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Textile floor coverings — Determination of mass loss, fibre bind and stair nosing appearance change using the Lisson Tretrad machine

Revêtements de sol textiles — Détermination de la perte de masse, de la sensibilité au défibrage et du changement d'aspect au nez de marche à l'aide la machine Lisson Tretrad

Reference number
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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).

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 219, *Floor coverings*.

This second edition cancels and replaces the first edition (ISO 12951:1999), which has been technically revised.

Textile floor coverings — Determination of mass loss, fibre bind and stair nosing appearance change using the Lisson Tretrad machine

1 Scope

This International Standard specifies four methods of test of textile floor coverings (with or without an underlay, see Clause 9) using the Lisson Tretrad machine.

— test A: determination of mass loss of textile floor coverings, also used to assess fibre bind of synthetic pile carpets;

— test B: determination of stair nosing appearance change of textile floor coverings;

— test C: determination of fibre bind on synthetic loop pile carpets;

— test D: determination of fibre bind (hairiness) on needled floor coverings and floor coverings without pile.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 1765, *Machine-made textile floor coverings — Determination of thickness*

ISO 1957, *Machine-made textile floor coverings — Selection and cutting of specimens for physical tests*

ISO 2424, *Textile floor coverings — Vocabulary*

ISO 8543, *Textile floor coverings — Methods for determination of mass*

ISO 9405, *Textile floor coverings — Assessment of changes in appearance*

EN 1307, *Textile floor coverings — Classification of pile carpets*

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions, in addition to those in ISO 2424, apply:

3.1
mass loss per unit area
m_V
difference between the sample mass before and after the wear test, related to the tested area

Note 1 to entry: See Clause 10.

3.2
relative mass loss for pile carpets
m_{rv}
ratio of the mass loss per unit area m_v as a percentage of the mass of pile per unit area above the substrate (in accordance with ISO 8543)

3.3
I_{TR} index
index calculated according to the following formula:

$$I_{TR} = 0{,}19\sqrt{m_{AP}} \times \left(\frac{100 - m_{rv}}{100} \right)$$

where

m_{AP} is the mass per unit area above the substrate in grams per square metre, determined in accordance with ISO 8543;

m_{rv} is the relative fibre loss expressed as a percentage.

4 Principle

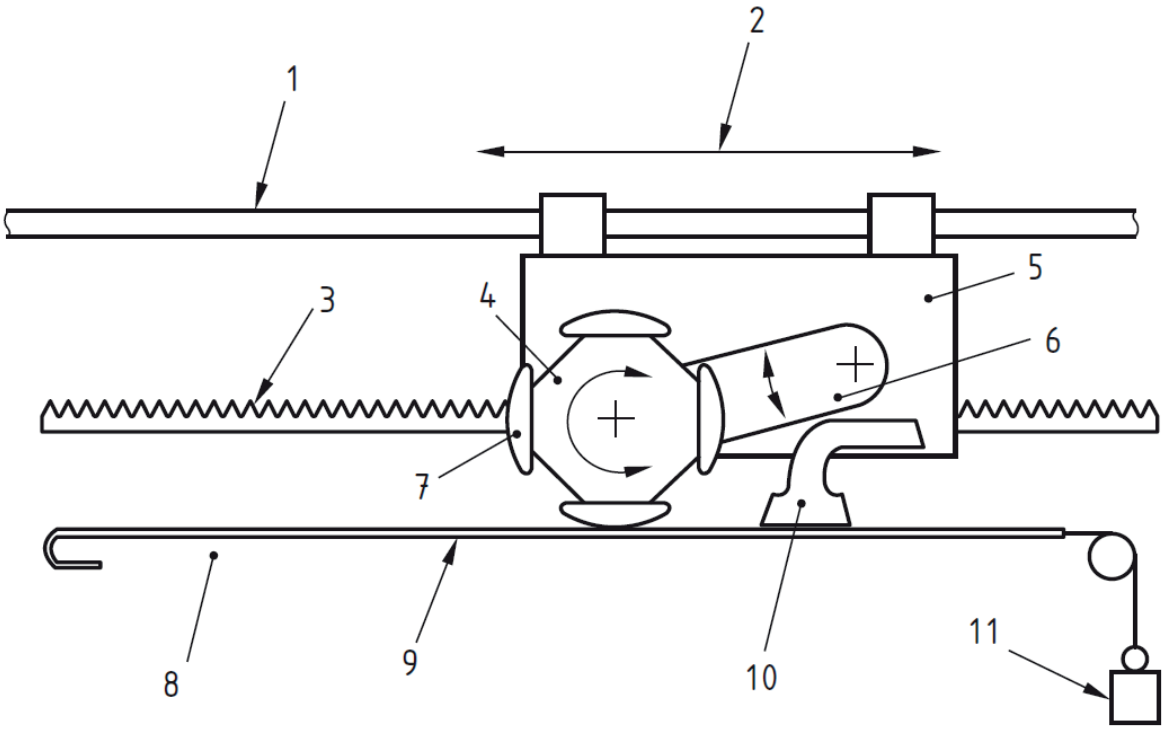
The specimens of a textile floor covering are exposed, at constant load and slippage and for a prescribed number of double passages, to the action of a four-footed wheel (Tretrad), the feet of which are fitted with interchangeable rubber soles.

5 Apparatus

5.1 Lisson Tretrad machine

5.1.1 General

A Lisson Tretrad machine comprises of a bed plate, a vacuum cleaning system, and two Tretrad assemblies (see Figure 1).



Key

1 support	2 movement of the Tretrad	3 cog bar	4 Tretrad wheel
5 frame	6 drive	7 foot	8 bed plate
9 specimen	10 dust extraction	11 tension weight	

Figure 1 — Lisson Tretrad machine

5.1.2 Bed plate

The bed plate faces are parallel to the track travelled by the Tretrad feet and the front edge of the plate is rounded with a 10 mm radius to simulate a stair nosing.

The test surface is formed by the width of the Tretrad feet and the length of the track over which the Tretrad runs. The track length shall be determined for each machine by measuring the distance between the front edge of the base plate and the perpendicular projection of the Tretrad axis at its furthermost point of reversal. The length of track shall be (800 ± 20) mm.

Two clamps mounted at each end of the bed plate are used to hold each specimen under tension. The tension is applied by means of a weighted third clamp, each specimen being subjected to a force of (20 ± 2) kg.

5.1.3 Tretrad assemblies

The Lisson Tretrad apparatus has two Tretrad assemblies, each of which comprises a Tretrad mounted in a frame that is free to rotate around an axis that is 135 mm to 140 mm above the upper surface of the bed plate.

Each Tretrad comprises four equally-spaced legs with rigidly attached feet platforms.

The surface of the foot platform has a radius of curvature of (112,5 ± 1) mm, a circumferential length of (100,0 ± 1,0) mm, and a width of (55,0 ± 0,5) mm. The ends of the contact surfaces of the platforms are rounded with a radius of (4,0 ± 0,5) mm.

The vertical force applied by the Tretrad feet, in the stationary state, shall be (15,0 ± 2,0) kg measured without the soles in position (see Figure 2).

The linear speed of the Tretrad is (0,28 ± 0,02) m/s and the peripheral speed of the Tretrad with sole coverings is (20,0 ± 2,0) % greater than the linear speed. This causes slippage of the feet on the test specimen in addition to the compressive action.

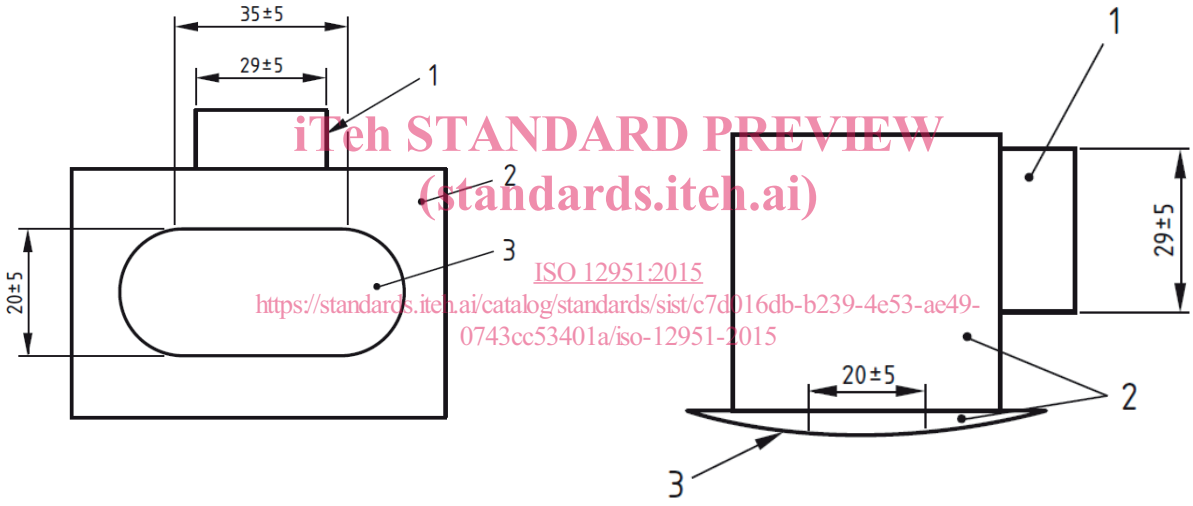
At the front edge of the bed plate, the Tretrad runs beyond the bed and is held horizontally by a height adjustable stopper, in such a way that the lower edge of the foot (without sole material) can be adjusted between 5 mm below and 5 mm above the level of the surface of the bed plate (see Figure 2).

At the points of reversal, the Tretrad remains stationary for approximately 1 s; during this stoppage at the forward point of reversal, the Tretrad is rotated through an angle (but not a right angle) to ensure that the feet walk evenly over the length of the test area.

5.1.4 Vacuum cleaning system

Suction nozzles follow the horizontal movement of the Tretrad assemblies. The nozzles are flexibly mounted and are equipped on their undersides with slides that rest on the edges of the test specimens, thereby not imposing any wear on the specimens.

Each nozzle has the dimensions shown in Figure 2 and is connected to the vacuum cleaner to extract the abraded fibre.



a) bottom view **b) side view**

Key

1 connection to vacuum

2 nozzle casing

3 nozzle mouth

Figure 2 — Vacuum inlet

The vacuum cleaner performance shall be such as to produce airflow of at least 30 l/s measured at the connection point of the nozzles by an appropriate anemometer in order to remove loose fibre from the surface of the specimens.

5.2 Other equipment

5.2.1 Soles

The soles[1)] shall be made from vulcanized styrene butadiene rubber (SBR) with silicic acid-based white filler additives and meet the requirements specified in Table 1. The soles shall have a wave profile on one face. The slip resistance of the sole material is controlled to ensure standard behaviour in the Lisson Tretrad test.

The sole material shall be stored in the dark and air exchange shall be avoided. After long times of storage of the soles (e.g. two years), they shall be validated by the calibration procedure (calibration carpet).

Table 1 — Properties of rubber soles for Lisson Tretrad machine

Size	minimum (190 ± 2) mm long by (55 ± 0,5) mm wide
Thickness	(2,5 ± 0,3) mm
Hardness	(90 ± 5) Shore A
Wavelength	(13,0 ± 0,5) mm
Amplitude	(2,0 ± 0,5) mm
Profile height	(0,6 ± 0,1) mm

5.2.2 Balance, capable of weighing the test specimens to the nearest 0,01 g.

5.2.3 External vacuum cleaner, equipped with a rotating brush, with or without beaters.

5.2.4 Standard photographs, for assessment of fibre bind of loop pile carpets.[2)]

5.2.5 Standard photographs, for assessment of fibre bind on needled floor coverings.[3)]

6 Sampling and selection of test specimens

Select the specimens in accordance with ISO 1957.

Test A: at least four specimens, each 1 500 mm in the direction of manufacture (machine direction) by 100 mm in the cross-machine direction. In the case of floor coverings without pile, two specimens will be sampled in the machine direction (1 500 mm) and two specimens will be sampled in the cross-machine direction (1 500 mm).

Test B: at least four specimens, each 1 500 mm in the direction of manufacture (machine direction) by 100 mm in the cross-machine direction.

Test C: at least four specimens, each 1 500 mm in the direction of manufacture (machine direction) by 100 mm in the cross-machine direction.

1) Certified soles are available from Textiles & Flooring Institute GmbH - Deutsches Teppichforschungsinstitut - Charlottenburger Allee 41, 52068 Aachen, Germany. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of the product. Equivalent products may be used if they can be shown to lead to similar results.

2) These standard photographs are available from Textiles & Flooring Institute GmbH - Deutsches Teppichforschungsinstitut - Charlottenburger Allee 41 52068 Aachen–Germany. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of the product. Equivalent products may be used if they can be shown to lead to similar results.

3) These standard photographs are available from CSTB -84 Avenue Jean Jaurès -BP 02-Champs Sur Marne-77421 Marne La Vallee - France. This information is given for the convenience of users of the standard and does not constitute an endorsement by CEN of the product. Equivalent products may be used if they can be shown to lead to the same results.