

DEPARTMENT OF TRANSPORTATION

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**METHOD OF TEST FOR MOISTURE CONTENT OF
SOILS AND AGGREGATES BY OVEN DRYING****A. SCOPE**

This test method describes a procedure for determining the moisture content of soils and aggregates by oven drying the material to a constant weight at a specified temperature.

The moisture content of a given solid material is defined as the ratio, expressed as a percentage, of the weight of the water contained by the material to the dry weight of the material.

B. REFERENCE

California Test 201 – Soil and Aggregate Sample Preparation

C. APPARATUS

1. Balance: a balance or scale sensitive to 0.1 % of the weight of the sample, and having a capacity equal to or greater than the wet weight of the sample to be tested.
2. Drying device: an oven or other suitable thermostatically controlled heating chamber capable of maintaining a temperature of $230^{\circ}\text{F} \pm 9^{\circ}\text{F}$.
3. Container: any pan or other container that will not be affected by the drying temperature, and is suitable for retaining the sample without loss while permitting water to evaporate.

NOTE: A broad shallow pan is normally most suitable for promoting drying. However, a container with a moisture-tight cover is required when the weight of the sample is not determined immediately after preparation or after cooling following the drying period.

D. TEST PROCEDURE

1. Prepare a representative portion of the material to be tested in accordance with California Test 201.
 - a. Unless other amounts are specified, the following minimum sample sizes are suggested.

Material	Minimum Sample Size
Soil	100 g
Fine Aggregate Nominal maximum size of 3/8 in. or smaller	500 g
Coarse Aggregate Maximum particle size larger than 3/8 in. sieve	1000 g
Miscellaneous Materials (straw, chips, etc.)	Sufficient bulk to be representative

- b. When testing lightweight, bulky materials such as straw, hand pack a substantial amount of material into a suitable container having a capacity of approximately 1 gal.
2. Determine the weight of the sample and record this weight as the “wet weight.”
 - a. The most convenient procedure for determining the weight of the sample before and after drying is to place it in a tared container where it will remain throughout the test.
 - b. Determine the weight of the container to be used. Determine the total weight of the container from the total weight to get the “wet weight.”
 3. Dry the sample to a constant weight at $230^{\circ}\text{F} \pm 9^{\circ}\text{F}$.
 - a. The drying time required to achieve constant weight will vary depending on the type, quantity, and condition of the material. In most cases, drying overnight (approximately 16 hr) is sufficient. Large clay lumps may require significantly longer drying time.
 - b. To reduce the drying time, break lumps of material into small fragments and spread in a thin layer over the bottom of the container. Position the container in the oven to allow the maximum air circulation and exhaust of the moisture-laden air.
 - c. Constant weight has been achieved when less than 0.1 % of the sample wet weight is lost during additional drying. If a constant weight has not been achieved, subsequent drying periods must be at least 1 hr.

NOTE: Verification of constant weight will not be necessary for each sample provided the drying time exceeds the minimum time established for similar materials and conditions in the same drying device.

4. Remove the sample from the oven and cool to room temperature.

NOTE: If the weight of the sample is not determined immediately after cooling, place a moisture-tight cover on the container to prevent absorption of moisture from the air.
5. Determine the weight of the sample and record this weight as the “dry weight.”

E. CALCULATION

Determine the moisture content of the sample as follows:

1. Weight of water in sample = wet weight minus dry weight.
2. Percent Moisture = $\frac{\text{Weight of Water}}{\text{Dry Weight of Sample}} \times 100$
3. Report moisture content to the nearest 0.1 %.

F. PRECAUTIONS

The drying rate of samples will be affected by the moisture conditions and number of samples in the oven. When wet samples are placed in the oven with nearly dry samples, the drying time for the nearly dry samples may be extended.

G. HEALTH AND SAFETY

It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Prior to handling, testing or disposing of any materials, testers must be knowledgeable about safe laboratory practices, hazards and exposure, chemical procurement and storage, and personal protective apparel and equipment.

Caltrans Laboratory Safety Manual is available at:

http://www.dot.ca.gov/hq/esc/ctms/pdf/lab_safety_manual.pdf

End of Text
(California Test 226 contains 3 pages)