

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 1289.7.1.3—1998

Methods of testing soils for engineering purposes

Method 7.1.3: Soil reactivity tests—Determination of the shrinkage index of a soil—
Core shrinkage index

RECONFIRMATION NOTICE

Technical Committee CE-009 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 13 June 2013.

The following are represented on Technical Committee CE-009:

Association of Geotechnical Testing Authorities (Qld)
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NOTES

Australian Standard®

Methods of testing soils for engineering purposes

Method 7.1.3: Soil reactivity tests — Determination of the shrinkage index of a soil — Core shrinkage index

1 SCOPE This Standard sets out a method for determining the shrinkage index of a soil (see AS 2870) by core shrinkage testing.

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

AS

1289 Methods of testing soils for engineering purposes

1289.0 Part 0: General requirements and list of methods

1289.2.1.1 Method 2.1.1: Soil moisture content tests — Determination of the moisture content of a soil — Oven drying method (standard method)

1289.2.2.1 Method 2.2.1: Soil moisture content tests — Determination of the total suction of a soil — Standard method

2870 Residential slabs and footings — Construction

3 APPARATUS The following apparatus is required:

- (a) Thin-walled sampler consisting of 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%, and any internal clearance shall not exceed 1% of the diameter at the cutting edge.
- (b) Drying oven complying with AS 1289.0.
- (c) Balance of 500 g capacity having a limit of performance not exceeding ± 0.05 g.
- (d) Spatula or palette knife of convenient size.
- (e) Vacuum desiccator.
- (f) Metal drawing pins.
- (g) Vernier callipers with a precision of 0.05 mm, capable of measuring lengths 50 to 120 mm.
- (h) Apparatus to measure total soil suction in accordance with that described in AS 1289.2.2.1.
- (i) Drying room with temperature controlled at $23 \pm 2^\circ\text{C}$.
- (j) Supersaturated solution of ammonium chloride (see Note 1).

4 SAMPLE An undisturbed sample shall be obtained from a thin-walled sampler pushed into the soil. The sample shall have a diameter of between 38 and 65 mm. A visual description of the soil shall be recorded.

5 PROCEDURE

5.1 Core shrinkage test The procedure shall be as follows:

- (a) Taking care to minimize loss of moisture, cut the sample to provide a cylindrical core shrinkage specimen of length within the range of 1.5 to 2 diameters.
- (b) Measure and record the average length of the specimen (H_o) with the vernier callipers to the nearest 0.2 mm.
- (c) Determine the initial mass of the specimen (m_o).
- (d) Collect and seal the remaining sample trimmings. Determine the soil suction (u_o) using the sample trimmings according to AS 1289.2.2.1 and determine the moisture content according to AS 1289.2.1.1 of the remainder of the soil. Collect and seal any intact sample core for use in the determination of the moisture content-suction relationship (see Note 2).
- (e) Determine the mass of two drawing pins (m_p). Place a drawing pin firmly into the centre of each end of the specimen. Using the vernier callipers, measure the distance between the rounded heads of the pins (D_o).
- (f) Allow the specimen to rest on a smooth surface in the temperature controlled drying room. Take regular readings of total mass of specimen and pins (m_t) and distance between drawing pins (D_t) at least four times daily (see Note 3). Ensure that the drawing pins are in good contact with the specimen ends by pushing firmly before taking length measurements. Discontinue readings once shrinkage ceases. Record crack development through the specimen. Record the final mass of the specimen and pins (m_f).
- (g) Place specimen in the oven to dry to constant mass at 105° to 110°C.
- (h) Measure the distance between the drawing pins (D_d) and the mass of the specimen and pins (m_d).
- (i) Break the specimen apart and inspect for uniformity and for rock, gravel or organic inclusions. Estimate the percentage by volume of significant inert inclusions.

5.2 Moisture content-suction relationship (moisture characteristic) (see Note 4) The procedure shall be as follows:

- (a) From the remaining core sample retained in accordance with Clause 5.1(d), cut at least two thin discs of soil 3 to 4 mm thick (see Note 5). Place the pair of soil discs in a vacuum desiccator over a supersaturated solution of ammonium chloride of analytical reagent quality (see Note 1). The vacuum desiccator shall be located in the constant temperature room. Monitor mass of the discs to assess when mass equilibrium is reached.
- (b) After mass equilibrium is reached, determine the moisture content of the pair of soil discs in accordance with AS 1289.2.1.1. The corresponding value of soil suction can be assumed to be 5.5 pF.