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# INTERNATIONAL STANDARD



# 2094

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION · МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ · ORGANISATION INTERNATIONALE DE NORMALISATION

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## Textile floor coverings — Determination of thickness loss under dynamic loading

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## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, International Standard ISO 2094 replaces ISO Recommendation R 2094-1971 drawn up by Technical Committee ISO/TC 38, *Textiles*.

The Member Bodies of the following countries approved the Recommendation :

Australia	Hungary	South Africa, Rep. of
Belgium	India	Sweden
Canada	Israel	Switzerland
Czechoslovakia	Italy	Turkey
Denmark	Japan	United Kingdom
Egypt, Arab Rep. of	Netherlands	U.S.A.
Finland	Norway	U.S.S.R.
France	Poland	
Germany	Romania	

No Member Body expressed disapproval of the Recommendation.

# Textile floor coverings – Determination of thickness loss under dynamic loading

## 1 SCOPE AND FIELD OF APPLICATION

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 REFERENCES

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) : The distance between a reference plate on which the specimen rests and a parallel presser-foot applying a given pressure to the specimen. Ordinarily the thickness of a textile floor covering without compression is measured under the standard pressure of  $2,0 \times 10^{-3}$  N/mm<sup>2</sup>\* applied to a circle of area between 300 and 1 000 mm<sup>2</sup> within a larger area.

**3.2 thickness loss** (of a textile floor covering under dynamic loading) : The 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 onto 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.

\* Equivalent to 0,2 gf/mm<sup>2</sup>.

## 5 APPARATUS

**5.1 Dynamic loading machine**, with the general principle as shown in the figure, and meeting the following requirements.

A weight-piece (A) has a plate with two steel feet of rectangular cross-section attached to its underside. The cam (B) is shaped such that a cantilever (F) pivoting at D firstly raises the weight-piece and then allows it to fall freely from a height of 63,5 mm onto the specimen approximately every 4,3 s. Each fall of the weight-piece corresponds to one impact. The specimen is clamped to a steel plate (C) 150 mm long and 125 mm wide, by means of two 150 mm long and 20 mm wide steel bars at the sides, screwed at the ends to the base plate.

The base plate is slowly traversed in such a way that there is 3,2 mm movement for each drop of the weight-piece and the return traverse is 1,6 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 50 mm wide by about 90 mm long, which may have a ridge across the centre.

Total mass of impact assembly :	1 279 ± 13 g
Size of each foot on weight-piece :	
width	6,3 mm
length	51 mm
depth	9,5 mm
Inside distance between feet :	38,1 mm
Height of drop to steel plate :	63,5 mm
Frequency :	14 ± 1 impacts per minute

A device to count the impacts is necessary.

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.

**5.2 Thickness tester**, as specified in ISO 1765, capable of measuring the thickness of the specimen under a pressure of  $2,0 \times 10^{-3}$  N/mm<sup>2</sup> to an accuracy of 0,1 mm while the specimen is clamped to the steel plate.

**5.3 Guard ring**, as specified in ISO 1765, for testing textile floor coverings without pile.

## 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 125 mm X 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 selvedge.

**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

Lay out the specimens flat, singly and with the use surface uppermost, in the chosen standard atmosphere for testing textiles, for 24 h or until they reach equilibrium, whichever is the longer. Equilibrium shall be considered to have been reached when successive weighings, carried out at intervals of not less than 2 h, of the specimens exposed to the moving air, show no progressive change in mass greater than 0,25 %.

## 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 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 is held flat to the plate and not buckled. (Overtightening of the screws has been found to promote buckling.) Measure the thickness under the pressure of  $2,0 \times 10^{-3}$  N/mm<sup>2</sup>, 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, 500 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.

## 10 CALCULATION AND EXPRESSION OF RESULTS

For each area of each specimen, record the original thickness at the standard pressure and its thickness under the conditions described 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.

**11 TEST REPORT**

The test report shall include the following particulars :

a) that the procedure was conducted in accordance with this International Standard, and details of any operations not included, or optional;

b) the standard atmosphere used (temperate or tropical);

c) 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;

d) the separate results for each level when a sample of more than one thickness level or pile construction has been tested.

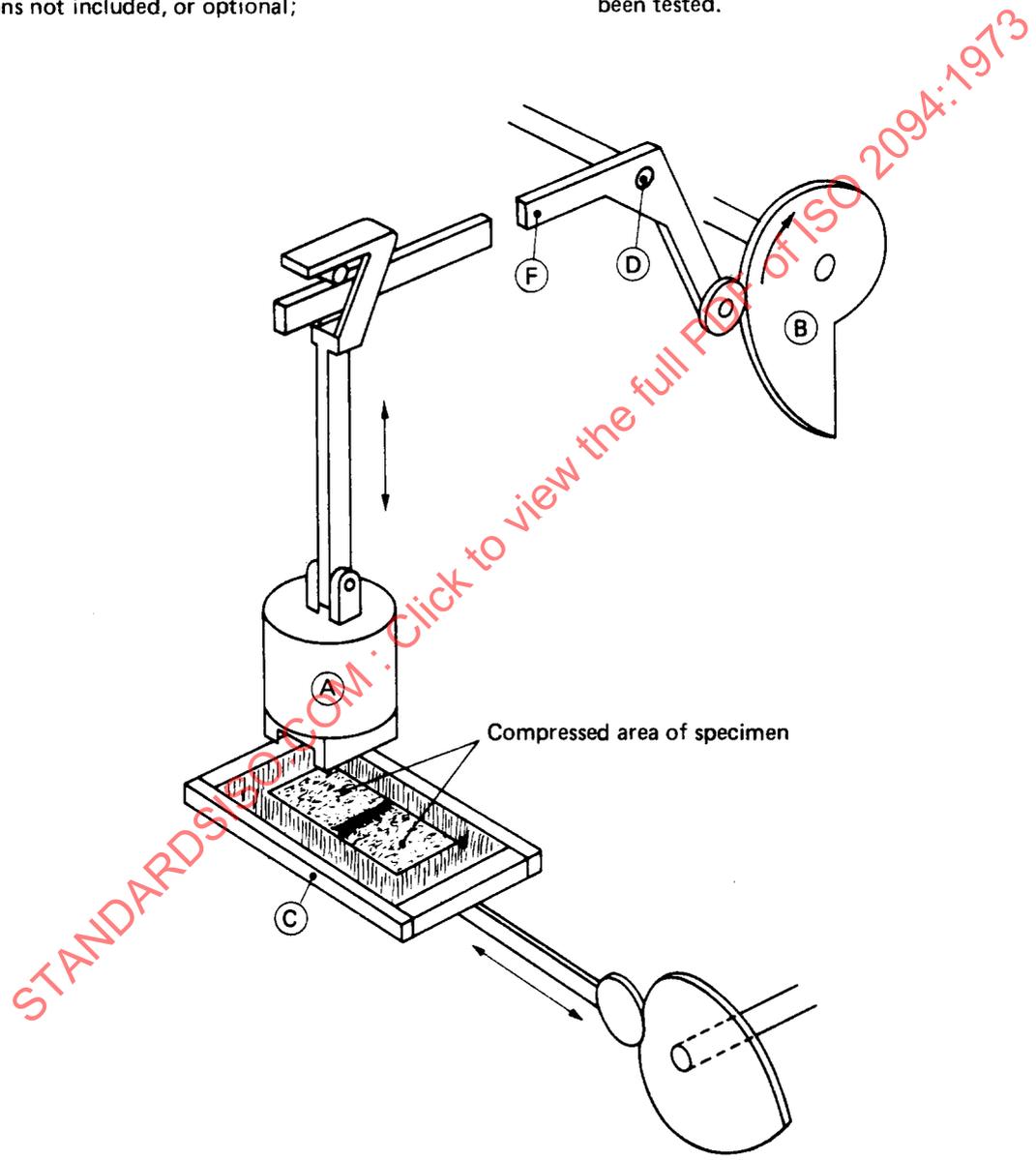


FIGURE – Diagram showing principle of dynamic loading machine

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