Australian Standard®

Geotextiles—Methods of test

Method 5: Determination of puncture-resistance—Drop cone method

FOREWORD

The determination of the puncture resistance with the drop cone makes use of the modified CBR mould. Evaluating the resistance to tear initiation, this test is particularly relevant in situations where coarse aggregate or riprap is dropped or pushed against the fabric. It is a simple test and requires a minimum of equipment.

METHOD

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

2 APPLICATION. This method is applicable to both woven and non-woven geotextiles and may also be used for geomembranes and composites. It is a useful index test for quality acceptable under field conditions.

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
3706.4	Method 4:	Determination of burst strength—California bearing ratio (CBR) plunger method
1289	Methods of testing soil for engineering purposes	
1289.F1.1	Method F1.1:	Soil strength and consolidation tests—Determination of the California bearing ratio of a soil—standard laboratory method for a remoulded specimen.

4 PRINCIPLE. A circular specimen is gripped around its entire circumference by clamps. A cone of specified mass 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.

The relationship between the drop height and the diameter of the hole has been found, from testing a wide range of geotextiles, to be—

$$d_2 = d_1 \left(\frac{h_2}{h_1}\right)^{0.68} \quad \ldots . \; 4(1)$$

or

$$h_2 = h_1 \left(\frac{d_2}{d_1}\right)^{1.47} \quad \ldots . \; 4(2)$$

where

h_1 = drop height (first value), in millimetres

h_2 = drop height (second value), in millimetres

d_1 = diameter of hole corresponding to a drop height h_1, in millimetres

d_2 = diameter of hole corresponding to a drop height h_2, in millimetres

NOTES:

1. The exponent applying to Equation 4(1) was found to be generally in the range between 0.55 and 0.7. The value of 0.68 was established as the best approximation.