Australian Standard®

Geotextiles—Methods of test

Method 3: Determination of tearing strength—Trapezoidal method

FOREWORD

Failure of a geotextile by tear propagation after initial ripping or puncturing is thought to be a possible failure mode in many geotextile applications.

The pattern of failure in tear is different in non-wovens from that in woven fabrics. Failure of woven fabric occurs essentially through the sequential rupture of yarns in tension, whereas the failure of a non-woven fabric is significantly affected by interfibre frictional forces.

METHOD

1 SCOPE This standard sets out the method for determining the tearing strength of geotextiles under in-plane loading, using the trapezoidal method*.

NOTE: The trapezoidal method is a tearing force tension test in which the strength is determined primarily by the individual fibres of the fabric structure, and their bonding or interlocking where applicable.

2 APPLICATION This method is applicable to all types of geotextiles, but has limitations for high-strength materials (i.e. those having a wide-strip tensile strength in excess of approximately 80 kN/m) due to specimens slipping in the jaws.

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

AS
2193 Methods for calibration and grading of force-measuring systems of testing machines

3704 Geotextiles—Glossary of terms

3706 Geotextiles—Methods of test
3706.1 Method 1: General requirements, sampling, conditioning, basic physical properties and statistical analysis

4 PRINCIPLE A trapezoidal outline is marked centrally on a rectangular test specimen. The specimen is gripped along the two non-parallel sides of the trapezoid in the jaws of a tensile testing machine. A continuously increasing force is applied in such a way that the tear propagates across the specimen. The value of the tearing strength of the specimen is obtained from the force/extension curve, and is taken as the maximum force thus recorded.

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 for a Grade B machine in accordance with AS 2193, and having an extension rate of 300 mm/min.

The machine should have an autographic recorder with adequate pen response or an interfaced computer to properly record the force/extension curve.

For machines with no autographic recorder, appropriate measuring instruments are required to allow readings of the applied force and the corresponding extension at a number of points up to failure.

* This method is based on ASTM D 4533-85, Test method for trapezoidal tearing strength of geotextiles. The original ASTM method appears in Volume 04.08 of the *Annual Book of ASTM Standards*, copyright American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103, USA. Copies of this ASTM method or the entire Volume 04.08, may be obtained either from Standards Australia or ASTM direct.