

Australian/New Zealand Standard®

Textile floor coverings—Tests and measurements

Method 17: Determination of thickness, compression and recovery characteristics

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TX/9 on Carpets. In Australia, the Standard supersedes AS 2111.17—1979, *Methods of test for textile floor coverings—Determination of thickness, compression and recovery characteristics of a textile floor covering*.

This method is technically equivalent to BS 4098:1975, *Determination of thickness compression and recovery characteristics of textile floor coverings*.

FOREWORD

The thickness of a textile floor covering depends upon the pressure applied to it. The ability of a textile floor covering to be compressed and to recover after compression is an important factor in its performance.

A pressure of 2 kPa has been adopted for measuring the initial thickness of textile floor coverings because, under the conditions of test, this pressure has been found to be just sufficient to flatten any protruding fibres without appreciably compressing textile floor coverings of low density. The highest pressure used in this method is 200 kPa, which appreciably compresses most textile floor coverings.

The method of measuring thickness used in this Standard is based on that prescribed in AS/NZS 2111.1, *Machine-made textile floor coverings—Determination of total thickness*.

METHOD

1 SCOPE This Standard describes a method for measuring the thickness, compression and recovery characteristics of textile floor coverings.

2 APPLICATION The method is applicable to all textile floor coverings of uniform thickness and construction and to textile floor coverings with areas of varying thickness or density of pile if these areas can be measured separately. For textile floor coverings where areas of different thickness cannot be measured separately, the method may be used to give indicative measures of thickness, compression and recovery.

STANDARDS NEW ZEALAND

COPYRIGHT

STANDARDS AUSTRALIA



Documents

Document Sharing Hub

3 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

2001 Methods of test for textiles

2001.1 Part 1: Conditioning procedures

2103 Dial gauges and dial test indicators (metric series)

2119 Method for sampling and cutting specimens of textile floor coverings for testing

2454 Textile floor coverings—Terminology

4 DEFINITIONS For the purpose of this Standard, the definitions given in AS 2454 and those below apply.

4.1 Compression—the change in thickness of the textile floor covering when the pressure is increased from 2 kPa to 200 kPa.

4.2 Initial thickness—the thickness of textile floor covering measured under a pressure of 2 kPa.

4.3 Load-compression curve—the plot of decreasing thickness against increasing pressure from 2 kPa to 200 kPa.

4.4 Load-recovery curve—the plot of increasing thickness against decreasing pressure from 200 kPa to 2 kPa.

4.5 Work of compression—the work done on the textile floor covering when the pressure is increased from 2 kPa to 200 kPa, i.e. in Figure 1, the area ADB.

NOTE: Compression takes no account of the shape of the load-compression curve. Work of compression will distinguish between textile floor coverings which, although they have the same value of compression, have differently shaped load-compression curves.

4.6 Percentage thickness recovery—the thickness to which the textile floor covering recovers when the pressure is diminished from 200 kPa to 2 kPa, expressed as a percentage of the initial thickness.

4.7 Percentage compression recovery—the change in thickness when the pressure is diminished from 200 kPa to 2 kPa, expressed as a percentage of the compression.

4.8 Percentage work recovery—the work done by the textile floor covering when the pressure is diminished from 200 kPa to 2 kPa, expressed as a percentage of the work of compression from 2 kPa to 200 kPa pressure, i.e. in Figure 1, the area $100 \times (\text{area CEB}) / (\text{area ADB})$.

NOTE: Percentage thickness recovery is based upon the total thickness of the textile floor covering. Percentage compression recovery would normally be expected to rank textile floor coverings in the same order as that of the percentage work recovery. Percentage work recovery is mainly influenced by the work done by movement of the pile in the type of textile floor covering and is thus more sensitive to change in the pile than percentage thickness recovery and has a much lower value.

5 PRINCIPLE The thickness of a textile floor covering specimen is measured as the distance between the reference plate on which the textile floor covering rests and a parallel circular presser-foot, exerting a known pressure to an area between 300 mm² and 1000 mm² inclusive, within a larger area of textile floor covering. By the application of a series of increasing and subsequently decreasing loads to the specimen, the thickness at various pressures and the load-compression and load-recovery curves can be determined.

6 APPARATUS The following apparatus is required:

- (a) *Measuring instrument* An instrument used for measuring the thickness, having a circular plane presser-foot of area between 300 mm^2 and 1000 mm^2 . It shall be capable of exerting pressures normal to the surface of the textile floor covering, from 2 kPa to 200 kPa with intermediate values of 5 kPa, 10 kPa, 20 kPa, 50 kPa, 100 kPa and 150 kPa, with an accuracy of $\pm 0.05 \text{ kPa}$ or ± 1 percent of the total pressure applied to the specimen, whichever is the greater. The instrument shall have a means of measuring thickness to an accuracy of 0.1 mm over a range of 25 mm. The movement of the presser-foot shall be normal to the plane of the textile floor covering. The reference plate on which the specimen rests shall be plane, at least $125 \text{ mm} \times 125 \text{ mm}$ in size and parallel to the presser-foot to within one part in 500. The reference plate and the presser-foot shall be flat to an accuracy of 0.0125 mm.

If a dial gauge is used for the thickness measurement, it shall comply with AS 2103. The rigidity of the instrument frame should be such that no measurable deflection occurs under the loads to be used.

- (b) *Circular guard ring* The circular guard ring shall have a mass of 1000 g, an external diameter not greater than 125 mm and an internal diameter of $d + 40 \text{ mm}$ (d being the diameter of the presser-foot in millimetres), such that a pressure of at least 1 kPa is exerted. A thread of 40 mm width may be cut from the guard ring.
- (c) *A straightedge* For example a ruler, for brushing the surface of the specimen.
- (d) *Conditioning apparatus* Means of producing and maintaining the standard atmosphere as specified in AS 2001.1.

7 SAMPLE AND TEST SPECIMENS

7.1 General Select the sample and the test specimen in accordance with AS 2119. Select the test specimens well away from distorted parts of the sample. Test areas shall not contain the same warp or weft threads.

7.2 Textile floor coverings with yarn pile or flocked pile Prepare sufficient specimens to allow at least five tests to be made. Test specimens shall be at least $75 \text{ mm} \times 75 \text{ mm}$, but they may be of larger dimensions as required by other tests, or several measurements may be made on one larger sample provided that the centres of the areas in contact with the presser-foot are not less than 75 mm apart and the whole area of the specimen is supported in the same horizontal plane.

7.3 Textile floor coverings other than those covered by Clause 7.2 Prepare sufficient specimens to allow 10 tests to be made. Test specimens shall be at least $125 \text{ mm} \times 125 \text{ mm}$, but they may be of any larger dimensions as required by other tests, or several measurements may be made on one larger sample provided that the centres of the areas in contact with the presser-floor are not less than 75 mm apart and the whole area of the specimen is supported in the same horizontal plane.

8 PROCEDURE The test procedure shall be as follows:

- (a) For specimens with a pile, brush lightly the use-surface, firstly against, then with the direction of pile lean, using the apparatus in Clause 6(c).
- (b) The specimens shall be conditioned in the standard atmosphere as specified in AS 2001.1 by laying them out flat and singly with the use surface uppermost. Condition them for a minimum of 24 h or until they reach moisture equilibrium. Preconditioning is not required.