

State of Nevada
Department of Transportation
Materials Division

METHOD OF TEST FOR DETERMINING MOISTURE CONTENT OF BITUMINOUS MIXTURES USING MICROWAVE OVENS

SCOPE

This test method provides a rapid field test procedure for determining the moisture content of bituminous mixtures.

APPARATUS

1. Microwave oven, capable of holding a 4,000 g sample.
2. Sample container, capable of holding 600 g (paper, glass or ceramic).
3. Balance, with 1,000 g capacity and sensitive to 0.1 g.
4. Gloves, heat resistant.
5. Glass beaker or plastic container, minimum 600 mL.

SAMPLE PREPARATION

1. Obtain a representative sample per Test Method Nev. T200.
2. Obtain a 500 ± 50 g representative portion of the sample per Test Method Nev. T203.

NOTE: If the bituminous sample is thoroughly dried in an oven overnight, until a constant weight is achieved, then the moisture test is not required and 0% will be placed in the moisture content (MC) field on NDOT form 040-050, make a note that it was oven dried.

PROCEDURE

1. Place 600 mL glass beaker filled with water in the microwave oven, keep the beaker at least half full at all times.
2. Place the sample in a tared sample container and weigh to the nearest 0.1 g.

3. Place the weighed container with sample in the microwave oven and turn the microwave oven on for 5 minutes.
4. After 5 minutes, turn the microwave oven off, remove the container with the sample, weigh the container with the sample to the nearest 0.1 g, and record the weight.
5. Place the container with the sample back in the microwave oven. Change the water in the 600 mL beaker, to avoid the water from boiling over onto the drying sample. Turn the microwave oven on and dry the sample for 2 additional minutes.
6. Remove the container with sample from the microwave oven; weigh to the nearest 0.1 g, and record weight.
7. Repeat steps 5 and 6 until a constant weight is obtained. In most cases, a 10 minute drying period is sufficient.

NOTE: When determining the moisture content of bituminous plantmix, if the sample starts smoking, immediately turn off the microwave oven, weigh and record the sample weight, this will be the end of the moisture test. If smoke is present, then the oil is beginning to burn and the process is complete.

CALCULATIONS

After a constant weight has been obtained, calculate the moisture content of the sample as follows:

$$\% \text{ Moisture Content} = \frac{(\text{Initial Mass (Wet Weight)} - \text{Final Mass (Dry Weight)})}{\text{Final Mass (Dry Weight)}} \times 100$$

REPORT

Record all weights on NDOT form 040-050. Moisture content shall be reported to the nearest 0.01%.

PRECAUTIONS

1. Use gloves for handling hot mixtures when placing in or removing from the microwave oven.
2. Do not use metal containers in the microwave oven at any time. Damage to the microwave oven will occur.
3. When weighing samples, do so with a buffer to avoid error in the balance due to heat transfer. A buffer such as: wooden stakes, sieve pan or other suitable device that can be placed on the balance.
4. The same balance should be used to obtain all the weights for this test method.