
**Textiles — Determination of the
abrasion resistance of fabrics by the
Martindale method —**

**Part 2:
Determination of specimen
breakdown**

*Textiles — Détermination de la résistance à l'abrasion des étoffes par
la méthode Martindale —*

Partie 2: Détermination de la détérioration de l'éprouvette

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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 on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 38, *Textiles*, Subcommittee SC 24, *Conditioning atmospheres and physical tests for textile fabrics*.

This second edition cancels and replaces the first edition (ISO 12947-2:1998), which has been technically revised.

It also incorporates the Technical Corrigendum ISO 12947-2:1998/Cor 1:2002.

A list of all parts in the ISO 12947 series can be found on the ISO website.

Textiles — Determination of the abrasion resistance of fabrics by the Martindale method —

Part 2: Determination of specimen breakdown

1 Scope

This document specifies the procedure for the determination of specimen breakdown (end-point of test) by inspection at fixed intervals and is applicable to all textile fabrics including nonwovens apart from fabrics where the specifier indicates the end performance as having a low abrasion wear life.

This document is not applicable to coated fabrics (including laminated fabrics). If the abrasion behaviour of the coated surface of a coated fabric is to be determined, use the methods described in the various parts of ISO 5470.

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 105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

ISO 139, *Textiles — Standard atmospheres for conditioning and testing*

ISO 12947-1:1998, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 1: Martindale abrasion testing apparatus*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12947-1, ISO 3572, ISO 8388, ISO 9092, ISO 23733 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

thread

textile yarn, either single or resulting from twisting together two or more single or folded yarns

3.2

woven fabric

fabric produced by interlacing (by weaving on a loom or a weaving machine) a set of warp threads and a set of weft threads normally at right angles to each other

[SOURCE: ISO 3572:1976, 2.1]

3.3

knitted fabric

fabric in which at least one system of *threads* (3.1) is formed into knitted loops and the knitted loops are intermeshed into stitches

[SOURCE: ISO 8388:1998, 3.0.1]

3.4

cut pile fabric

fabric for which a surface effect is formed by tufts or cut loops of *threads* (3.1) that stand up from the ground fabric

Note 1 to entry: Corduroy fabric (cord fabric) is an example of cut pile fabric.

3.5

uncut pile fabric

fabric for which a surface effect is formed by uncut loops of *threads* (3.1) that stand up from the ground fabric

3.6

raised fabric

fabric for which a surface effect is formed by mechanically raising fibres from *threads* (3.1) of the ground fabric

3.7

flocked fabric

fabric for which a surface effect is formed by fixing fibre snippets (flock) onto the surface of a textile substrate

3.8

chenille yarn

novelty yarn with pile protruding radially from the axis, where the pile fibres are held between a core yarn system

[SOURCE: ISO 23733:2007, 3.1]

3.9

nonwoven fabric

structures of textile materials, such as fibres, continuous filaments, or chopped yarns of any nature or origin, that have been formed into webs by any means, and bonded together by any means, excluding the interlacing of yarns as in *woven fabric* (3.2), *knitted fabric* (3.3), laces, braided fabric or tufted fabric

[SOURCE: ISO 9092:2011, 2.1, modified.]

3.10

specimen breakdown

breakdown point which is reached when criteria based on thread breakage or *worn off area* (3.11) are met

3.11

worn off area

area which has been denuded of pile or flock such that the ground fabric is exposed

3.11.1

fully worn off area

worn off area (3.11) extending to more than three quarters of the exposed surface area

3.11.2

partially worn off area

worn off area (3.11) in which there is some visual loss of pile or flock in discrete locations

Note 1 to entry: A partially worn off area is such that when viewed through the template (5.2), no pile is visible and the ground fabric is exposed.

4 Principle

A circular specimen, mounted in a specimen holder and subjected to a defined load, is rubbed against an abrasive medium (standard fabric) in a translational movement tracing a Lissajous figure, the specimen holder being additionally freely rotatable around its own axis perpendicular to the plane of the specimen. The evaluation of the abrasion resistance of the textile fabric is determined from the inspection interval to breakdown of the specimens.

The specimens are mounted in specimen holders with foam backing. Specimens with a mass per unit area ≥ 500 g/m² are mounted in specimen holders without foam. Pile fabrics which are tested without foam backing are subjected to a specified preparatory treatment (see 7.5.2).

Two abrasion load parameters are specified. The total effective mass of the abrasion load (i.e. the mass of the specimen holder assembly and the appropriate loading piece) are as follows:

- a) (795 ± 7) g for fabrics intended for workwear, upholstery, bed linen and fabrics for technical use (i.e. a nominal pressure of 12 kPa);
- b) (595 ± 7) g for fabrics intended for apparel and household textiles, excluding upholstery and bed linen (i.e. a nominal pressure of 9 kPa).

Abrasion testing is continued up to breakdown (see Clause 8) of the test specimen.

The inspection interval is determined by the specimen breakdown. The number of rubs is recorded at which specimen breakdown is not yet observed (this number of rubs is the upper limit of the time elapsed before specimen breakdown and, at the same time, the lower limit of the abrasion interval at which specimen breakdown occurs).

5 Apparatus and materials

5.1 Test apparatus and auxiliary materials, as specified in ISO 12947-1.

5.2 Template.

A mask made of a rigid transparent material with a hole of diameter $(2,5 \pm 0,1)$ mm through which the test specimen can be viewed (to get an approximate viewing area of 4,9 mm²).

5.3 Magnifying device.

A magnifying device (in most of the cases, a magnification factor of 8 or 10 has been found suitable) shall be used in order to recognize completely broken threads, including threads forming loops.