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# International Standard



# 3385

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## Cellular polymeric flexible materials — Determination of fatigue by constant load pounding

*Matériaux polymères alvéolaires souples — Détermination de la fatigue par indentation à charge constante*

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# Cellular polymeric flexible materials — Determination of fatigue by constant load pounding

## 1 Scope and field of application

This International Standard specifies a method for the determination of loss in thickness and loss in hardness of flexible cellular materials intended for use in upholstery.

This test method provides a means of assessing the service performance of flexible cellular materials of the latex and polyether urethane types used in load-bearing upholstery.

The measured loss in thickness and loss in hardness are related to, but are not necessarily the same as, the losses likely to occur in service.

The method is applicable both to standard size test pieces cut from stock material and to shaped components.

## 2 Reference

ISO 2439, *Polymeric materials, cellular flexible — Determination of hardness (indentation technique)*.

## 3 Principle

Repeated indentation of a test piece by an indenter smaller in area than the test piece, the maximum load reached during each cycle being kept within specified limits.

## 4 Apparatus

**Pounding test machine**, having the following parts.

**4.1 Plane platen**, capable of fully supporting the test piece, and suitably vented with holes approximately 6 mm in diameter at approximately 20 mm pitch in order to allow air to escape from the test piece.

**4.2 Indentor**, having an overall diameter of  $250 \pm 1$  mm with a  $25 \pm 1$  mm radius at its lower edge, provided with a device for applying a maximum force of  $750 \pm 20$  N during one loading cycle. The indentor shall be rigidly fixed to its guide and its surface shall be smooth but not polished.

By means of a crank or other suitable mechanism, the machine shall be capable of oscillating either the platen (4.1) carrying the test piece, or the indentor support mounting (4.3), towards the other in a vertical direction at a rate of  $70 \pm 5$  strokes per minute. The amplitude of the stroke shall be adjustable.

**4.3 Indentor support mounting**, such that the indentor force is carried by it except at that part of the stroke when the mounting and platen are closest together; at this point the full force of the indentor shall be supported by the test piece. The indentor shall be free to be lifted in its mounting to prevent overloading of the test piece. Means shall be provided whereby at any stroke the time can be controlled during which the full force is exerted by the indentor. This time shall be no more than 25 % of the total duration of each cycle.

**4.4 Force measuring device**, whereby the load applied to the test piece by the indentor can be measured. A suitable method consists in mounting the platen upon load cells.

NOTE — Where adjustment is manual, the indentor is attached to the lower end of a shaft which passes through a vertical guide above the platen carrying the test piece. Adjustment of the vertical position of the indentor relative to the platen controls the length of time at any stroke that the full force of the indentor is supported by the test piece. A suggested arrangement is shown diagrammatically in figure 1.

A suggested method of securing automatic adjustment is shown in figure 2, whereby the length of time during which the test piece supports the indentor is controlled directly by the time during which the valve is open.

## 5 Test pieces

### 5.1 Form and dimensions

Test pieces shall be right parallelepipeds having sides of length  $380 \pm 20$  mm and a thickness of  $50 \pm 2$  mm. Tests may also be carried out on components that do not comply with these dimensions subject to agreement between the interested parties.

### 5.2 Samples showing orientation

If the products show an orientation of the cellular structure, the direction in which the indentation is to be carried out shall be agreed upon between the interested parties. Normally, testing is carried out in that direction in which the finished product will be stressed under service conditions.

### 5.3 Number

Three test pieces shall be tested.

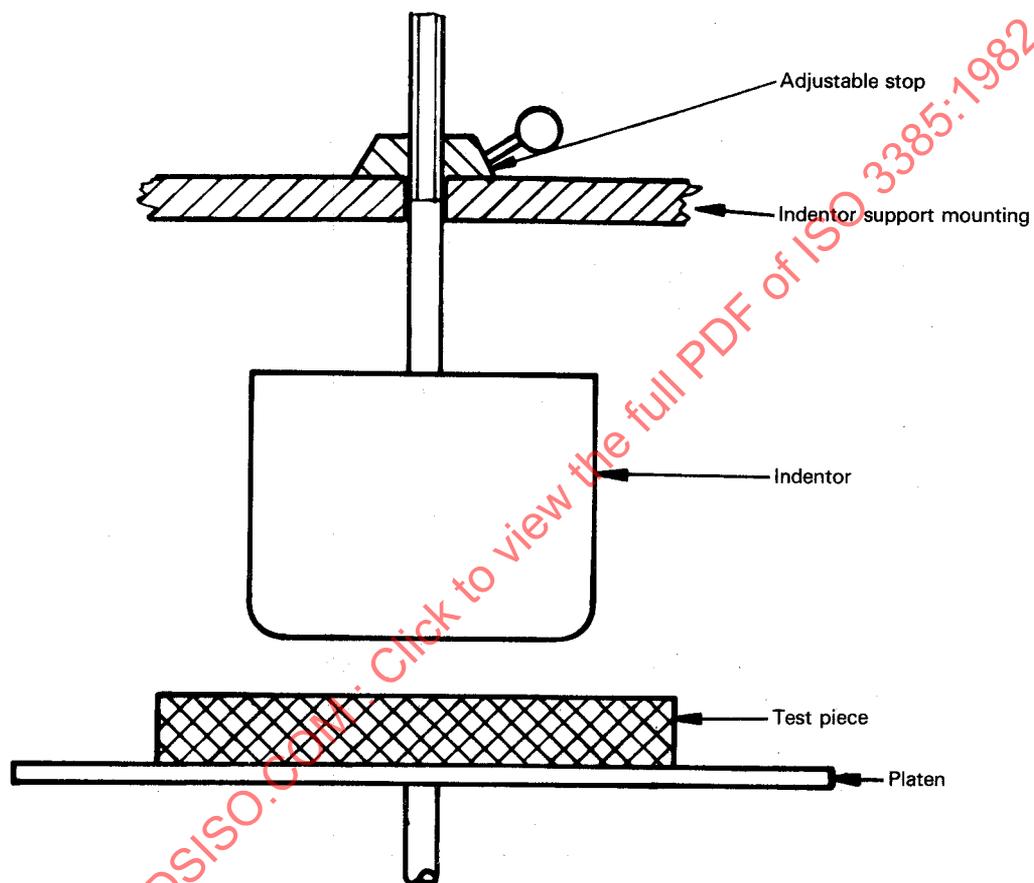


Figure 1 — Diagrammatic arrangement for manual adjustment machine