
**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.

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 of 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 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)*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 248, *Textiles and textile products*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 3303-1:2012), which has been technically revised.

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

- in [Clause 2](#), ISO 7500-1:2018 has been added for the calibration of force measurement system;
- the title of [Clause 5](#) has been changed to “Apparatus and reagents”;
- reagents have been added to [Clause 5](#);
- in [5.1](#), the testing machine has been changed to that of power driven, equipped with an electronic force measurement system and an electronic crosshead displacement monitor.
- in [5.2](#) and bibliography, EN 12332-1 has been deleted as it was replaced with this document;
- in [Figure 1](#), the round direction of clamp has been modified;
- in [5.6](#), blotting paper has been added;
- in [7.3](#), the preparation of wet test pieces has been specified.
- in [9.1](#), the recommendations on conditioning for fabrics coated on one side or on both sides have been added separately;
- in [10.6](#), procedure for wet test pieces has been specified.

A list of all parts in the ISO 3303 series can be found on the ISO website.

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.

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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.

The method described in this document, 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

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 the determination of the bursting strength of rubber or plastics coated fabrics, using a mechanically operated steel ball.

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

ISO 7500-1:2018, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines* — Calibration and verification of the force-measuring system

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 <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Principle

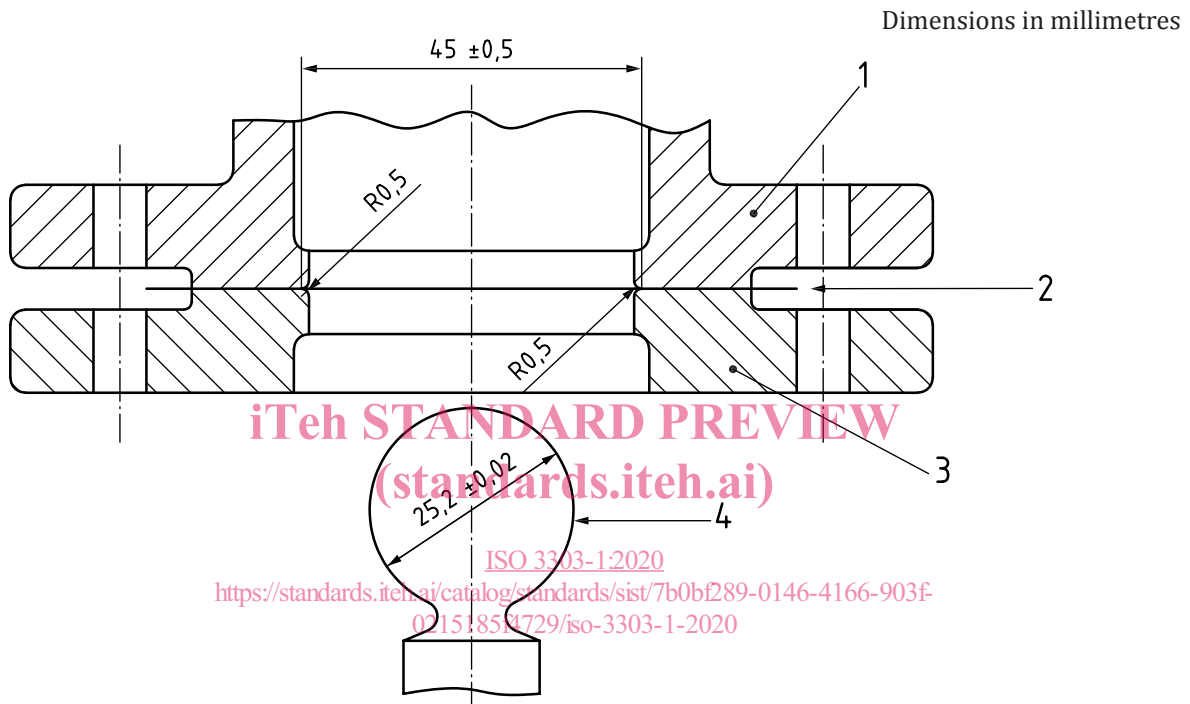
A test piece is securely clamped between rigid coaxial apertures. A polished steel ball traversing at a fixed speed is pressed against the test piece until failure occurs. The force required to cause failure and the displacement of the polished steel ball at failure are recorded.

5 Apparatus and reagents

5.1 Testing machine, power driven, equipped with an electronic force measurement system and an electronic crosshead displacement monitor. The drive system shall be capable of maintaining constant the speed of the moving head to $\pm 10\%$ of the set value. The force measurement system shall be capable of measuring the relevant forces occurring during the test within class 2 of ISO 7500-1:2018. The crosshead displacement monitor shall be capable of measuring the relevant displacements under load to within $\pm 1,0$ mm.

5.2 Bursting attachment (see [Figure 1](#)), such that the test piece is held securely by a ring mechanism of internal diameter $45,0 \text{ mm} \pm 0,5 \text{ mm}$, with the centre of the test piece pressed against a polished steel ball of diameter $25,20 \text{ mm} \pm 0,02 \text{ mm}$ 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 $38,00 \text{ mm} \pm 0,02 \text{ mm}$ may be used, but the results might not be comparable.



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

Figure 1 — Bursting attachment

- 5.3 Equipment in which the test pieces can be immersed in water prior to wet testing.**
- 5.4 Distilled or deionized water**, for preparing the wet test pieces.
- 5.5 Wetting agent or surfactant.**
- 5.6 Blotting paper**, two sheets required for the test on wet test pieces.

6 Sampling

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

7 Preparation of test pieces

7.1 Take five test pieces across the usable width of the sample (see NOTE), at least 1 mm 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 location 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 selvage, which is consistent in its properties, uniformly finished, and free of unacceptable flaws.

7.2 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.

7.3 When it is required to determine the properties of wet material, immerse the test pieces for 24 h in water (5.4), or water containing no more than 0,1 % wetting agent or surfactant (5.5), of about 20 times the total volume of the test pieces at the room temperature. Immediately after removal from the water, rinse the test pieces thoroughly in water and proceed to test within 1 min.

8 Time-interval between manufacture and testing

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

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

8.3 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.

9 Atmosphere for conditioning and testing

9.1 For conditioning

The atmosphere shall be the method of conditioning “1” specified in ISO 2231:1989.

For fabrics coated on one side only, a minimum of 16 h exposure is recommended.

For fabrics coated on both sides, a minimum of 24 h exposure is recommended.

9.2 For testing

The atmosphere shall be selected from A through E specified in ISO 2231:1989. If it is necessary to control both temperature and humidity, select the atmosphere from A through C.

NOTE The temperature 23 °C is normally the testing atmosphere in temperate countries and 27 °C is normally in tropical and subtropical countries.

10 Procedure

10.1 Unless otherwise agreed (see 7.2), secure the conditioned test piece in the ring-clamp such that the coated side of the fabric faces away from the steel ball.