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## Textiles — Determination of fabric propensity to surface pilling, fuzzing or matting —

Part 4:

### Assessment of pilling, fuzzing or matting by visual analysis

*Textiles — Détermination de la propension au boulochage, à l'ébouriffage ou au moutonnement des étoffes en surface —*

*Partie 4: Évaluation du boulochage, de l'ébouriffage ou du moutonnement par analyse visuelle*

ICS: 59.080.01

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## Foreword

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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](http://www.iso.org/directives)).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, 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 [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 24, *Conditioning atmospheres and physical tests for textile fabrics*.

A list of all parts in the ISO 12945- series, under the general title *Textiles- Determination of the fabric propensity to surface pilling, fuzzing or matting*, can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Textiles — Determination of fabric propensity to surface pilling, fuzzing or matting —

## Part 4:

## Assessment of pilling, fuzzing or matting by visual analysis

### 1 Scope

This part of ISO 12945 describes a method for the visual assessment of pilling, fuzzing, and matting respectively of textile fabrics. This method is applicable to most of woven and knitted fabrics, including napped fabrics (fleeces, inlay fabrics).

### 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.

There are no normative references in this document.

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

#### 3.1 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 1 to entry: This change can occur during washing, dry cleaning, and/or wearing.

#### 3.2 pilling

generation of pills over the surface of the fabric

#### 3.3 fuzzing

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

Note 1 to entry: This change can occur during washing, dry cleaning, and/or wearing.

**3.4 matting**

disorientation of the raising fibres from a napped fabric, which produces a visible surface change

[SOURCE: ISO 16487:2016, 3.1, without mentioning [Figure 1](#)]

Note 1 to entry: This change can occur during washing, dry cleaning, and/or wearing.

**4 Principle**

After the specimens have been physically tested, under defined conditions, pilling, fuzzing, and matting are assessed visually.

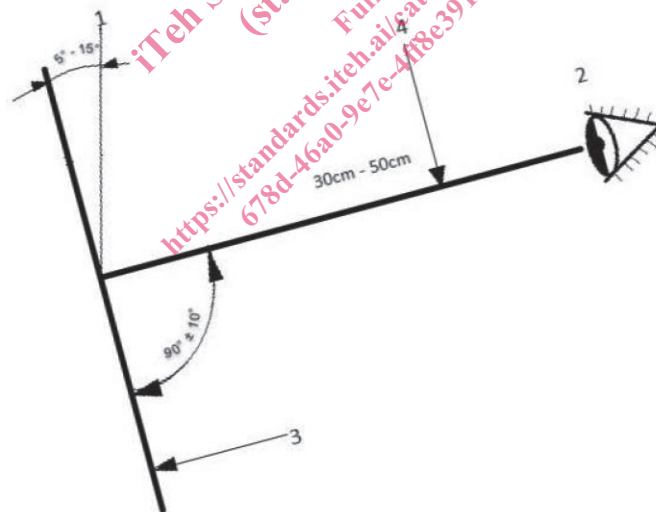
**5 Apparatus**

**5.1 Viewing cabinet**

Viewing cabinet, illuminated with a light source with artificial daylight D65 (in accordance with ISO 3668) with a brightness of at least 600 lx to give uniform illumination over the surface of the specimen(s) and masked in such a way that the observer does not look directly into the light. It is recommended to use it after a warm up period of at least 10 minutes. The illuminant should be positioned at an angle between 5° and 15° to the plane of the specimen (see [Figure 1](#)). The distance between the eye and the specimen should be between 30 cm to 50 cm for normal corrected vision.

Alternative viewing cabinets may be used as agreed between interested parties and shall be reported.

NOTE The use of different viewing cabinets can lead to different test results.



**Key**

- 1 light source
- 2 observer
- 3 specimen

**Figure 1 — Illumination of specimens**

**6 Preparation of test specimens**

The test specimens shall be prepared and tested in conjunction with ISO 12945-1, -2 or -3.

## 7 Assessment of pilling, fuzzing, and matting

7.1 The viewing cabinet shall be situated in a darkened room.

7.2 Clear away loose parts of surface for the purpose of assessment.

7.3 Place the tested specimen and a reference specimen (with or without pretreatment as appropriate) centrally in the specimen mount on the viewing cabinet (see [Figure 1](#)) with the length direction vertical. If necessary, use a piece of self-adhesive tape to ensure correct placement. Mount the tested specimen on the left and the reference specimen on the right.

7.4 View each specimen from just outside the viewing cabinet (see [5.1](#)) (to prevent glare from the light source) and directly in front of the specimen, as shown in [Figure 1](#).

7.5 Grade each specimen in accordance with the grading scheme given in [Table 1](#) (pilling), [Table 2](#) (fuzzing) and [Table 3](#) (matting). If the grading appears between 2 grades, report the “half” grading as, for example, 3-4.

7.6 It is recommended that more than one observer assess the tested specimens.

Each observer assesses each test specimen with respect to pilling, fuzzing and matting to give three separate grades.

When more than one observer is involved in the assessment, the test result for the laboratory sample is the average of the observer grade averages with respect to pilling, fuzzing and matting.

Photographic assessment may be used to support the primary descriptive method of assessment, as agreed upon between the interested parties. When used, it shall be reported.

An additional assessment can be made by rotating the specimen to a position where the observed pilling, fuzzing or matting is more severe. This assessment can be used to provide data for an “extreme condition”, e.g. where a surface is being viewed along the plane of the surface. When used, it shall be reported.

Report any other aspect which shows deterioration in surface appearance.

**Table 1 — Pilling grading scheme**

Grade	Description
5	No change
4	Partially formed pills
3	Moderate pilling — pills of varying size and density partially covering the specimen surface
2	Distinct pilling — pills of varying size and density covering a large proportion of the specimen
1	Severe pilling — pills of varying size and density covering the whole of the specimen surface

**Table 2 — Fuzzing grading scheme**

Grade	Description
5	No change
4	Slight surface fuzzing
3	Moderate surface fuzzing
2	Distinct surface fuzzing
1	Dense surface fuzzing

**Table 3 — Matting grading scheme**

Grade	Description
5	No change
4	Slight surface matting
3	Moderate surface matting
2	Distinct surface matting
1	Dense surface matting

## 8 Results

For each surface appearance (i.e. pilling, fuzzing, and matting), record the grade for each specimen and calculate the mean result for all assessments carried out as described in [Clause 7](#). If the mean result is not a whole number, round the result to the nearest half grade.

## 9 Test report

The test report shall give the following information:

- a) reference to this part of ISO 12945 (i.e. ISO 12945-4);
- b) description of the tested specimens (i.e. ISO 12945-1, ISO 12945-2 or ISO 12945-3);
- c) number of specimens;
- d) number of observers;
- e) the rounded mean grade assessed in relation to the type of the surface change(s) - i.e. pilling, fuzzing, and matting respectively - (to the nearest half grade);
- f) if agreed between interested parties, individual specimen pilling grades, fuzzing grades, and matting grades;
- g) date of the test;
- h) if applicable, the photographic rating standards used;
- i) if applicable, the extreme assessment conditions used;
- j) any other aspect which shows deterioration in surface appearance;
- k) any deviation from the given procedure.