

STANDARDS AUSTRALIA

RECONFIRMATION

OF

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Methods of test for textiles

**Method 2.28: Physical tests—Determination of abrasion resistance of textile fabrics
(rotary platform, double-head method)**

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Methods of test for textiles

Method 2.28: Physical tests— Determination of abrasion resistance of textile fabrics (rotary platform, double- head method)

PREFACE

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

This method is based on the American Society for Testing and Materials method ASTM D 3884, *Test method for abrasion resistance of textile fabrics (rotary platform, double-head method)* and American Federal Test Method Standard No. 101A TM 5306, *Abrasion resistance of cloth; Rotary platform, double-head (Tablet) method*.

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 the 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, yarns, or fabric.

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

The results of abrasion tests are subject to variation due to changes in the abradant during specific tests. The abradant is accordingly discarded at frequent intervals, or checked periodically against a standard. With disposable abradants, the abradant is used only once and discarded after limited use. With permanent abradants that use hardened metal or equivalent surfaces, it is assumed that the abradant will not change appreciably in 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 to be cleaned 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 judgment 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 the 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 cannot be relied upon where differences in laboratory test findings are small. In general, they cannot 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, testing procedures, methods of evaluation of abrasion resistance, and interpretation of results.

Before definite predictions of fabric usefulness can be drawn from an abrasion test as made on the rotary platform, double-head (RPDH) abrading machine (see Figure 1), actual end-use trials need to be conducted and related to the abrasion test. Different types of wear (for example, wear on men's clothing at cuffs, crotch, etc.) may correspond to different ratings of the RPDH test.

In making a comparison of different fabrics (i.e. of different fibres, weights, etc.) the RPDH test will not always reveal a difference known to exist when the fabrics are actually used. Therefore, end-use trials are needed in conjunction with the RPDH abrasion test, at least as a guide for future testing of these fabrics.

Uncontrolled manufacturing or finishing variations occurring within a fabric or within lots of the same style of fabric can, however, be detected satisfactorily with the RPDH tester.

Because of the conditions mentioned above, technicians frequently fail to get too good an agreement between results obtained on the same type of testing instrument both within and between laboratories, and the precision of these methods is uncertain.

METHOD

1 SCOPE This Standard sets out a method for the determination of the abrasion resistance of textile fabrics using the rotary platform, double-head tester (RPDH). This method is applicable to all textile fabrics including coated and laminated fabrics. A method for wet testing is also specified.

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

AS

1199 Sampling procedures and table for inspection by attributes

2001 Methods of test for textiles

2001.1 Method 1: Conditioning procedures

2001.2.3 Method 2.3: Physical tests—Determination of breaking force and extension of textile fabrics

3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

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

3.2 End point—the point at which there is damage or visual change to the surface appearance of the fabric. Damage may be in the form of appearance of a hole, or appearance of frayed broken threads. Relevant visual changes may be loss of surface texture or pile or loss of surface coating.

4 PRINCIPLE A test specimen is abraded using rotary rubbing action under controlled conditions of pressure and abrasive action. The test specimen, mounted on a platform, turns on a vertical axis against the sliding rotation of two abrasion wheels. One abrasion wheel rubs the test specimen outward toward the periphery, and the other inward toward the centre. The resulting abrasion marks form a pattern of crossed arcs over an area of approximately 30 cm².

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 Conditioning facility A conditioning facility with a means of providing and maintaining a standard atmosphere, as described in AS 2001.1, shall be used.

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