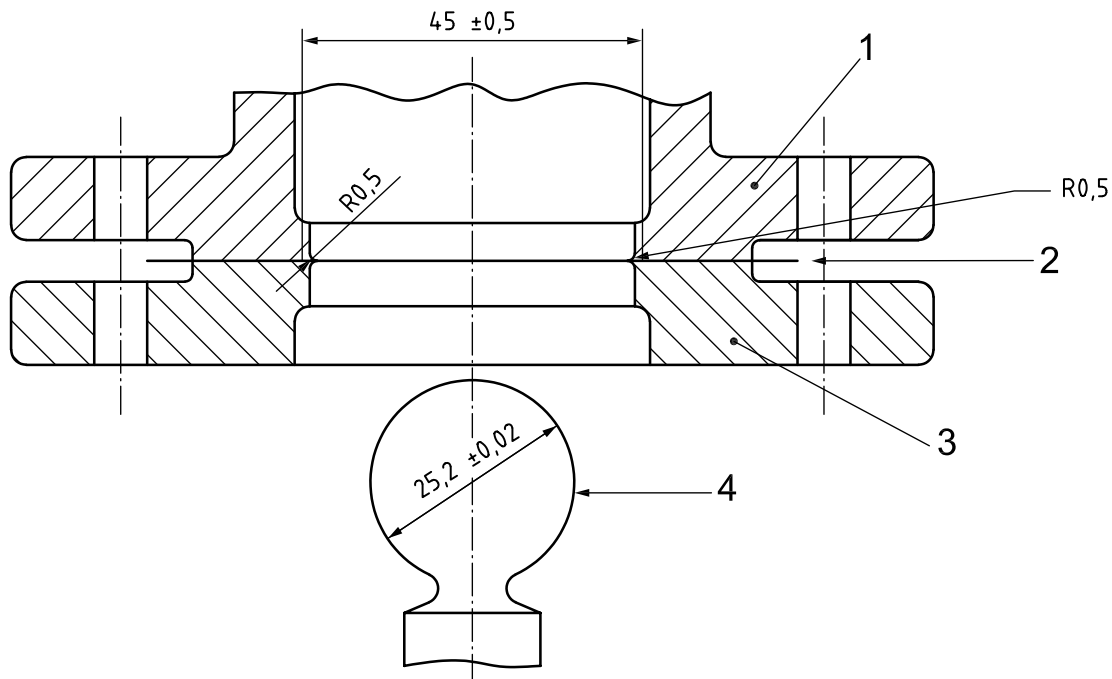
4 Apparatus

4.1 Test 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. A pendulum-type inertia dynamometer might 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.

4.2 Bursting attachment (see Figure 1), such that the test piece is held securely by a ring mechanism of internal diameter $45 \text{ mm} \pm 0,5 \text{ mm}$, with the centre of the test piece pressed against a polished steel ball of diameter $25,2 \text{ mm} \pm 0,02 \text{ mm}$ 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.

An alternative ball size of $38 \text{ mm} \pm 0,02 \text{ mm}$ (see EN 12332-1) may be used, but the results might not be comparable.

Dimensions in millimetres



- Key**
- 1 upper clamp
 - 2 test piece
 - 3 lower clamp
 - 4 polished steel ball

Figure 1 — Bursting attachment

5 Sampling

The sample shall be taken so that it is as representative as possible of the whole consignment.

6 Preparation of test pieces

6.1 Take five test pieces across the usable width of the sample (see the note), at least 1 m from the extremity of the sample, and of sufficient size so that each test piece can be clamped firmly in the clamping system of the test machine. The smaller dimension of each test piece shall be at least 12 mm greater than the outside diameter of the clamping surfaces. Alternatively, the sample may be tested at the requisite locations across its width, avoiding areas that have already been used for a test by at least 20 mm.

NOTE The usable width is defined in ISO 2286-1 as that width, excluding the selvedge, which is consistent in its properties, uniformly finished, and free of unacceptable flaws.

6.2 The face of the coated fabric to be tested shall be defined and agreed between the interested parties. The results might not be the same if the opposite face is tested.

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 four weeks and, for evaluations intended to be comparable, the tests, as far as possible, shall be carried out after the same time-interval.

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

8 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 pieces for 24 h in distilled water containing 1 % ethanol at the chosen standard temperature. Immediately after removal from the water, blot the test piece between two sheets of absorbent paper and test at once.

9 Procedure

9.1 Unless otherwise agreed (see 6.2), secure the conditioned test piece in the ring-clamp such that the coated side of the fabric faces away from the steel ball.

9.2 Move the test piece and steel ball towards each other at a rate of 300 mm/min \pm 30 mm/min until the test piece ruptures under the pressure being applied by the steel ball.

9.3 For each test, read from the scale of the test machine the force, in newtons, and the displacement in millimetres to the nearest 0,1 mm of the steel ball required to cause the rupture of the test piece.

9.4 Ignore any test results from test pieces which rupture at the edge of the clamp or slip in the clamp, and repeat the test on another test piece.

9.5 Record the mean of the five results obtained.

10 Test report

The test report shall indicate the following particulars:

- a) a reference to this part of ISO 3303;
- b) all details necessary for the identification of the sample;
- c) the conditioning method, atmosphere and time of exposure or whether the test pieces were conditioned in the wet state;
- d) the conditions under which the test was conducted;
- e) the rupturing force, expressed in newtons, and the displacement of the steel ball at rupture, expressed in millimetres, given as the mean of the five results;
- f) the date of the test.

Bibliography

- [1] ISO 2286-1, *Rubber- or plastics-coated fabrics — Determination of roll characteristics — Part 1: Methods for determination of length, width and net mass*
- [2] EN 12332-1, *Rubber- or plastics-coated fabrics — Determination of bursting strength — Part 1: Steel ball method*

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