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

**Part 1:**  
**Martindale abrasion testing apparatus**

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

*Partie 1: Appareil d'essai d'abrasion Martindale*



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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 the member bodies casting a vote.

International Standard ISO 12947-1 was prepared by Technical Committee ISO/TC 38, *Textiles*.

ISO 12947 consists of the following parts under the general title *Textiles – Determination of the abrasion resistance of fabrics by the Martindale method*:

- *Part 1: Martindale abrasion testing apparatus*
- *Part 2: Determination of specimen breakdown*
- *Part 3: Determination of mass loss*
- *Part 4: Assessment of appearance change*

Annexes A and B form an integral part of this part of ISO 12947.

## Introduction

The choice of method of abrasion testing is established before the start of the testing and recorded in the test report, since the results of the different methods cannot be compared with each other.

The determination of resistance to pilling of fabrics using the Martindale apparatus is given in ISO 12945, *Textiles — Determination of the resistance to pilling and change of appearance of fabrics*, parts 1, 2 and 3<sup>1)</sup>.

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1) These three parts of International Standard ISO 12945 are yet to be published.

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

## Part 1: Martindale abrasion testing apparatus

### 1 Scope

This part of ISO 12947 specifies requirements for the Martindale testing apparatus and auxiliary materials for use in the test methods specified in parts 2 to 4 of ISO 12947 for determination of the abrasion resistance of fabrics.

This part of ISO 12947 is applicable to apparatus for the testing of:

- a) woven and knitted fabrics;
- b) pile textiles having a pile height of up to 2 mm;
- c) nonwovens.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 12947. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 12947 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 137:1975, *Wool — Determination of fibre diameter — Projection microscope method*.

ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*.

ISO 845:1988, *Cellular plastics and rubbers — Determination of apparent (bulk) density*.

ISO 2060:1994, *Textiles — Yarn from packages — Determination of linear density (mass per unit length) — Skein method*.

ISO 2061:1995, *Textiles — Determination of twist in yarns — Direct counting method*.

ISO 2286-3:1998, *Rubber- or plastics-coated fabrics — Determination of roll characteristics — Part 3: Method for the determination of thickness*.

ISO 3074:1975, *Wool — Determination of dichloromethane — Soluble matter in combed sliver*.

ISO 3801:1977, *Textiles — Woven fabrics — Determination of mass per unit length and mass per unit area*.

ISO 5084:1996, *Textiles — Determination of thickness of textiles and textile products*.

ISO 7211-2:1984, *Textiles — Woven Fabrics — Construction — Methods of analysis — Part 2: Determination of number of threads per unit length*.

ISO 12947-2:1998, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 2: Determination of specimen breakdown*.

ISO 12947-3:1998, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 3: Determination of mass loss*.

### 3 Definitions

For the purposes of this part of ISO 12947, the following definitions apply.

#### 3.1 abrasion rub

one revolution of the two outer drives of the Martindale abrasion tester

#### 3.2 abrasion cycle

completion of all the translational abrasion movements tracing a Lissajous figure comprising 16 rubs, i.e. 16 revolutions of the two outer drives and 15 revolutions of the inner drive of the Martindale abrasion tester

#### 3.3 inspection interval

number of continuously performed rubs

#### 3.4 Lissajous figure

figure created by movement which changes from a circle to gradually narrowing ellipses, until it becomes a straight line, from which progressively widening ellipses develop, in a diagonally opposite direction before the pattern is repeated

#### 3.5 work station

abrading table

### 4 Principle

The Martindale abrasion tester subjects a circular specimen to a defined load and rubs it against an abrasive medium (i.e. standard fabric) in a translational movement tracing a Lissajous figure. The specimen holder, containing either specimen or abrasive medium depending on which method (ISO 12947, Parts 2, 3 or 4) is being used, is additionally freely rotatable around its own axis perpendicular to the horizontal plane.

The specimen is subjected to abrasive wear for a predetermined number of rubs. The number of abrasion rubs making up the inspection interval depends upon the product type and method of assessment.

### 5 Apparatus

#### 5.1 General

The test apparatus consists of a baseplate on which are mounted the abrading tables and drive mechanism. The drive mechanism consists of two outer drives and an inner drive which cause the specimen holder guide plate to trace a Lissajous figure (see annex A).

NOTE The Martindale apparatus does not generate a perfect Lissajous motion.