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, 1,000 g minimum capacity, sensitive to 0.1 g.
4. Gloves, heat resistant.
5. Glass beaker or plastic container, minimum 600 mL.

SAMPLING

Obtain a representative sample per Test Method Nev. T200.

SAMPLE PREPARATION

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

NOTE: If the bituminous mixture is thoroughly dried in an oven overnight, and a constant weight is achieved, then the moisture test is not required and 0.0 will be placed in the "Initial Mass" field. In remarks, document that the sample was oven dried to a constant weight.

PROCEDURE

1. Place a 600 mL glass beaker or plastic container filled with approximately 300 mL of water (maintain water level during drying) into the microwave oven to prevent overheating during the drying process.

2. Place the sample in a tared sample container and weigh to the nearest 0.1 g.

3. Place the weighed container with the sample in the microwave oven and turn the microwave oven on for approximately 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. Change the water in the 600 mL beaker, to avoid the water from boiling over onto the drying sample. Place the container with the sample back in the microwave oven. Turn the microwave oven on and dry the sample for approximately 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, an approximate 10 minute drying period is sufficient.

   NOTE: When determining the moisture content of bituminous mixture, if the sample starts smoking, immediately turn off the microwave oven, discard the sample and start another moisture with another split of the same sample. If smoke is present, then the oil is beginning to burn, and the moisture test is invalid.

   Microwave ovens vary in wattage, which will vary the drying time. Adjust the drying time appropriately to prevent smoking of the material and to obtain a constant weight.

NOTES

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 shall be used to obtain all the weights for this test method.

CALCULATIONS

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

$$\text{Moisture Correction (MC)} = \frac{(\text{Initial Mass} - \text{Final Mass})}{\text{Final Mass}} \times 100$$

REPORT

Report the “Moisture Correction (MC)” to the nearest 0.01% in the appropriate NDOT Agency View.