1 Scope:

1.1 This method provides a procedure for determining the amount of moisture in either bituminous mixtures or graded aggregates used in bituminous mixtures. Its primary purpose is to provide a rapid field test to permit production control of bituminous mixtures and its use is strictly limited to moisture content determination.

2 Referenced Documents:

AASHTO:
M 231 Weighing Devices Used in the Testing of Materials

MT Materials Manual:
MT 201 Sampling Roadway Materials
MT 202 Sieve Analysis of Fine and Coarse Aggregate
MT 303 Sampling Bituminous Paving Mixtures
MT 309 Reducing Samples of Hot Mix Asphalt to Testing Size
MT 322 Quantitative Extraction of Bituminous Mixtures
MT 607 Reducing Field Samples of Aggregate to Testing Size

3 Apparatus:

3.1 Microwave - oven capable of holding 4000-gram sample.

3.2 Sample containers - capable of holding 600 grams (must be Pyrex, glass, porcelain, ceramic or paper plates).

3.3 Balance - with a 16,000-gram capacity and sensitive to 0.1 gram and conforming to the requirements of M 231.

3.4 Spatula -

3.5 Gloves.

3.6 Airtight container - capable of holding the 2500 to 3000 gram sample.

3.7 Flat pan - approximately 25 x 20 x 3 inches.

4 Sample Preparation:

4.1 Obtain 2500 to 3000 grams of bituminous mix (according to MT 303) or aggregate (according to MT 201).

4.2 Quarter the aggregate into two 500 ± 50 gram samples. Aggregate samples will be reduced in size according to MT 607.

4.3 Bituminous mixtures will be reduced in size according to MT 309, Method B, to two 500 ± 50 gram samples.
5 Procedure:

5.1 Place sample in tared container, and weigh to the nearest 0.1 gram.

5.2 Put sample in microwave oven and turn oven on.

5.3 After 2 minutes, turn the oven off, remove the container and sample, weigh the sample and container to the nearest 0.1-gram, and record the weight.

5.4 Place sample and container back in the oven. Turn oven on, and dry sample for 2 more minutes.

5.5 Remove sample and container from oven, weigh to the nearest 0.1-gram, and record weight.

5.6 Repeat steps 5.4 and 5.5 until a constant weight is obtained.

6 Calculations:

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

\[
\text{Percent of Initial Moisture} = \frac{M_f - M_i}{M_f} \times 100
\]

Where - 

- \( M \) = % Moisture

- \( M_i \) = initial, moist mass

- \( M_f \) = final, dry mass

Example - \( M_i = 541.2g \)

\( M_f = 536.0g \)

Moisture Content = \( \frac{541.2g - 536.0g}{536.0g} \times 100 = 0.970 \), say 0.97%

6.2 If the moisture contents of the two samples differ by more than 0.2%, the test is invalid. In this case new samples must be prepared and the test rerun.

6.3 Record the moisture content as the average of the two samples.

7 Precautions:

7.1 Use gloves for handling hot mixtures during quartering and when placing in or removing from oven.

7.2 Do not use metal containers in oven at any time. Damage to the oven will occur.

7.3 Do not delay getting sample into oven after sampling. (If a delay of 15 minutes or more is anticipated, samples must be placed into and kept in sealed containers. For reliable results, all samples should be tested within 1 hour of sampling).

7.4 **DO NOT USE** the moisture content sample for additional testing.