Australian Standard™

Methods of testing soils for engineering purposes

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

1 SCOPE This Standard sets out the procedure for the determination of the California Bearing Ratio (CBR) of a soil when compacted and tested in the laboratory. The method is applicable to both fine-grained and medium-grained soils as defined in AS 1289.0.

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

AS	
1152	Specification for test sieves
1289	Methods of testing soils for engineering purposes
1289.0	Method 0: General requirements and list of methods
1289.1	Method 1: 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)
1289.5.1.1	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
1289.5.4.2	Method 5.4.2: Soil compaction and density tests—Compaction control tests—Assignment of maximum dry density and optimum moisture content values
2103	Dial gauges and dial test indicators
2193	Methods for calibration and grading of force-measuring systems of testing machines

3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

3.1 Laboratory moisture ratio—the ratio of the moisture content of the specimen to the optimum moisture content of the material as determined on material prepared in accordance with Clause 5(a), as applicable, expressed as a percentage.

3.2 Laboratory density ratio—the ratio of the dry density of the specimen to the maximum dry density of the material as determined on material prepared in accordance with Clause 5(a), as applicable, expressed as a percentage.

4 APPARATUS The following apparatus shall be used:

(a) Steel penetration piston with a 49.6 ±0.1 mm diameter over the length of penetration and at least 150 mm long. The length of the piston will depend upon the number of surcharges and the depth of penetration required.

(b) Loading machine equipped with—

(i) a moveable head or base capable of travelling at a uniform (not pulsating) rate of 1 ±0.2 mm/min for use in forcing the penetration piston into the specimen; and

(ii) a force-measuring device meeting the accuracy and repeatability requirements of AS 2193 Grade C testing machines for the range of forces used in the test. The force-measuring device shall be capable also of indicating seating loads of approximately 50 N and approximately 250 N (see Note 1).

(c) Cylindrical metal mould (see Figure 1) of known volume with an internal diameter 152 ±1 mm, height 178 ±1 mm and wall thickness of at least 5 mm, provided with a metal extension collar and a perforated metal baseplate.

(d) Steel spacer disc (see Figure 2) of 150 ±0.5 mm diameter and 61 ±0.25 mm high, fitted with a removable handle for lifting the disc from the mould.

(e) Compaction apparatus complying with the requirements of AS 1289.5.1.1 or AS 1289.5.2.1, as applicable (see Note 2).

(f) Metal stem and perforated plate with a mass of 1.00 ±0.025 kg (see Figure 3).

(g) Metal surcharges, with each surcharge having a mass of 2.25 ±0.025 kg, a diameter of 150 ±0.5 mm and with a centre hole of 55 ±1.0 mm diameter (see Figure 4 and Note 3).

(h) Two displacement measuring devices e.g. dial gauges capable of measuring the expected range of travel, graduated to 0.01 mm and meeting the accuracy and repeatability requirements of AS 2103.

(i) Sieve, 19 mm and, if required, a 4.75 mm sieve, complying with AS 1152.

(j) Balance of sufficient capacity and limit of performance not exceeding ±5 g.

(k) Jack, lever, frame or other suitable device which shall be used for extruding specimens from the cylinder (optional).

(l) Metal tripod, if swell is to be measured to support the dial gauge or displacement measuring device for measuring the amount of swell during soaking (see Figure 5).

(m) Setting piece, if swell is to be measured and the tripod or displacement measuring device is removed from the mould during the test, to set the reading on the dial gauge or measuring device attached to the metal tripod prior to each reading in the swell test.

(n) Water tank or container capable of maintaining water at a level above the moulds, during soaking.

(o) Other apparatus such as a mixing bowl, straightedge, filter paper and dishes.