

Australian Standard[®]

Geotextiles—Methods of test

Method 5: Determination of puncture resistance—Drop cone method

PREFACE

This Standard was prepared by the Standards Australia committee CE-020, Geosynthetics, to supersede AS 3706.5—2000.

The determination of the puncture resistance with the drop cone makes use of the modified CBR mould. Evaluating the resistance to puncture, this test is particularly relevant in situations where coarse aggregates or riprap is dropped or pushed against the fabric.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

METHOD

1 SCOPE

This Standard sets out the method for determining the puncture resistance of geotextiles by the drop cone method for both atmospheric and wet-conditioned specimens.

This method is applicable to both woven and non-woven geotextiles.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1289 Methods of testing soils for engineering purposes

1289.6.1.1 Method 6.1.1: Soil strength and consolidation tests—Determination of the California Bearing Ratio of a soil—Standard laboratory method for a remoulded specimen

3704 Geosynthetics—Glossary of terms

3706 Geotextiles—Method of test

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

3 PRINCIPLE

A circular specimen is gripped around its entire circumference by clamps. A specified cone is dropped onto the surface of the specimen. The diameter of the punctured hole, in combination with the drop height, gives a measure of the puncture resistance.

4 DEFINITIONS

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

4.1 Puncture diameter (d_h)

The puncture diameter, in millimetres, corresponding to a test drop height of h .

4.2 Standard puncture diameter (d_{500})

The puncture diameter, in millimetres, corresponding to the standard test drop height of 500 mm.

4.3 Puncture resistance (h_{50})

The drop height, in millimetres, required to obtain a puncture diameter of 50 mm.

5 CALCULATION OF PUNCTURE RESISTANCE

Puncture resistance shall be calculated in accordance with Appendix A.

The puncture resistance may be expressed as either—

- (a) diameter of the hole at a drop height as set out in Clause 6; or
- (b) drop height that will produce a hole of diameter 50 mm.

6 SELECTION OF DROP HEIGHT

The test drop height shall be 250 mm, 500 mm, 750 mm, 1000 mm or 1500 mm, ± 1 mm, measured as the distance from the point of the cone to the surface of the geotextile.

A drop height shall be selected such that a hole diameter greater than or equal to 15 mm and less than 50 mm is achieved.

For weaker materials, a drop height of less than 500 mm shall be used if there is a possibility of the cone totally puncturing the geotextile at the 500 mm test height. For stronger materials, a drop height of up to 1500 mm may be used.

NOTES:

- 1 Greater drop heights are not recommended without due consideration of safety issues.
- 2 Guidance on the selection of a drop height is given in Table 1.

TABLE 1
GUIDE TO SELECTION OF DROP HEIGHTS

Type of geotextile	Mass per unit area, g/m ²	Drop height, mm
Non-woven	<100	250
	$\geq 100 < 350$	500 to 750
	$\geq 350 < 500$	750 to 1000
	>500	1500
Woven	≥ 300	500
	>300	>750

NOTE: Preliminary trial tests may be required, the results of which have to be excluded from the calculation of results.

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