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Textile floor coverings — Determination of mass loss using the Lisson test

Revêtements de sol textiles — Détermination de la perte de masse à l'aide de la machine Lisson

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Contents

Page

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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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 12951 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 12, *Textile floor coverings*.

Annex A forms a normative part of this International Standard. Annex B is for information only.

Textile floor coverings — Determination of mass loss using the Lisson test

1 Scope

This International Standard specifies a method of test to determine the mass loss of textile floor coverings using the Lisson Tretrad machine.

Experience with the method described shows that some countries regard the Lisson Tretrad test to be not suitable for wool and wool-rich textile floor coverings but many ISO members are using the method sucessfully.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard 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 1765, *Machine-made textile floor coverings — Determination of thickness.*

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

ISO 2424, *Textile floor coverings — Vocabulary.*

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

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, (see clause 10)

3.2
relative mass loss m_{rV}**, for pile carpets**
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 calculated according to the following equation:

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

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, comprising a bed plate, a vacuum cleaning system and two Tretrad assemblies (see Figure 1)

5.1.1 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 (200 ± 10) N.

5.1.1 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 ± 1) mm and a width of (55 ± 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 (150 ± 2) N measured without the soles in position (see Figure 2).

NOTE A ring dynamometer may be used to check this force.

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 ± 1) % 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 horizontal 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.

5.1.2 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 in order to extract the abraded fibre.

The vacuum cleaner performance shall be such as to produce an 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 Soles,[1)] made from vulcanized styrene butadiene rubber (SBR) with silicic acid-based white filler additives

The soles have a wave profile on one face, and the slip resistance of the sole material is controlled to ensure standard behaviour in the Lisson Tretrad test (see annex A).

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. > 2 years) they shall be validated by the calibration procedure (calibration carpet).

Size (mm)	:	minimum 190 ± 2 long by 55 ± 0,5 wide
Thickness (mm)	:	2,5 ± 0,3
Density (g/cm^3)	:	1,32 ± 0,03
Hardness (Shore A)	:	90 ± 3
Wavelength (mm)	:	13,0 ± 0,5
Amplitude (mm)	:	4,0 ± 0,3
Profile height (mm)	:	0,6 ± 0,1
Slip resistance (N)	:	2,8 ± 10 %

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

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

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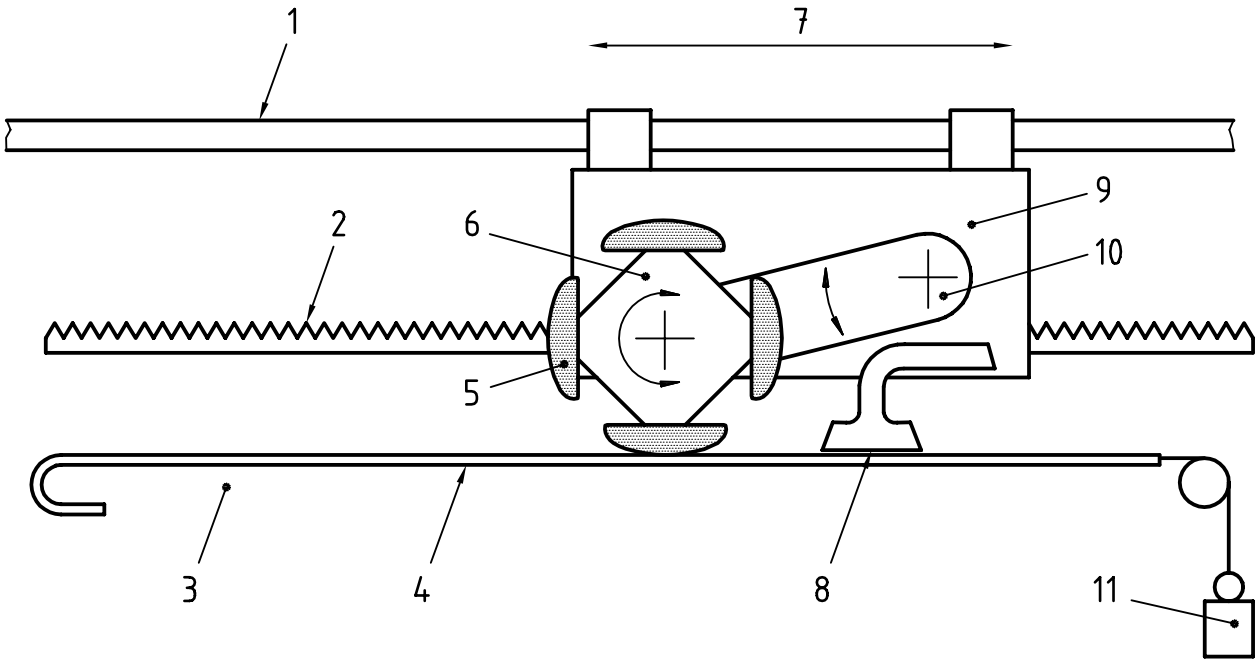
1) Certified soles are available from TFI, Deutsches Teppichforschungsinstitut, Charlottenburger Allee 41, 52068 Aachen, Germany.

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.

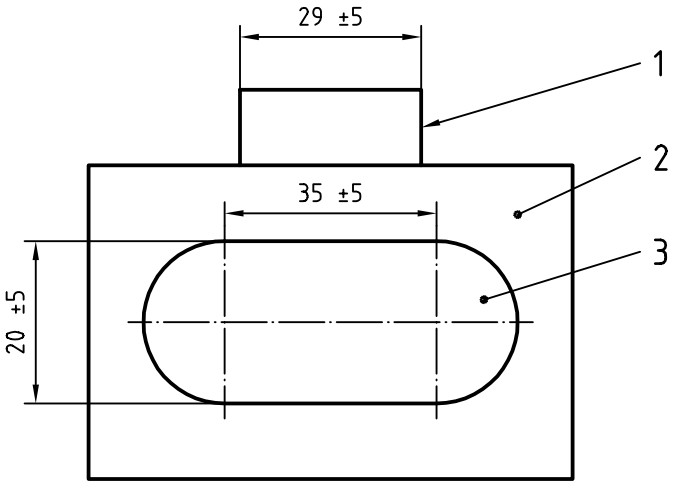


Key

1	Support	7	Movement of the Tretrad
2	Cogbar	8	Dust section
3	Bed plate	9	Frame
4	Specimen	10	Drive
5	Foot	11	Tension weight
6	Tretrad wheel		

Figure 1 — Lisson Tretrad testing machine

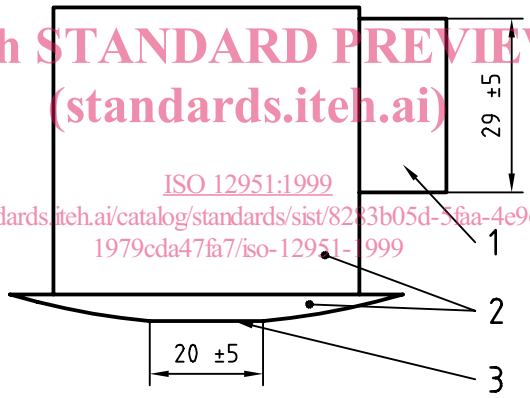
Dimensions in millimetres



Key

1 Conection to vacuum cleaner
2 Nozzle casing
3 Nozzle mouth

a) bottom view



Key

1 Connection: side view
2 Nozzle casing
3 Nozzle mouth

b) side view

Figure 2 — Vacuum inlet

6 Sampling and selection of test specimens

Select the specimens in accordance with ISO 1957. For each test prepare at least four specimens each 1 500 mm in the direction of manufacture (machine direction) by 100 mm in the cross-machine direction.

Tiles shall be cut and assembled into the appropriate dimensions of the required specimens.

Where appropriate, unsealed cut edges shall be sealed to prevent edge tuft loss during the test.

7 Atmosphere for conditioning and testing

The specimens shall be conditioned for at least 48 h in the standard atmosphere for testing textiles specified in ISO 139, prior to testing in the same atmosphere. The specimens shall be laid out singly, use surface uppermost.

8 Calibration of the apparatus

The test apparatus shall be checked with a calibration carpet[2)] and calibrated by adjusting the set number of to and fro traverse cycles.

9 Procedure

Prior to testing clean the specimen with the vacuum cleaner (5.4) giving four passes in each direction with the final pass in the direction of pile lay.

Weigh the test specimens individually to determine m_1 (see 10.1) to the nearest 0,01 g and then mount them on the bed plate as described below.

Fit the test specimen over the leading 10 mm radius rounded edge of the Lisson Tretrad base plate (5.1.1) to the forward mount and clamp on the table under a tension of (200 ± 10) N.

Test specimens that may become distorted during the test shall be further stabilised by being adhered to the bed plate. To carry this out, initially fix single sided tape to the underside of the specimens then attach the specimens to the bed plate by means of double sided tape; this allows for removal of the specimens without weight change (in this case omit the pretensioning).

Specimens with a distinct pile lay shall be fitted to the bed plate with the pile lay in the direction of the stair nosing.

If the material is usually fitted with an underlay then the specimen shall be mounted over the underlay it is intended to be used with.

Fit new rubber soles to the Tretrad before each test.

Adjust the height of each Tretrad (see Figure 3) in relation to the bed plate in accordance with Table 1.

The tests shall be performed with the vacuum cleaner turned on continuously.

Subject the specimens to 500 double passages of the Tretrad then readjust the clamping tension to (200 ± 10) N ; operate the machine to the remaining number of the calibrated total double passages of the Tretrad.

At the end of the test clean the specimens with four passages of the vacuum cleaner (5.4) then lay the specimen, use surface uppermost, in the standard atmosphere. After about 48 h weigh the specimen to determine m_2 (see 10.1) to the nearest 0,01 g.

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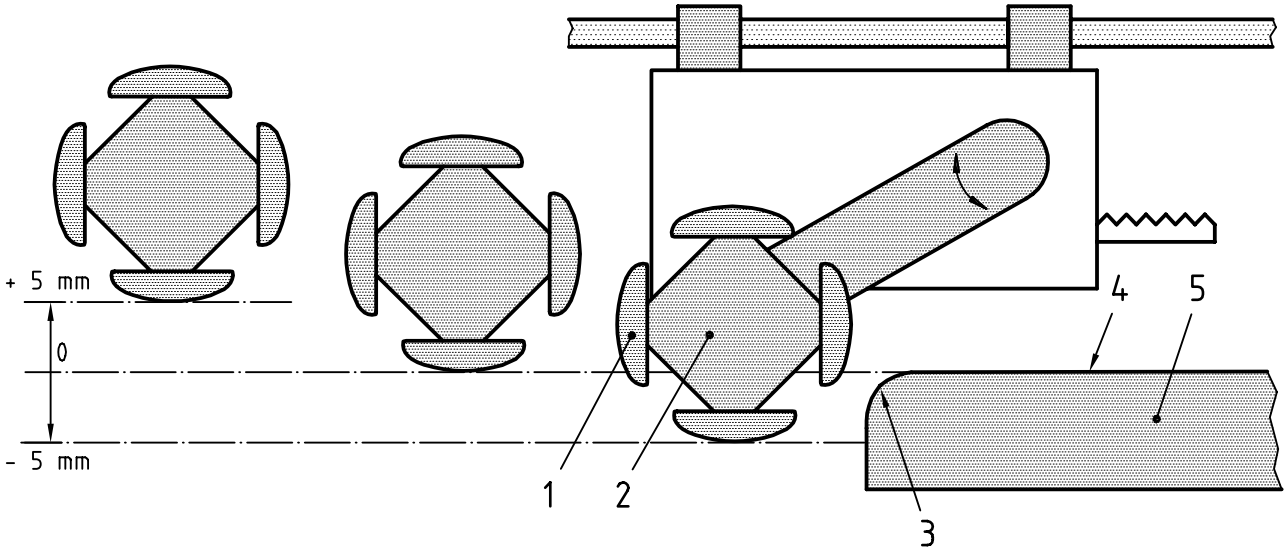
2) A standard carpet, supplied with calibration details is available from TFI, Deutsches Teppichforschungsinstitut, Charlottenburger Allee 41, 52068, Aachen, Germany.

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.



Key

1 Foot
2 Tretrad
3 Stair nosing (= 10 mm)
4 Surface of bed plate
5 Bed plate

Figure 3 — Adjustment of wheel height

Table 1

Total thickness of specimen measured in accordance with ISO 1765 (mm)	Adjustment of wheel height in relation to surface of bed plate (mm)
⩽ 10,0	−5
> 10,0	0
⩽ 10,0 plus underlay	0
> 10,0 plus underlay	+5

10 Calculation and expression of results

10.1 Mass loss per unit area m_v

Calculate the mass loss per unit area m_v in grams per square metre according to the following equation:

$$m_v = \frac{(m_1 - m_2)}{A}$$

where

m_1 is the mass of the initial conditioned specimen, in grams;

m_2 is the mass of the final conditioned specimen, in grams;

A is the tested area of the specimen in square metres (width of Tretrad foot × length of track over which Tretrad walks in accordance with 5.1.1).