

Australian Standard[®]

Geotextiles—Methods of test

Method 6: Determination of seam strength

1 SCOPE

This Standard sets out the method for determining the seam strength of geotextiles.

2 APPLICATION

The method may be used for testing any type of seam or joint, either from manufactured rolls or joints made in situ, whether by stitching, heat-bonding or other means.

3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

3704 Geotextiles—Glossary of terms

3706 Geotextiles—Methods of test

3706.1 Method 1: General requirements, sampling, conditioning, basic physical properties and statistical analysis

3706.2 Method 2: Determination of tensile properties—Wide-strip method

4 PRINCIPLE

A specimen containing the seam is gripped across the entire width in the jaws of a tensile testing machine, which is operated at a prescribed rate of extension. A force (perpendicular to the seam axis) is applied to the specimen until the joint/seam of the geotextile ruptures. A corresponding specimen of unseamed material is tested by the wide strip method (see AS 3706.2). The strength of the seamed specimen, as a percentage of that of the unseamed specimen, gives the seam efficiency.

5 DEFINITIONS

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

5.1 Seam strength

The maximum resistance of the junction formed by stitching or joining two pieces of geotextile.

5.2 Seam efficiency

The tensile strength of a joint or seam between two pieces of geotextile, expressed as a percentage of the tensile strength of the unseamed specimen, as determined by this test.

6 APPARATUS AND REAGENTS

The apparatus and reagents shall be in accordance with AS 3706.2.

7 PREPARATION OF TEST SPECIMENS

7.1 Sampling

A minimum of 10 pairs of test specimens that include the seam or joint shall be sampled in accordance with AS 3706.1.

The specimens shall be cut as follows:

- (a) A minimum of five pairs of specimens with the larger dimension in the machine direction, and the seam running in the cross-machine direction.
- (b) A minimum of five pairs of specimens with the larger dimension in the cross-machine direction, and the seam running in the machine direction.

Each pair of specimens shall be taken as shown in Figure 1, and shall be of such size that both a seamed and unseamed specimen may be prepared therefrom. Each pair of cut test specimens shall be marked as corresponding pairs.

7.2 Size of specimens

7.2.1 Seamed specimen

Each seamed specimen shall be of sufficient length to ensure an initial jaw separation of 100 mm plus the joint or seam width (see Figure 2), and for the ends of the specimen to project not less than 20 mm beyond the jaws. The overall width of the specimen shall be 250 mm.

The seam or joint shall be located along the centre-line of the sample, perpendicular to the direction of the applied load.

For non-woven and composite fabrics, the specimen shall be cut as shown in Figure 3, then enough specimen shall be removed to achieve a nominal width of 200 mm.

For woven and knitted fabrics, cuts shall be made at a distance of 25 mm plus $J/2$ (see Figure 3) from the centre-line, to facilitate the removal of the edge yarns in order to obtain the nominal width of 200 mm.

7.2.2 Unseamed specimen

7.2.2.1 For atmospherically conditioned testing

Each specimen shall be prepared so that it is 200 mm wide (excluding ravelled edge where applicable). The length of the specimen depends on the type of jaw being used. For all jaw types, the length shall be such that the ends of the specimen shall not project less than 20 mm beyond the jaws.

For woven geotextiles, the 200 mm width of the test specimen shall be obtained by cutting the specimen 220 mm wide and removing or ravelling threads from each side alternately until the removal of one more thread will reduce the width below 200 mm. The width of the cut test specimen shall be obtained by cutting in the machine or cross-machine direction, as appropriate.

7.2.2.2 For wet-conditioned and atmospherically conditioned testing

Where the tensile properties are required for both wet-conditioned specimens and atmospherically conditioned specimens, each specimen shall be taken not less than twice as long as required for atmospheric testing (see Clause 7.2.1). Each specimen shall be numbered and cut crosswise into two test specimens of equal length, one for testing the tensile properties of a wet-conditioned specimen, the other for determining the tensile properties of an atmospherically conditioned specimen. Each test specimen shall be numbered so that each pair of tests may be carried out on specimens containing either the same set of yarns (woven materials) or from the same processing area (non-woven materials).

For geotextiles that shrink excessively when wet, it will be necessary to cut the test pieces for wet tensile properties longer than those to be tested after conditioning in the atmosphere. No adjustment or allowance shall be made for any change in width on wetting of the test specimen.

7.2.3 *For wet-conditioned testing*

For geotextiles that shrink excessively when wet, the test pieces for wet tensile properties shall be cut longer than those to be tested after conditioning in the atmosphere. No adjustment or allowance shall be made for any change in width on wetting of the test specimen.

7.3 Conditioning

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

7.4 Marking

There shall be no marks for specimen identification, or for any other purpose, within or at the boundary of the gauge length of any specimen, except that the jaw lines shall be marked, to enable centering of specimens equidistant in the jaws.

8 TEST CONDITIONS

The test atmosphere shall be in accordance with AS 3706.1. Wet-conditioned specimens shall be tested in the tensile testing machine within 20 min after their removal from the water bath.

9 PROCEDURE

9.1 Seamed specimens

Testing shall be in accordance with AS 3706.2. The seamed specimen shall be placed in the jaws in accordance with Figure 2.

For each seamed specimen, record as the strength the maximum force indicated by the autographic recorder chart, microprocessor printout, or applied force readings. Where a number of peak forces are indicated, choose the maximum peak as the strength.

9.2 Unseamed specimens

Testing shall be in accordance with AS 3706.2.

For each unseamed specimen, record as the strength the maximum force indicated by the autographic recorder chart, microprocessor printout, or applied force readings. Where a number of peak forces are indicated, choose the maximum peak as the strength.

10 CALCULATIONS

10.1 Values for individual or paired specimens

10.1.1 *Seam strength*

The seam strength of each specimen that includes a seam or joint shall be calculated from the following equation:

$$(a) \quad S = F \times C \quad \dots 10.1.1(1)$$

where

S = joint or seam strength, in kilonewtons per metre

F = strength of seamed specimen, in kilonewtons

C = constant, calculated from Equation 10.1.1(2) or 10.1.1(3), as appropriate.