
**Rubber- or plastics-coated fabrics —
Determination of coating adhesion**

*Supports textiles revêtus de caoutchouc ou de plastique — Détermination
de l'adhérence du revêtement*

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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 3.

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 member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 2411 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 45, *Rubber and rubber products*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this standard, read "...this European Standard..." to mean "...this International Standard...".

This third edition cancels and replaces the second edition (ISO 2411:1991), which has been technically revised.

Annex A of this International Standard is for information only.

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Foreword

The text of EN ISO 2411:2000 has been prepared by Technical Committee CEN/TC 248 "Textiles and textile products", the secretariat of which is held by BSI, in collaboration with Technical Committee ISO/TC 45 "Rubber and rubber products".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2000, and conflicting national standards shall be withdrawn at the latest by November 2000.

This standard includes an informative annex A.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

Knowledge of the strength of adhesion between the coating and the adjacent layer is important as an inadequate adhesion strength can often result in failure of the product due to delamination.

NOTE Persons using this standard should be familiar with normal laboratory practice. This standard 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.

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Rubber- or plastics-coated fabrics — Determination of coating adhesion

1 Scope

This European Standard specifies a method of determining the coating adhesion strength of coated fabrics.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated by amendment or revision. For undated references the latest edition of the publication referred to applies.

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

EN ISO 2286-1, *Rubber- or plastics-coated fabrics — Determination of roll characteristics — Part 1: Methods for the determination of length, width and net mass* (ISO 2286:1998)

ISO 5893, *Rubber and plastics test equipment — Tensile, flexural and compression types (constant rate of traverse) — Description*

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

3 Terms and definitions

For the purposes of this European Standard the following terms and definitions apply.

3.1

delamination

partial or whole separation of two, or more, of the component layers of a coated fabric. This can be either a fabric to polymer separation or separation within the actual polymeric layer

3.2

coating to fabric peel

separation with no coating polymer residue remaining on the substrate

3.3

partial film tear

delamination leaving patches of coating polymer still adhering to the substrate

3.4

inseparable

inability of the coating to peel because it breaks during preparation or test, indicating that the coating adhesion strength is greater than the coating polymer strength

3.5

coating or film delamination

splitting of a multilayer coating leaving one or more layers of coating film residue on the substrate

3.6

fabric failure

breaking of substrate during test, indicating that the coating adhesion strength is greater than the substrate strength

3.7

fabric delamination

splitting or delamination of substrate leaving a partial layer or complete fabric laminate adhering to the coating

NOTE An example of this is in the case of coated non woven laminates, when the non woven textile element can fail due to the coating adhesion strength being greater than the between-fibre cohesion of the non woven textile fabric.

3.8

substrate

textile component of a coated fabric

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4 Preparation of test specimens

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4.1 General

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For the determination of coating adhesion all samples shall be taken within the usable width (according to EN ISO 2286-1) of the coated fabric under test. A total of ten *test* specimens shall be tested.

Each test specimen shall be not less than 75 mm wide and not less than 200 mm long.

Five test specimens shall be cut with the length parallel to the longitudinal direction and five test specimens with their length parallel to the transverse direction of the coated fabric under test.

In the case of coated fabrics with substrate having a pile, prepare ten test specimens in the longitudinal direction, five in the direction of the pile and five against the direction of the pile.

Either methods of preparation may be used. The method of preparation to adopt is determined by pretesting if necessary.

NOTE Generally thick coatings are processed by method 1, thin coatings by method 2.

4.2 Method of preparation 1

4.2.1 Where the strength of the coating layer exceeds the force of the adhesive bond to the substrate, prepare the test specimen by carefully cutting through the coating to the substrate at right angles to the length of the test specimen. From this cut carefully separate the coating film from the substrate, for a distance sufficient to enable the ends of the test specimen to be mounted in the jaws of the test apparatus. Trim the width of the test specimen to $(50 \pm 0,5 \text{ mm})$ taking care to avoid damaging the longitudinal threads of the substrate.

4.2.2 Condition the test specimens in one of the atmospheres in accordance with EN ISO 2231.

4.2.3 After conditioning, mount the test specimen in the test apparatus, clamping the coated end in the stationary jaw and the coating film in the traversing or moveable jaw (see Figure 1).

NOTE When the adhesion is very strong and it is not possible to manually separate the coating film from the substrate, method of preparation 2 described in 4.3 should be used.

4.3 Method of preparation 2

4.3.1 Where the coating layer is not sufficiently strong to be stripped continuously from the substrate, but where the coating layer can be distinctly identified from the substrate and can be cut through separately, bond two test specimens of the same material face to face, leaving the first 50mm clear of adhesive and an adhesive system suitable for the type of coating being evaluated. It is important that the adhesive chosen does not cause the coating to swell irreversibly or otherwise affect the coating/fabric bond strength.

NOTE 1 Where the coated surface is treated in any way for example siliconising which can inhibit the coating-to-coating bond, it is recommended that the adhesion test be conducted before any such treatment is applied.

NOTE 2 If necessary, it is possible to use a plain weave cotton fabric, desized and bleached, in order to ensure complete release of remaining solvent.

NOTE 3 Alternatively, when testing PU coated fabrics a sheet of rubber can be used in place of one of the coated specimens. The formulation of the rubber compound should be such as to produce a sheet with low stiffness and low elongation.

4.3.2 To ensure a good bond, the composite test specimen shall be rolled at least twice with a roller of 76 mm face width and mass of 2 kg.

4.3.3 All types of adhesive can be used e.g. solvent based, aqueous based, hot melt reactive. Wherever possible, the adhesive system used should be as agreed between those responsible for carrying out the test and those to whom the test results are reported.

4.3.4 Apply the adhesive strictly in accordance with the recommendations of the adhesive supplier. Allow sufficient time for the bond to attain its optimum strength, turn back the uncoated length of one of the plies of the test specimen and carefully cut through the coating down to the substrate at the adhesion line.

Carefully separate the substrate from its coating for a distance sufficient to enable the ends of the test specimen to be mounted in the jaws of the test apparatus. Trim the test specimen at each edge to a width of $(50 \pm 0,5) \text{ mm}$ taking care to avoid damaging the longitudinal threads of the substrate.

4.3.5 Condition the test specimens in one of the atmospheres as detailed in accordance with EN ISO 2231.