



TEX-103-E

Determining Moisture Content in Soil Materials



Why

To determine the moisture (water) content of embankment (soils), flexible base, roadway salvaged materials, and treated materials using a conventional oven or a microwave oven.



When

- Item 247
- Item 251
- Item 260
- Item 263
- Item 265
- Item 275
- Item 276
- Special Spec. 3088
- Special Spec. 3089
- Special Spec. 3095



How

Equipment

- Drying oven
- Microwave oven
- Balance
- Oven safe container with lid



- Microwave safe container with lid
- Gloves suitable for handling hot containers
- Desiccator cabinet, or jar, containing silica gel or anhydrous calcium sulfate
- Heat sink, for microwave oven



Preparations

- Sample in accordance with Tex-100-E and split or quarter to the minimum weight listed in Table 1.
- Store test sample in an airtight container at a temperature between 37°F and 86°F, do not store in direct sunlight.
- Always select a representative sample in all cases.
- Make moisture content determination as soon as practical after sampling.

QUICK FACTS: SB 102 DRAFT

Part I: Conventional Oven Method

Procedure

- Select test specimen mass using Table 1.
- Weigh a clean, dry container and lid and record to nearest 0.1 g.
- Place sample in the container at an even layer and cover with lid immediately.
- Weigh and record to the nearest 0.1 g.
- Place container without lid in oven.
- Dry minimum of 16 hours at $230^{\circ} \pm 9^{\circ}\text{F}$.
 - When testing the sample after drying for liquid limit (Tex-104-E) and plastic limit (Tex-105-E) or sulfate content (Tex-145-E), dry at a maximum temperature of 140°F .
 - Dry sample for organic content (Tex-148-E) at a maximum temperature of 104°F .
- After sample has dried to constant weight remove container from oven and place lid on firmly.
- Allow sample and container to cool to room temperature.
- Weigh the container, lid, and sample and record to the nearest 0.1 g.



Part II: Microwave Oven Method

Hazards

- Handle hot containers with insulated container holder, serious burns can result from improper handling.
- **Caution:** Drying soils containing metallic materials may cause arcing in the oven. Highly organic soils and those containing oils and coal may ignite and burn during drying.
- Do not use metallic containers in a microwave oven.
- The use of a microwave oven is acceptable in place of a $230 \pm 9^{\circ}\text{F}$ oven for drying soil specimens.



Procedure

- Weigh a clean, dry container and lid and record to nearest 0.1 g. (not metallic).
- Place sample in the container at an even layer and cover with lid immediately, weigh and record to the nearest 0.1 g.
- The minimum sample weight is 500 g.
- Remove the lid and place the container with the sample and a heat sink in the microwave and run for 3 minutes.
- Weigh the container and sample with the lid and record to the nearest 0.1 g.
- Carefully mix the sample with a spatula.
- Return the sample and container in the microwave for 1 minute.
- Repeat drying, cooling, and weighing, until the change between two consecutive weights 0.1% or less of the initial wet weight of the sample, record to the nearest 0.1 g..

Action

Report

- Report the moisture content to the nearest 0.1%.