



**SLOVENSKI STANDARD**  
**SIST EN ISO 12947-1:1999**

**01-julij-1999**

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**Tekstilije - Ugotavljanje odpornosti tekstilij proti drgnjenju po Martindalovi metodi - 1.del: Martindalov preskuševalni aparat za drgnjenje (ISO 12947-1:1998)**

Textiles - Determination of the abrasion resistance of fabrics by the Martindale method - Part 1: Martindale abrasion testing apparatus (ISO 12947-1:1998)

Textilien - Bestimmung der Scheuerbeständigkeit von textilen Flächengebilden mit dem Martindale-Verfahren - Teil 1: Martindale-Scheuerprüfgerät (ISO 12947-1:1998)

Textiles - Détermination de la résistance à l'abrasion des étoffes par la méthode Martindale - Partie 1: Appareillage d'essai d'abrasion de Martindale (ISO 12947-1:1998)

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Textiles - Determination of the abrasion resistance of fabrics by  
the Martindale method - Part 1: Martindale abrasion testing  
apparatus (ISO 12947-1:1998)

Textiles - Détermination de la résistance à l'abrasion des  
étoffes par la méthode Martindale - Partie 1: Appareillage  
d'essai d'abrasion de Martindale (ISO 12947-1:1998)

Textilien - Bestimmung der Scheuerbeständigkeit von  
textilen Flächengebilden - Martindale-Verfahren - Teil 1:  
Martindale-Scheuerprüfgerät (ISO 12947-1:1998)

This European Standard was approved by CEN on 15 December 1998.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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EN ISO 12947-1:1998

## Foreword

The text of the International Standard ISO 12947-1:1998 has been prepared by Technical Committee ISO/TC 38 "Textiles" in collaboration with Technical Committee CEN/TC 248 "Textiles and textile products", the secretariat of which is held by BSI.

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 June 1999, and conflicting national standards shall be withdrawn at the latest by June 1999.

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.

**NOTE FROM CEN/CS:** The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

### Endorsement notice

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The text of the International Standard ISO 12947-1:1998 was approved by CEN as a European Standard without any modification.

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# INTERNATIONAL STANDARD

**ISO**  
**12947-1**

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

### Part 1: Martindale abrasion testing apparatus

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*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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## ISO 12947-1:1998(E)

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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 12947-1:1999.

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## 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.

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### 2 Normative references

[SIST EN ISO 12947-1:1999](https://standards.iteh.ai/catalog/standards/sist/6a1587f4-5ab6-412a-bb6c-279b6be72312/sist-en-iso-12947-1-1999)

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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.

The specimen holder guide plate is moved horizontally by the drive mechanism in such a way that every point of the guide plate describes the same Lissajous figure.

The specimen holder guide plate is fitted with bearing housings and low friction bearings which carry the specimen holder guide spindles. The lower end of each specimen holder spindle is inserted into each corresponding specimen holder body. On the upper end of the spindle, loading pieces can be fitted. The specimen holder consists of a body, insert and nut.

The apparatus is fitted with a pre-settable counting device which counts each revolution of one of the outer drives.

## 5.2 Drive and base plate attachments

### 5.2.1 Drive

The drive shall be arranged so that the heated exhaust air from the motor ventilation cannot reach the abraded surface. The movement of the specimen holders takes place by means of:

- a) two outer synchronised drive units, in which:
  - the distance of the axis of the drive units from their central axis is  $(30,25 \pm 0,25)$  mm;
  - the rotational frequency of the outer drive units is  $(47,5 \pm 2,5)$   $\text{min}^{-1}$ ;
- b) an inner drive unit, in which:
  - the distance of the axis of the drive unit from its central axis is  $(30,25 \pm 0,25)$  mm;
  - the rotational frequency of the drive unit is  $(44,5 \pm 2,4)$   $\text{min}^{-1}$ .

The ratio of the rotation of the outer drive units to that of the inner drive unit shall be 16:15, i.e. after 16 revolutions of the outer units, the inner unit has carried out 15 revolutions and it has returned to the starting position of the Lissajous figure.

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The maximum length of stroke of the specimen holder guide plate in both the longitudinal and transverse directions is  $(60,5 \pm 0,5)$  mm.

### 5.2.2 Counter

The counter for counting the abrasion rubs shall measure to an accuracy of one rub.

### 5.2.3 Abrading table

Each of the abrading tables consist of the following elements:

- a) abrading table (see figure 1);
- b) clamping ring (see figure 2);
- c) clamping mechanism to fasten the clamping ring;
- d) pressing weight of mass  $(2,5 \pm 0,5)$  kg and of diameter  $(120 \pm 10)$  mm.

## 5.3 Specimen holder guide plate

The specimen holder guide plate is a plate in which three guides engage the drive units. These guides interact so as to ensure a uniform, smooth and low vibration movement of the specimen holder guide plate.

The specimen holder guide spindles are located in bearing housings secured to the guide plate central to each abrading table. Each bearing housing carries two bearings. The guide spindles are freely moving and free from play in the bearings (see also 7.2). These essential requirements are fulfilled by bearing housings and bearings in which:

- a) the overall length of the bearing housing is  $(31,75 \pm 0,127)$  mm;