

Australian Standard®

AS 3706.1—2012

Geotextiles—Methods of test

Method 1: General requirements, sampling, conditioning, basic physical properties and statistical analysis

1 SCOPE

This Standard sets out general requirements for the testing of fabrics intended for use as geotextiles. It sets out sampling and conditioning procedures, the methods for the determination of basic physical properties such as length and mass per unit area, and the principles of statistical analysis to be applied to the other Standards in this series, as appropriate.

NOTE: Guidance on statistical analysis is given in Appendix A.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard.

AS

2001	Methods of tests for textiles
2001.1	Method 1: Conditioning procedures
2001.2.12	Method 2.12: Physical tests—Determination of width of fabrics
2001.2.13	Method 2.13: Physical tests—Determination of mass per unit area and mass per unit length of fabrics
2001.2.15	Method 2.15: Physical tests—Determination of thickness of textile fabrics
2490	Sampling procedures and charts for inspection by variables for percent nonconforming
3704	Geotextiles—Glossary of terms
3706	Geotextiles—Methods of test
3706.2	Method 2: Determination of tensile properties—Wide-strip method
3706.3	Method 3: Determination of tearing strength—Trapezoidal method
3706.4	Method 4: Determination of burst strength—California bearing ratio (CBR)—Plunger method
3706.5	Method 5: Determination of puncture-resistance—Drop cone method
3706.6	Method 6: Determination of seam strength
3706.7	Method 7: Determination of pore-size distribution—Dry-sieving method
3706.9	Method 9: Determination of permittivity, permeability and flow rate
3706.10.1	Method 10.1: Determination of transmissivity—Radial method
3706.11	Method 11: Determination of durability—Resistance to degradation by light, heat and moisture
3706.12	Method 12: Determination of durability—Resistance to degradation by hydrocarbons or chemical reagents
3706.13	Method 13: Determination of durability—Resistance to certain microbiological agents

ISO

3933 Textiles—Woven fabrics—Measurement of length of pieces

3 DEFINITIONS

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

4 SAMPLING

4.1 Principle

Bulk samples shall be taken from an identifiable batch in accordance with Clause 4.3, and the results of testing shall apply to that batch. The test sample shall be selected and the test specimens shall be prepared from this sample in accordance with Clause 4.4, and the test specimen shall be marked and stored in accordance with Clause 4.5.

4.2 Apparatus

The following apparatus is required:

- (a) Sharp-edged cutting instrument, preferably a large, strong pair of scissors, or a sharp scalpel that will not tear the sample or affect its properties.
- (b) Straightedge accurate to 1 mm or a suitable template.
- (c) Marking pen that does not use a solvent-based fluid. A pen containing a water-based fluid may be used.

4.3 Selection of the bulk sample

A bulk sample shall be selected using a sampling plan developed in accordance with AS 2490.

4.4 Test specimens

Test specimens shall be taken as follows:

- (a) Take a test sample from the bulk sample, of the length specified in Table 1. Each sample shall be taken across the whole production width of the roll or rolls, and any part within 2 m of either end of the roll and any portion normally trimmed off during the production process shall be excluded.
- (b) Examine the sample. Note and record any abnormalities, variations between different parts of the sample, or other obvious physical defects.
- (c) Disregard any part of the sample that is within 100 mm of any edge of the roll, or any visibly non-representative, soiled, or damaged part.
- (d) Cut separate test specimens as specified in Table 1 and the relevant test method.

NOTE: Where samples are taken from more than one roll (see Clause 4.3), the specimens should be divided up as evenly as possible between those rolls.

Where the required specimens are square or rectangular in shape, cut them so that the edges are—

- (i) for wovens—parallel to the warp or weft directions; or
 - (ii) for non-wovens—parallel and perpendicular to the machine production direction.
- (e) Where more than one specimen is to be cut from one sample, take the specimens as widely spaced as possible over the whole surface of the sample so that their positions are systematically different in the longitudinal and cross-directions. (For woven materials, this implies that no two specimens contain the same warp or weft yarns.)

TABLE 1
REQUIREMENTS FOR TEST SAMPLES AND TEST SPECIMENS

Reference	Test	Sample length* m	Number of test specimens required†
Clause 6(c)	Fabric thickness	1	10
Clause 6(d)	Mass per unit area	1	10
AS 3706.2	Tensile properties	2	10
AS 3706.3	Tearing strength	1	10
AS 3706.4	Burst strength	2	10
AS 3706.5	Puncture resistance	2	10
AS 3706.6	Seam strength	3‡	10
AS 3706.7	Pore-size distribution—dry	1	5
AS 3706.9	Permittivity	1	5
AS 3706.10.1	Transmissivity	1	5
AS 3706.11	Light and heat resistance	3	12
AS 3706.12	Hydrocarbon or chemical resistance	3	12
AS 3706.13	Microbiological resistance	3	12

* Length along roll for full production width.

† These are minimum quantities. Some test methods may require additional test specimens.

‡ Length along the seam.

4.5 Marking and storage

The test specimens shall be—

- (a) marked on the nominated face surface and with the machine direction as applicable;
NOTE: The actual surface that is subject to testing should be marked.
- (b) numbered or otherwise individually identified;
- (c) rolled (where necessary) without folding, creasing or breaking; and
- (d) stored away from light, heat and dust.

5 CONDITIONING AND TESTING ENVIRONMENTS

5.1 General

The four conditioning procedures are as follows:

- (a) Atmospheric conditioning in a standard atmosphere (Clause 5.2).
- (b) Atmospheric conditioning in a non-standard atmosphere (Clause 5.3).
- (c) Wet conditioning (Clause 5.6).
- (d) Dry conditioning (Clause 5.7).

The two testing environments are as follows:

- (i) Standard atmosphere (Clause 5.2).
- (ii) Non-standard atmosphere (Clause 5.3).

Conditioning in accordance with Item (a), Item (c) or Item (d), and testing in the standard atmosphere, shall be the referee method.

5.2 Standard atmosphere

Samples or test specimens shall be conditioned and the test carried out in an air-conditioned room or chamber capable of providing and maintaining the standard atmosphere of $65 \pm 3\%$ relative humidity (RH) at a temperature of $20 \pm 2^\circ\text{C}$, and in accordance with the relevant requirements of AS 2001.1. Where these limits are exceeded, the actual conditions shall be stated on the test report.

5.3 Non-standard atmosphere

In conditions where fine control of the environment is not possible, samples and test specimens shall be conditioned and tests shall be carried out in the atmosphere of the test laboratory. Such atmosphere shall be monitored and temperature-controlled to $20 \pm 2^\circ\text{C}$. Relative humidity (RH) shall be between 40% and 70%.

5.4 Placement of materials for atmospheric conditioning

The material shall preferably be hung or laid flat singly on open wire shelves allowing free access of air to all surfaces. If the material must be folded, all surfaces shall, as far as practicable, be freely exposed to the air.

5.5 Atmospheric conditioning period

The atmospheric conditioning period for the standard atmosphere and for the non-standard atmosphere shall be not less than 24 h or until constant mass is achieved.

5.6 Wet conditioning

For wet conditioning, the samples or test specimens shall be immersed in water at a temperature of $20 \pm 5^\circ\text{C}$ for a minimum of 24 h.

NOTE: To obtain thorough wetting, it may be necessary or advisable to add 0.2 g/L of a non-ionic neutral wetting agent to the water.

5.7 Dry conditioning

For dry conditioning, the samples or test specimens shall be placed in a desiccator until constant mass is attained.

NOTE: A minimum time of 24 h has been found acceptable in most cases.

6 BASIC PHYSICAL PROPERTIES

The physical properties of geotextiles shall be determined in accordance with the appropriate Standards, as follows:

- (a) Roll length.....ISO 3933.
- (b) Roll width..... AS 2001.2.12.
- (c) Thickness AS 2001.2.15, subject to the following variations:
 - (i) The minimum area of the presser foot shall be 2000 mm^2 .
 - (ii) The recommended pressure shall be 2.0 kPa.
NOTE: This is a standardized pressure for testing purposes. In use, a geotextile would normally be under higher pressure.
 - (iii) The coefficient of variation of the thickness shall be determined and reported.
- (d) Mass per unit area.....AS 2001.2.13, subject to the following variations:
 - (i) The number of specimens shall be 10.
 - (ii) The coefficient of variation of the mass per unit area shall also be determined and reported.