

STANDARDS AUSTRALIA

RECONFIRMATION

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Methods of test for textiles

**Method 2.27: Physical tests—Determination of abrasion resistance of textile fabrics
(inflated diaphragm method)**

RECONFIRMATION NOTICE

Technical Committee TX-020 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 6 July 2016.

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Methods of test for textiles

Method 2.27: Physical tests— Determination of abrasion resistance of textile fabrics (inflated diaphragm method)

PREFACE

This Standard was prepared by the Standards Australia Committee on Testing of Textiles, under the direction of the Textile Standards Board.

In the preparation of this Standard, cognizance was taken of the following Standard: ASTM D 3886 *Abrasion resistance of textile fabrics (inflated diaphragm method)*

The method is based upon the development described by R.G. [unclear] in *Improved multipurpose abrasion test and its application for the wear resistance of textiles*, Textile Research Journal, July 1949, p. 394.

FOREWORD

The measurement of the resistance to abrasion of textile and other materials is very complex. The resistance to abrasion is affected by many factors, such as inherent mechanical properties of the fibres; the dimensions of the fibres; the structure of the yarns; the construction of the fabrics; and the type, kind and amount of finishing material added to the fibres, yarn or fabrics.

The resistance to abrasion is also greatly affected by the conditions of the tests, such as the nature of the abradant, the relative action of the abradant over the area of the specimen abraded, the pressure between the specimens, and the dimensional changes in the specimens.

Abrasion tests are all subject to variation due to changes in the abradant during specific tests. Accordingly the abradant is discarded at frequent intervals or checked periodically against a standard. With disposable abradants, the abradant is used once only or discarded after limited use. With permanent abradants that use hardened metal or equivalent surfaces, it is assumed that the abradant will not change appreciably during a specific series of tests. Similar abradants used in different laboratories will not change at the same rate, due to differences in usage. Permanent abradants may also change due to pick up of finishing or other material from test fabrics and accordingly are checked at frequent intervals. The measurement of the relative amount of abrasion may also be affected by the method of evaluation and may be influenced by the judgement of the operator.

The resistance of textile materials to abrasion, as measured on a testing machine in the laboratory is generally only one of several factors contributing to wear performance or durability as experienced in actual use of the material. While abrasion resistance (often stated in terms of the number of cycles on a specified machine, using a specified technique to produce a specified degree or amount of abrasion) and durability (defined as the ability to withstand deterioration or wearing out in use, including the effects of abrasion) are frequently related, the relationship varies with different end uses, and different factors may be necessary in any calculation of predicted durability from specific abrasion data. Laboratory tests may be reliable as an indication of relative end use performance in cases where the difference in abrasion resistance of various materials is large, but they should not be relied upon where differences in laboratory test findings are small. In general, they should not be relied upon for prediction of actual wear-life in specific end uses unless there are data showing the specific relationship between laboratory abrasion tests and actual wear in the intended end use.

These general observations apply to all types of fabrics, including woven, non-woven, and knit apparel fabrics, household fabrics, industrial fabrics, and floor coverings. It is not surprising, therefore, to find that there are many different types of abrasion testing machines, abrasants, testing conditions, methods of evaluation of abrasion resistance, and interpretations of results.

All the test methods and instruments so far developed for measuring abrasion resistance may show a high degree of variability in results obtained by different operators and in different laboratories; however they represent the methods now most widely in use.

Since there is a definite need for measuring the relative resistance to abrasion, standardized test methods are desirable and useful, and may clarify the problem and lessen the confusion.

Because of the conditions mentioned above, technicians frequently fail to get good agreement between results obtained on the same type of testing instrument both within and between laboratories, and the precision of these methods is uncertain. Accordingly this Standard is not recommended for acceptance testing in contractual agreements between purchaser and seller because of the poor between-laboratory precision of the method.

METHOD

1 SCOPE. This Standard sets out a method for the determination of the resistance to abrasion of textile fabrics using the inflated diaphragm tester. The method is applicable to woven and knitted textile fabrics. It is not applicable to floor coverings.

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

AS	
1199	Sampling procedures and tables for inspection by attributes
2001	Methods of test for textiles
2001.1	Method 1: Conditioning procedures

3 DEFINITIONS. For the purpose of this Standard the definition below applies.

Abrasion—the wearing away of any part of a material by rubbing against another surface.

4 PRINCIPLE. A test specimen is abraded by rubbing either unidirectionally or multidirectionally against an abrasant having specified surface characteristics, while the specimen is held in a fixed position when supported by an inflated diaphragm which is held under constant pressure. Resistance to abrasion is evaluated by various means.

5 REAGENTS.

5.1 Water—filtered tap water shall be used.

5.2 Wetting agent—ethoxylated derivative of a synthetic alcohol (non-ionic) wetting agent* shall be used.

6 APPARATUS

6.1 Inflated diaphragm tester† (see Figure 1). An inflated diaphragm tester with the essential following parts shall be used:

- (a) *Surface abrasion head.* A surface abrasion head comprising a circular clamp (i.e. clamping ring and a tightening collar) over a rubber diaphragm shall be provided. The height from the surface of the clamped-in specimen to the upper edge of the tightening collar shall not exceed 9.5 mm. The clamping area of the body of the clamp and the ring shall have gripping surfaces to prevent the slipping of the test specimen and leakage of air pressure during the test. Means shall be provided for supplying air pressure to the body of the clamp so that the pressure under the diaphragm can be controlled between 0 and 41 kPa with an accuracy of $\pm 5\%$ of range.

* Teric BL8, produced by ICI Australia Ltd, is a suitable wetting agent.

† The Stoll-Quartermaster has been found suitable and is available from Custom Scientific Instrument Inc., 13 Wing Drive, Whippany, N.J. 07981, U.S.A.