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Textile floor coverings — Determination of thickness loss under dynamic loading

*Revêtements de sol textiles — Détermination de la perte d'épaisseur
sous charge dynamique*



Reference number
ISO 2094:1999(E)

Foreword

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International Standard ISO 2094 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 12, *Textile floor coverings*.

This third edition cancels and replaces the second edition (ISO 2094:1986) clause 5 of which has been technically revised.

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Textile floor coverings — Determination of thickness loss under dynamic loading

1 Scope

This International Standard specifies a method for the determination of the thickness loss of textile floor coverings under dynamic loading.

It is applicable to all types of textile floor coverings with a surface that is level in height and construction.

It does not apply to other textile floor coverings unless the areas of different thickness or construction can be tested separately.

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*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1

thickness (of a textile floor covering)

distance between a reference plate on which the specimen rests and a parallel presser-foot applying a given pressure to the specimen

NOTE Ordinarily the thickness of a textile floor covering without compression is measured under the standard pressure of 2,0 kPa ± 0,2 kPa applied to a circle of area between 300 mm² and 1 000 mm² within a larger area.

3.2

thickness loss (of a textile floor covering under dynamic loading)

difference between the thickness of the textile floor covering, measured under the standard pressure, before and after it has received a stated number of standard impacts

4 Principle

The specimen is subjected to a cyclic-loading treatment in which a weight-piece, with two steel feet on its underside, repeatedly drops freely on to the specimen. The specimen is slowly traversed so that vertical shearing forces produced by the edges of the feet act on the requisite area of the specimen.

The thickness of the specimen is measured, before and after treatment, by the procedure specified in ISO 1765, except that the requirement of ISO 1765 not to measure within 20 mm of a change in level is not applicable.

5 Apparatus

5.1 Dynamic loading machine, consisting of the following main components:

5.1.1 Weight-piece, of total mass $1\,279\text{ g} \pm 13\text{ g}$ having a lower surface comprising two rectangular cross-section feet separated by an inside distance of $38\text{ mm} \pm 0,5\text{ mm}$.

Each of the feet has the following dimensions:

- width: $6,5\text{ mm} \pm 0,5\text{ mm}$;
- length: $51\text{ mm} \pm 0,5\text{ mm}$;
- depth: $9,5\text{ mm} \pm 0,5\text{ mm}$.

The weight-piece falls freely under gravity from a height of $63,5\text{ mm} \pm 0,5\text{ mm}$ on to the specimen every $4,3\text{ s} \pm 0,3\text{ s}$. The weight-piece is guided in its fall to ensure no lateral or turning movement. It is essential however that the guides impose negligible friction against the free fall of the weight-piece. Each fall of the weight-piece corresponds to one impact.

5.1.2 Steel base plate, $150\text{ mm} \pm 0,5\text{ mm}$ long and $125\text{ mm} \pm 0,5\text{ mm}$ wide, to which the specimen is clamped at the sides by means of two $150\text{ mm} \pm 0,5\text{ mm}$ long and $20\text{ mm} \pm 0,5\text{ mm}$ wide steel bars, screwed at the ends of the base plate.

The base plate is slowly traversed in such a way that there is $3,2\text{ mm} \pm 0,1\text{ mm}$ movement for each drop of the weight-piece and the return traverse is $1,6\text{ mm} \pm 0,1\text{ mm}$ out of step with the forward traverse. A complete cycle (one forward traverse and one reverse traverse) is made for a total of 25 impacts to give a total compressed area approximately 50 mm wide by about 90 mm long, which may have a ridge across the centre.

NOTE Before the instrument is used, it is essential to check that the vertical guides have not been displaced, that their surfaces, together with other bearing surfaces and cams, are oiled, and that the impact weight-piece moves freely in the guides.

5.1.3 Counting device, to count the number of impacts.

5.2 Thickness tester, as specified in ISO 1765, capable of measuring the thickness of the specimen under a pressure of 2,0 kPa to an accuracy of 0,1 mm while the specimen is clamped to the steel base plate.

5.3 Straight-edge, for brushing the surface of the specimen, for example a ruler.

6 Atmosphere for conditioning and testing

The specimens shall be conditioned and the test conducted in one of the standard atmospheres for conditioning and testing of textiles specified in ISO 139.

7 Test specimens

7.1 Test at least two specimens from each sample selected according to the directions in ISO 1957. Cut each test specimen approximately 125 mm × 125 mm, with a side parallel to the warp (or to the machine production direction) and so that they do not contain the same warp or weft threads. They shall be cut at least 50 mm from the selvage.

7.2 When a textile floor covering of more than one thickness level or pile construction is to be tested, it shall have a central area of uniform construction of not less than 75 mm in the warp direction (or parallel to the machine production direction) by 112,5 mm in the weft direction (or perpendicular to the machine production direction).

8 Preparation of test specimens

For specimens with a pile, lightly brush the use-surface first against, then with, the direction of pile lean using the straight-edge (5.3).

Lay out the specimens flat, singly and with the use surface uppermost, in the chosen standard atmosphere for testing textiles, for at least 24 h.

9 Procedure

9.1 Obtain the zero reading for the steel plate on the thickness tester, as prescribed in ISO 1765. Clamp the specimen on to the steel plate with the warp direction (or direction parallel to the machine production direction) at right angles to the direction of the travel of the plate, taking special care that the backing be held flat to the plate and not buckled (over-tightening of the screws has been found to promote buckling). Measure the thickness under a pressure of 2,0 kPa ± 0,2 kPa, to the nearest 0,1 mm in two places, centred in the separate areas impacted by each foot.

9.2 Place the plate in position on the machine and apply 50 impacts. Measure the specimen thickness in the same two places immediately after treatment, avoiding any central ridge across the area, and then replace the specimen for further treatment. Thickness measurements shall be made at intervals up to 1 000 impacts (after 50, 100, 200 and 1 000 will be found suitable) but more impacts may be applied. If required, the specimen may then be measured after a period of recovery without pressure.

9.3 Repeat the procedure specified in 9.1 and 9.2 for each specimen in the sample.

10 Expression of results

For each area of each specimen, record the original thickness at the standard pressure and its thickness under the conditions specified in 9.2, to the nearest 0,1 mm. By subtraction, calculate the thickness losses after the stated number of impacts. Calculate the mean thickness of the untreated specimens (see 9.1) and the mean thickness losses after the stated number of impacts, to the nearest 0,1 mm. When a sample of more than one thickness level or construction has been tested, calculate the results for each level separately. If there is a difference in thickness loss of greater than 10 % between the means of the individual results on the two individual specimens, carry out repeat tests on a further two specimens.

11 Test report

The test report shall include the following information:

- a) the identity (source and type) of the sample from which the specimens were taken;
- b) that the procedure was conducted in accordance with this International Standard and also details of any operations not included or which are optional;

- c) the standard atmosphere used (temperate or tropical);
- d) the mean thickness of the untreated specimen, measured under the standard pressure, and the mean thickness losses after the various stated number of impacts, to the nearest 0,1 mm;
- e) the separate results for each level when a sample of more than one thickness level or pile construction has been tested.

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