**Department of Sustainable Natural Resources**

# SOIL SURVEY STANDARD TEST METHOD

# SOIL MOISTURE CONTENT

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| **ABBREVIATED NAME** | MC |
| **TEST NUMBER** | P1 |
| **TEST METHOD TYPE** | A |
| **VERSION NUMBER** | 1 |
| **ADOPTION DATE** | 1990 |
| **ADOPTION SIGNED** | B Craze |

## RECORD OF AMENDMENTS

| Version | Date | Reason for/Nature of Amendment | Authorised By |
|---|---|---|---|
| Source | | AS1289 B1.1 | |
| 1 | 1990 | Adopted without change from AS1289 B1.1 | B Craze |
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## SCOPE

This method covers the laboratory determination of the moisture content of a soil as a percentage of its oven-dried weight. The method may be applied to fine, medium and coarse grained soils for particle sizes from 2 mm to >10 mm.

## PRINCIPLE

The method is based on removing soil moisture by oven-drying a soil sample until the weight remains constant. The moisture content (%) is calculated from the sample weight before and after drying.

## SPECIAL APPARATUS

**For fine-grained soils (maximum particle size 2 mm)**

- A thermostatically controlled oven preferably of the forced-draught type, capable of maintaining a temperature between 105 °C and 110 °C.
- A balance readable and accurate to 0.01 g. (See Note 1.)
- Numbered aluminium weighing tins with close fitting numbered lids. A suitable size is 75 mm diameter and 25 mm deep.
- A desiccator containing anhydrous self-indicating silica gel. A suitable size is 250 mm diameter.

**For medium-grained soils (maximum particle size 10 mm)**

- An oven as specified above.
- A balance readable and accurate to 0.2 g. (See Note 1.)
- Suitable airtight corrosion-resistant container of about 400 g capacity.
- A scoop.

**For coarse-grained soils (maximum particle size >10 mm)**

- An oven as specified above.
- A balance readable and accurate to 1 g. (See Note 1.)
- Suitable corrosion-resistant container of about 3.5 kg capacity.
- A scoop.

## PROCEDURE

### For fine-grained soils

1. Clean and dry the weighing tin+lid and weigh to 0.01 g ($W_1$). (See Note 2.) Select a representative quantity of moist soil in the amount specified by a test. Where not otherwise specified use at least 30 g. Place the sample in the weighing tin and replace lid. Weigh the tin and contents to 0.01 g ($W_2$). (See Note 3.)

2. Remove the lid and place the tin with contents and lid in the oven and dry to constant weight between 105 °C and 110 °C. (See Notes 4 and 5.)

3. Remove the tin with contents from the oven, replace the lid and place the whole in the desiccator to cool. (See Note 6.)

4. Weigh the tin and contents to 0.01 g ($W_3$). (See Note 7.)

### For medium-grained soils

1. Clean and dry the container and weigh to 0.1 g ($W_1$). (See Note 2.) Place a sample of about 300 g of soil in the container, replace the lid and weigh to 0.1 g ($W_2$).

2. Remove the lid and place the container and lid in the oven and dry between 105 °C and 110 °C (see Notes 3 and 4) to a constant weight. (See Note 5.)

3. After drying, remove the container from the oven, replace the lid and allow to cool.

4. Weigh the container with contents to 0.1 g ($W_3$).

### For coarse-grained soils

1. Clean and dry the container and weigh to 1 g ($W_1$). Place a sample of about 3 kg of soil in the container and weigh to 1 g ($W_2$).

2. Place the container in the oven and dry between 105 °C and 110 °C (see Notes 3 and 4) to a constant weight. (See Note 5.)

3. After drying, remove the container from the oven and allow to cool.

4. Weigh the container with contents to 1 g ($W_3$).

## CALCULATIONS

Calculate the moisture content of the soil as a percentage of the dry soil weight.

$$MC\% = \frac{W_2 - W_3}{W_3 - W_1} x 100$$

Where:

$W_1$ = Weight of tin (g)
$W_2$ = Weight of moist soil + tin (g)
$W_3$ = Weight of dried soil + tin (g)

Where chemical analyses are performed on moist (air-dry) samples, it is convenient to correct the results to an oven-dry basis by use of an appropriate Moisture Factor (MF) calculated as follows:

$$MF = \frac{W_2 - W_1}{W_3 - W_1}$$

or

$$MF = 1 + \frac{MC}{100}$$

## REPORTING THE RESULTS

Report the moisture content of the soil to three significant figures. (See Note 4.)

## REFERENCE

Standards Association of Australia. *AS 1289 B1.1-1977. Determination of the Moisture Content of a Soil: Oven Drying Method (standard method).*

## NOTES

1. The balance to be used in a particular test will depend on the size of the sample. The balance should be accurate to within 0.03% of the weight of the sample.

2. It is convenient to maintain a table of weighing tin weights. Weighing tins should be thoroughly cleaned and re-weighed at least every 6 months. If tins become dirty or tarnished, they should be thoroughly cleaned immediately and re-weighed.

3. The sample may be crumbled to assist drying but care is necessary to avoid loss of any soil.

4. Soils containing gypsum lose water of crystallisation on heating. Therefore, a moisture content determined by this method will be affected by approximately 0.1% for each 1% of gypsum. If it is suspected that gypsum is present in the soil, dry the moisture content samples at not more that 80 °C, for a longer period and report the method used.

5. Checking every moisture content sample to determine that it is dried to a constant weight is impractical. In most cases, drying of a moisture content sample overnight (16 hours) is sufficient. In cases where there is doubt concerning the adequacy of overnight drying, drying should be continued until the difference in weight of the cooled sample after two successive periods does not exceed 0.1% of the original sample weight. Samples of sand may often be dried to constant weight after 7 hours. Since dry soil may absorb moisture from wet samples, dried samples should be removed before placing wet samples in the oven. Drying time should be extended if the oven is full.

6. If the lids of the tins fit well and it is unlikely that the samples are to be left for a considerable time before weighing, the samples need not be placed in the desiccator to cool.

7. Moisture content samples should be discarded and should not be used in any other test.