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Australian Standard®

Methods of testing soils for engineering purposes

Method 5.1.1: Soil compaction and density tests—Determination of the dry density/moisture content relation of a soil using standard compactive effort

AS 1289.5.1.12017

1 SCOPE

This Standard sets out a method for the determination of the relationship between the moisture content and the dry density of a soil, when compacted, using standard compactive effort (596 kJ/m^3). Compaction is conducted over a range of moisture contents to establish the maximum mass of dry soil per unit volume achievable for this compactive effort and its corresponding moisture content. The procedure is applicable to that portion of a soil that passes the 37.5 mm sieve. Soil that passes the 19.0 mm sieve is compacted in a 105 mm diameter mould. Soil that contains more than 20% of material retained on the 19.0 mm sieve is compacted in a 152 mm diameter mould.

This test method may be used for establishing a maximum dry density and optimum moisture content for the determination of other engineering properties.

NOTES:

1 For compaction control testing, the use of alternative test methods such as AS 1289.5.7.1 may be considered.

2 Corrections for oversize material are not covered in this Method but may be made using Method AS 1289.5.4.1 when required for compaction control.

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)
1289.2.1.2	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

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AS
1289.2.3.1 Method 2.3.1: Soil moisture content tests—Establishment of correlation—Subsidiary method and the 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
1289.3.1.2 Method 3.1.2: Soil classification tests—Determination of the liquid limit of a soil—One point Casagrande method (subsidiary method)
1289.3.5.1 Method 3.5.1: Soil classification tests—Determination of the soil particle density of a soil—Standard method
1289.3.9.1 Method 3.9.1: Soil classification tests—Determination of the cone liquid limit of a soil
1289.3.9.2 Method 3.9.2: Soil classification tests—Determination of the cone liquid limit of a soil—One-point method
1289.5.4.1 Method 5.4.1: Soil compaction and density tests—Compaction control test—Dry density ratio, moisture variation and moisture ratio
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
1289.5.7.1 Method 5.7.1: Soil compaction and density tests—Compaction control test—Hilf density ratio and Hilf moisture variation (rapid method)
1289.6.1.1 Method 6.1.1: Soil strength and consolidation tests—Determination of the California Bearing Ratio of a soil—Standard laboratory method for a remoulded specimen

ISO
3310 Test sieves—Technical requirements and testing (series)

3 DEFINITION

For the purpose of this document, the definition below applies:

3.1 Competent person

A person who has acquired, through education, training, qualification or experience, or a combination of these, the knowledge and skill enabling that person to perform the required task correctly and safely.

4 APPARATUS

The following apparatus is required:

(a) Steel moulds, of a size dependent on the maximum size of material being tested, as follows:

(i) *For compaction of material passing a 19.0 mm sieve Mould A*: A cylindrical metal mould having an internal diameter of 105 mm and effective height of 115.5 mm fitted with a detachable baseplate and a removable collar assembly about 60 mm high, both of which can be firmly attached to the mould, complying with the tolerances given in Table 1.

NOTE: A suitable design is shown in Figure 1.

(ii) *For compaction of that fraction of the soil material that passes a 37.5 mm sieve but contains more than 20% of material that would be retained on a 19.0 mm sieve Mould B*: A cylindrical metal mould having an internal diameter of 152 mm and effective height of 132.5 mm fitted with a detachable baseplate and a removable collar assembly about 60 mm high, both of which can be firmly attached to the mould, complying with the tolerances given in Table 1.

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