

Australian Standard[®]

AS 3706.13—2012

Geotextiles—Methods of test

Method 13: Determination of durability— Resistance to certain microbiological agents

FOREWORD

This Method was prepared after consideration of various similar procedures in ISO, Australian and American (AATCC)* Standards. The fungal mixture from the AATCC method is believed to be the most appropriate, as other agencies, while suitable for testing normal textiles such as carpets, do not have the strength to attack geotextiles, which are synthetic fabrics designed for in-ground service.

METHOD

1 SCOPE

This Standard sets out the method for determining the resistance of geotextiles to microbiological agents that are present in certain soils.

2 APPLICATION

This method is applicable to all geotextiles.

NOTE: Experience and exhumation of geotextiles and geotextile-related products that had performed successfully, in some cases for more than two decades, indicate that geotextiles and geotextile-related products made out of plastic materials are generally resistant against microbiologically initiated decay. Therefore, it can be expected that most of these products, commercially available at the present time, will pass the soil burial test successfully and, therefore, it is not necessary to submit them all to this test, independent of their function. If the requirements for appropriate functioning of the geotextiles and geotextile-related products demand proof of microbiological resistance or if they are manufactured from newly developed polymers whose resistance is in any doubt, the soil burial test should be performed.

3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- | | |
|--------|--|
| 2193 | Method of calibration and grading of force-measuring systems of testing machines |
| 2243 | Safety in laboratories |
| 2243.3 | Part 3: Microbiological safety in containment |

* AATCC = American Association of Textile Chemists and Colourists.

AS

- 3704 Geotextiles—Glossary of terms
- 3706 Geotextiles—Methods of test
- 3706.1 Method 1: General requirements, sampling, conditioning and basic physical properties, and statistical analysis
- AATCC Test method 30-2004 Antifungal activity, assessment on textile materials: Mildew and rot resistance of textile materials

4 PRINCIPLE

Specimens are subjected to burial in a prepared soil for a specified time. The durability is assessed by comparing the ultimate force and elongation at ultimate force of exposed specimens with that of unexposed specimens.

5 DEFINITIONS

For the purpose of this Standard, the definitions given in AS 3704 apply.

6 APPARATUS

The following apparatus is required:

- (a) *Constant-rate-of-extension (CRE) tensile testing machine*—complying with the requirements of a Grade B machine in accordance with AS 2193, and having an extension rate of 100 mm/min and an autographic recorder with adequate pen response or an interfaced computer to properly record the force/elongation curve.

For machines with no autographic recorder, appropriate measuring instruments shall be used to allow readings of the applied force and the corresponding elongation at a number of points up to failure.
- (b) *Trays*—with loose fitting lids for holding prepared soil.
- (c) *Enclosure*—capable of maintaining temperature of $28 \pm 1^\circ\text{C}$ and not less than 85% relative humidity.
- (d) *Viability control fabric*—consisting of an untreated cotton fabric of approximately 270 g/m^2 .

7 SOIL BED CONDITIONING

Place the test soil in air-dry condition in trays, boxes or suitable containers to a depth of not less than 125 mm and bring to optimum moisture content by gradual addition of water accompanied by mixing to prevent puddling. After allowing it to stand for 24 h, sieve the soil through a 6.4 mm mesh screen.

Maintain uniform moisture content by covering the soil container with a suitable lid. The moisture content of the soil during the test period shall be maintained between 20% and 30% (based on dry weight). If the surrounding air is maintained at 85% or more relative humidity, the loss of moisture is negligible.

The soil bed shall be considered as satisfactory if the viability control fabric loses not less than 90% tensile strength after 168 h (7 d) exposure.

NOTE: Various types of soil that have been found satisfactory for this purpose include garden and naturally fertile topsoils, composts, and greenhouse potting soil. These usually possess the proper physical characteristics, along with an organic content sufficient to ensure a high degree of microbial activity and the presence of cellulose-destroying organisms.

8 PREPARATION OF TEST SPECIMENS

8.1 Sampling

A minimum of six specimens for each of the test conditions (unexposed and exposed) shall be sampled in accordance with AS 3706.1. For woven fabrics or other fabrics having anisotropic properties, a minimum of six specimens shall be cut for each of the test conditions requested and for both the machine direction and the cross-machine direction.

Each specimen shall be not less than 250 mm × 50 mm. Where applicable, woven materials shall be prepared as ravelled strips by cutting them wider and removing threads to reduce the width to 50 mm, and to ensure that each specimen of a set has the same number of threads in the longer dimension.

8.2 Conditioning

The specimens shall be conditioned either atmospheric or wet, as required, in accordance with AS 3706.1.

9 TEST CONDITIONS

The test atmosphere shall be in accordance with AS 3706.1.

Wet-conditioned samples shall be tested in the tensile testing machine within 20 min after their removal from the water bath.

10 PROCEDURE

10.1 Unexposed specimens

The procedure shall be as follows:

- (a) Take six specimens (six cut in each direction, if applicable).
- (b) Set up the tensile testing machine as follows:
 - (i) Adjust the distance between the jaws to 200 ± 2 mm. Measure and record the gauge length.
 - (ii) Select the force range of the machine so that the break occurs between 10% and 90% of full-scale force.
 - (iii) Set the machine to an extension rate of 100 mm/min.
- (c) Insert the specimen centrally in the jaws with approximately equal lengths extending beyond the jaws at each end. Take care that the specimen length is parallel to the direction of application of force.
- (d) Start the testing machine and continue running the machine to rupture (i.e. break). For machines with no autographic recorder, record the applied force and corresponding elongation at a number of points up to failure.
- (e) If the specimen slips in the jaws, reject the result. (Jaw slippage may be detected by observing the movement between the jaw and trace of the original internal edge of the jaw marked with a chinagraph pencil, prior to loading.) Test another specimen from the same roll, after the adoption of one of the following procedures:
 - (i) Padding the face of the jaws (e.g. with felt, cork, cloth, or excess sample fabric).
 - (ii) Coating the specimen under the jaw face area.
 - (iii) Modifying the faces of the jaws.