

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 1289.3.1.2—2009

Methods of testing soils for engineering purposes

Method 3.1.2: Soil classification tests—Determination of the liquid limit of a soil—
One point Casagrande method (subsidiary method)

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 20 January 2017.

The following are represented on Technical Committee CE-009:

Association of Geotechnical Testing Authorities (Qld)
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NOTES

Methods of testing soils for engineering purposes

Method 3.1.2: Soil classification tests— Determination of the liquid limit of a soil—One point Casagrande method (subsidiary method)

This Standard incorporates Amendment No. 1 (October 2015). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

1 SCOPE

This Standard sets out a method for determining the liquid limit of a soil, (that is, the moisture content at which a soil passes from the plastic to the liquid state). The method is a rapid method since it involves taking only one measurement of the moisture content. This method is applicable only to cohesive fine-grained soils. The method may also be used on a sample of soil in its natural state.

NOTE: If it is suspected that the liquid limit is above 120%, the Standard procedure of AS 1289.3.1.1 will apply.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1289	Methods of testing soils for engineering purposes
1289.1.1	Method 1.1: Sampling and preparation of soils—Preparation of disturbed soil samples for testing
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)
1289.3.1.1	Method 3.1.1: Soil classification tests—Determination of the liquid limit of a soil—Four point Casagrande method
1683	Methods of test for elastomers
1683.15.1	Method 15.1: International rubber hardness

3 APPARATUS

The following apparatus is required:

- A thick, flat, rigid mixing plate of suitable size made of non-absorbent material.
- Mixing bowl of convenient size with a suitable close-fitting lid.
- Palette knives of convenient size.
- Liquid limit apparatus conforming in the essential details to the device illustrated in Figure 1 of AS 1289.3.1.1. The base of the liquid limit apparatus shall be made either of four equal-thickness laminations of vulcanized rubber bonded into a block of the dimensions given in Figure 1 or from a single vulcanized rubber block (natural rubber with carbon black loading) finished to the dimensions given in Figure 1. The hardness

A1 | of the finished block, measured on the upper and lower surfaces of the complete block in accordance with AS 1683.15.1, shall be in the range 86 to 94 IRHD.

NOTE: The interval between checking of the hardness of the base and using the apparatus should not exceed 2 years if the hardness lies in the range 91 to 94 IRHD or 3 years if the hardness lies in the range 86 to 90 IRHD.

(e) A grooving tool and gauge similar in essential details to that illustrated in Figure 2 or Figure 3 of AS 1289.3.1.1.

(f) A wash bottle or beaker containing potable water.

NOTE: Water—Some types of clay can be affected by poor or marginal potable water. In such cases, and when testing for reference purposes, distilled, demineralized or deionized water should be used.

4 ADJUSTMENT OF APPARATUS

The apparatus shall be adjusted as follows:

- (a) Inspect the liquid limit apparatus to determine that—
 - (i) the device is clean and dry and in good working order;
 - (ii) the cup falls freely; and
 - (iii) the total side-to-side play at the hinge, when measured at the front of the bowl, does not exceed 3 mm.

(b) Inspect the grooving tool to determine that it is clean and dry and that the width of the tip of the tool does not exceed 2.5 mm.

NOTE: Wear on the grooving tool—When the tip of the grooving tool has worn to a width of 2.5 mm, withdraw the tool from use and either reshape it to the correct dimensions or replace it. It may be found useful to have a standard gauge of the correct dimensions against which the tool can be checked. The cup is subject to wear by the grooving tool and should be replaced when the depth of wear exceeds 0.2 mm.

(c) Adjust the height to which the cup of the liquid limit device is lifted so that when the cup is raised to its maximum height the 10 mm gauge will only just pass between it and the base.

5 PROCEDURE

The procedure shall be as follows:

(a) Obtain a sample of at least 250 g from the material passing the 425 µm sieve, which has been prepared in accordance with AS 1289.1.1, then proceed as follows:

NOTE: Plastic limit sample preparation—If the plasticity index is to be calculated using the results from this test, the same method of preparation should be used for both the liquid limit test and the plastic limit test.

(i) Record the method of preparation.

NOTES:

- 1 Alternative preparation of sample—When no stones are present in the soil and practically all of it passes the 425 µm sieve, it is often convenient to test samples without preparing them as described previously. When a soil is tested in the natural condition, the result will often differ from that obtained with an air-dried or low-temperature (50°C) oven-dried sample.
- 2 If stones are present, use only the material passing the 425 µm sieve. This may be achieved by rubbing the wet soil through the sieve until a sufficient quantity is obtained. The sieve used for this process should not be one of a set used for a particle size analysis, as the rubbing of wet soil through a sieve results in rapid wear of the sieve. This wear, however, will not have any appreciable effect on the liquid limit obtained for the sample under test.