AS 1289.7.1.1:2025

Australian STANDARD®

STANDARDS Australia

Methods of testing soils for engineering purposes

Method 7.1.1: Soil reactivity tests — Determination of soil reactivity — Shrink-swell index

AS 1289.7.1.1:2025

This Australian Standard® was prepared by CE-009, Testing Of Soils For Engineering Purposes. It was approved on behalf of Standards Australia's Standards Development and Accreditation Committee on 08 December 2025.

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Association of Land Development Engineers
Australian Chamber of Commerce and Industry
Austroads
Cement Concrete & Aggregates Australia
Engineering & Construction Laboratories Association
Engineers Australia / Australian Geomechanics Society
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Method 7.1.1: Soil reactivity tests — Determination of soil reactivity — Shrink-swell index

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How to read this Standard

This page explains the meaning of the language and structure of this Standard.

Refer to Standards Australia's Standardisation Guide 006 for more details about drafting rules.

Australian and Australian/New Zealand Standards are voluntary unless they are referenced in legislation or called up in contracts.

Requirements

To conform to a Standard, all requirements in the Standard need to be met.

A requirement is any statement in the Standard which uses the word "shall".

Recommendations, permissions and possibilities

The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.

(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Standard was prepared by the Standards Australia Committee CE-009, Testing of Soils for Engineering Purposes, to supersede AS 1289.7.1.1:2003, *Methods of testing soils for engineering purposes, Method 7.1.1: Soil reactivity tests — Determination of the shrinkage index of a soil — Shrink–swell index*.

The objective of this document is to specify a method for conducting a swell test and a core shrinkage test on companion samples of undisturbed soil. Soil suction determinations are not essential to the method.

The major changes in this edition are as follows:

(a) Revision of equipment usage to accommodate variations from oedometer setup.

(b) Inclusion of shrink vs moisture content and swell vs moisture content plots.

(c) Guidance on determining when swelling is deemed to be complete.

A list of all parts in the AS 1289 series can be found in the Standards Australia online catalogue.

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Introduction

It is recognized that soils across the Australian continent are highly varied and that there are large variations in climatic conditions. These factors can make it difficult to obtain a suitable representative undisturbed soil sample to complete this test, particularly with dry, friable and sandy soil types. Nevertheless, because this test is intended to determine the shrink and swell characteristics of soils upon which structures are to be constructed, it is important that undisturbed samples are used and that these are obtained from a depth that is relevant to the proposed construction. Sampling occurs in accordance with AS 1289.1.3.1. The performance of the *in situ* soil will be influenced by its initial state (effective stresses, density, moisture content), previous geological history (stress and suction history) and structure (cementation, organic content, bioturbation). The effects of geological history and structure will be lost if the soil is remoulded.

This test is not conducted on remoulded specimens because the failure to replicate the *in situ* state results in a scenario that is potentially far from the true *in situ* value and is unlikely to reflect the true performance characteristics, potentially either overestimating or underestimating the true value.

AS 3798 allows for fill platforms to be constructed to Level 1, which is a recompacted fill zone upon which a dwelling may be constructed. The remoulding of these soils is completed to a targeted moisture and compaction level and, as such, an *in situ* undisturbed tube specimen may be obtained to complete the test.

The client determines the validity of the obtained shrink-swell index, and the method employed to achieve it, if it differs from this test method.

AS 2870 provides further guidance on the use, applicability and values used in this method.

To improve the accuracy of this test method, changes have been implemented in this edition to address components of the test apparatus. These changes ensure that the swell sample remains within the cutting ring providing lateral confinement throughout the test. This document addresses this critical element of the test.

Australian Standard®

Methods of testing soils for engineering purposes

Method 7.1.1: Soil reactivity tests — Determination of soil reactivity — Shrink-swell index

1 Scope

This document specifies a method for conducting a swell test and a core shrinkage test on companion samples of undisturbed soil. Soil suction determinations are not essential to the method.

Where *in situ* samples cannot be obtained, this method is not applicable. This test method does not apply to remoulded specimens.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1289.0, *Methods of testing soils for engineering purposes, Part 0: Definitions and general requirements*

AS 1289.2.1.1, *Methods of testing soils for engineering purposes, Method 2.1.1: Soil moisture content tests — Determination of the moisture content of a soil — Oven drying method (standard method)*

AS 1726, *Geotechnical site investigations*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
may
indicates the existence of an option

3.2
shall
indicates that a statement is mandatory

3.3
should
indicates a recommendation

4 Apparatus

The following apparatus is required:

(a) A thin-walled sampler. This is a tube with a bevelled cutting-edge machined directly on the sample tube. The bevelled cutting-edge shall make an angle not exceeding 15° to the axis of the tube with a permitted land width at the cutting edge not exceeding 0.5 mm. The ratio of net projected area of sampler to projected area of sample core shall not exceed 10 %. Any internal clearance shall not exceed 1 % of the diameter at the cutting edge.

(b) A drying oven conforming to AS 1289.0.