

**Textiles - Determination of fabric propensity  
to surface fuzzing and to pilling - Part 2:  
Modified Martindale method**

Textiles - Determination of fabric propensity to  
surface fuzzing and to pilling - Part 2: Modified  
Martindale method

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 12945-2:2000 sisaldab Euroopa standardi EN ISO 12945-2:2000 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 18.12.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 12945-2:2000 consists of the English text of the European standard EN ISO 12945-2:2000.</p> <p>This document is endorsed on 18.12.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

<p><b>Käsitlusala:</b></p> <p>This part of ISO 12945 specifies a method for determination of the resistance to pilling and surface change of textile fabrics using a modified Martindale method.</p>	<p><b>Scope:</b></p> <p>This part of ISO 12945 specifies a method for determination of the resistance to pilling and surface change of textile fabrics using a modified Martindale method.</p>
--	--

**ICS** 59.080.30

**Võtmesõnad:** appearance, determination, fabrics, garments, pilling, surface properties, tests, textiles

**English version**

**Textiles – Determination of fabric propensity to  
surface fuzzing and to pilling**

Part 2: Modified Martindale method  
(ISO 12945-2 : 2000)

Textiles – Détermination de la propension des étoffes à l'ébouriffage en surface et au boulochage – Partie 2: Méthode Martindale modifiée (ISO 12945-2 : 2000)

Textilien – Bestimmung der Neigung von textilen Flächengebilden zur Flusenbildung auf der Oberfläche und der Pillneigung – Teil 2: Modifiziertes Martindale-Verfahren (ISO 12945-2 : 2000)

This European Standard was approved by CEN on 2000-06-03.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist 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, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**

## Foreword

International Standard

ISO 12945-2 : 2000 Textiles – Determination of fabric propensity to surface fuzzing and to pilling – Part 2:  
Modified Martindale method,

which was prepared by ISO/TC 38 'Textiles' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 248 'Textiles and textile products', the Secretariat of which is held by BSI, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by January 2001 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

## Endorsement notice

The text of the International Standard ISO 12945-2 : 2000 was approved by CEN as a European Standard without any modification.

## Contents

Page

Introduction .....	3
1 Scope .....	4
2 Normative references .....	4
3 Terms and definitions .....	4
4 Principle .....	5
5 Apparatus .....	5
6 Auxiliary materials .....	11
7 Conditioning and testing atmosphere .....	12
8 Preparation of test specimens .....	12
9 Procedure .....	12
10 Assessment of fuzzing and/or pilling .....	13
11 Results .....	14
12 Test report .....	14
Annex A (normative) Categories of pilling test .....	15
Bibliography .....	16

## Introduction

Pills are formed when fibres on a fabric surface "tease out" and become entangled during wear. Such surface deterioration is generally undesirable, but the degree of consumer tolerance for a given level of pilling will depend on the garment type and fabric end use.

Generally the level of pilling which develops is determined by the rates of the following parallel processes:

- fibre entanglement leading to pill formation;
- development of more surface fibre;
- fibre and pill wear-off.

The rates of these processes depend on the fibre, yarn and fabric properties. Examples of extreme situations are found in fabrics containing strong fibres versus fabric containing weak fibres. A consequence of the strong fibre is a rate of pill formation that exceeds the rate of wear-off. This results in an increase of pilling with an increase of wear. With a weak fibre the rate of pill formation competes with the rate of wear-off. This would result in a fluctuation of pilling with an increase of wear. There are other constructions that the surface fibre wear-off occurs before pill formation. Each of these examples demonstrates the complexity of evaluating the surface change on different types of fabric.

The ideal laboratory test would accelerate the wear processes a), b) and c) by exactly the same factor and would be universally applicable to all fibre, yarn and fabric types. No such test has been developed. However, a test procedure has been established in which fabrics can be ranked in the same order of fuzzing and pilling propensity as is likely to occur in end-use wear.

The modification to the very widely adopted Martindale abrasion testing machine on which this part of ISO 12945 is based is described in a publication by H. Knecht: *Neue Methode zur Prüfung der Pillingneigung in Wirkerei und Strickerei Technik*, **38** (1988), 12, p. 1309.

## 1 Scope

This part of ISO 12945 specifies a method for determination of the resistance to pilling and surface change of textile fabrics using a modified Martindale method.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 12945. 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 12945 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 139, *Textiles — Standard atmospheres for conditioning and testing.*

ISO 12947-1, *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 part of ISO 12945 the following terms and definitions apply.

### 3.1

#### **fuzzing**

roughing up of the surface fibres and/or teasing out of the fibres from the fabric, producing a visible surface change

NOTE This change can occur during washing, dry cleaning and/or wearing.

### 3.2

#### **pills**

entangling of fibres into balls (pills) which stand proud of the fabric and are of such density that light will not penetrate and will cast a shadow

NOTE This change can occur during washing, dry cleaning and/or wearing.

### 3.3

#### **pilling**

generation of pills over the surface of the fabric