

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 1289.5.4.1—2007

Methods of testing soils for engineering purposes

**Method 5.4.1: Soil compaction and density tests—Compaction control test - Dry
density ratio, moisture variation and moisture ratio**

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 17 December 2015.

The following are represented on Technical Committee CE-009:

Association of Geotechnical Testing Authorities (Qld)
Australian Building Codes Board
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NOTES

Australian Standard®

AS 1289.5.4.1—2007

Methods of testing soils for engineering purposes**Method 5.4.1: Soil compaction and density tests—Compaction control test—Dry density ratio, moisture variation and moisture ratio****1 SCOPE**

This Standard sets out the method for determining the dry density ratio, moisture variation from optimum moisture content and moisture ratio of a soil at a test site. It is applicable to material that contains not more than 20% of material, on a wet basis, retained on the 37.5 mm sieve.

2 NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this document:

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| 1289 | Methods of testing soils for engineering purposes |
| 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) |
| 1289.2.1.2 | Method 2.1.2: Soil moisture content tests—Determination of the moisture content of a soil—Sand bath method (subsidiary method) |
| 1289.2.1.4 | Method 2.1.4: Soil moisture content tests—Determination of the moisture content of a soil—Microwave-oven drying method (subsidiary method) |
| 1289.2.1.5 | Method 2.1.5: Soil moisture content tests—Determination of the moisture content of a soil—Infrared lights method (subsidiary method) |
| 1289.2.1.6 | Method 2.1.6: Soil moisture content tests—Determination of the moisture content of a soil—Hotplate drying method |
| 1289.2.3.1 | Method 2.3.1: Soil moisture content tests—Establishment of correlation—Subsidiary method and the standard method |
| 1289.3.5.1 | Method 3.5.1: Soils classification tests—Determination of the soil particle density of a soil—Standard method |
| 1289.5.1.1 | Method 5.1.1: Soil compaction and density tests—Determination of the dry density/moisture content relation of a soil using standard compactive effort |
| 1289.5.2.1 | Method 5.2.1: Soil compaction and density tests—Determination of the dry density/moisture content relation of a soil using modified compactive effort |
| 1289.5.3.1 | Method 5.3.1: Soil compaction and density tests—Determination of the field density of a soil—Sand replacement method using a sand-cone pouring apparatus |
| 1289.5.3.2 | Method 5.3.2: Soil compaction and density tests—Determination of the field density of a soil—Sand replacement method using a sand pouring can with or without a volume displacer |
| 1289.5.3.5 | Method 5.3.5: Soil compaction and density tests—Determination of the field dry density of a soil—Water replacement method |

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- 1289.5.4.2 Method 5.4.2: Soil compaction and density tests—Compaction control test—Assignment of maximum dry density and optimum moisture content values
- 1289.5.8.1 Method 5.8.1: Soil compaction and density tests—Determination of field density and field moisture content of a soil using a nuclear surface moisture-density gauge—Direct transmission mode

3 APPARATUS

Where oversize material is present, the following apparatus is required:

- (a) Balance with limit of performance not exceeding $\pm 5\text{g}$.
- (b) Device for measuring volume of oversize, comprising—
 - (i) calibrated volumetric cylinder capable of measuring the volume to at least the nearest 5 mL;
 - (ii) syphon can and measuring cylinder to measure water displaced to at least the nearest 5 mL; or
 - (iii) wire basket as described in AS 1289.3.5.1.

4 PROCEDURE

The procedure for each test site shall be as follows:

- (a) Determine the field wet density of the soil (ρ) by one of the methods described in AS 1289.5.3.1, AS 1289.5.3.2, AS 1289.5.3.5 or AS 1289.5.8.1, as appropriate. If appropriate, when using a nuclear gauge, determine the field moisture content (w_f) of the soil.
- (b) Obtain a bulk sample of the soil of sufficient size to determine, as required, field moisture content, maximum dry density, optimum moisture content and percentage and volume of oversize material for the field density test location as follows (see Notes):
 - (i) *Sand replacement tests* During the field density test, obtain the sample from the field density test location. The material excavated from the field density test hole will normally constitute the sample. If this is insufficient, additional material may be obtained by enlarging the density hole laterally about equal to the depth of the field density test hole. The sides of any excavation made to recover such material shall be reasonably vertical. Do not combine this additional material with that taken from the field density test location until all measurements to determine oversize, field moisture content and mass are completed.
 - (ii) *Nuclear gauge tests* After completion of the field density test, obtain the sample by excavating the hole to the depth at which the source rod was located during the test. The hole shall be centred between the nuclear source and detector of the nuclear gauge. If the material excavated is insufficient, additional material may be obtained by enlarging the density hole laterally about equal to the full depth of the hole. The sides of any excavation made to recover such material shall be reasonably vertical.