

**METHODS OF SAMPLING AND TESTING**  
**MT 221-06**  
**TOTAL EVAPORABLE MOISTURE CONTENT OF AGGREGATE BY DRYING**  
*(Modified AASHTO T 255)*

**1 Scope:**

- 1.1** This test method covers the determination of the percentage of evaporable moisture in a sample of aggregate by drying both surface moisture and moisture in the pores of the aggregate. Some aggregate may contain water that is chemically combined with the minerals in the aggregate. Such water is not evaporable and is not included in the percentage determined by this test method.
- 1.2** The values stated in SI units are to be regarded as the standard. The values stated in parentheses are provided for information only.

**2 Referenced Documents:**

**2.1 *MT Materials Manual:***

MT-201 Sampling Roadway Materials  
MT-202 Sieve Analysis of Fine and Coarse Aggregate  
MT-203 Unit Weight of Aggregate  
MT-204 Specific Gravity and Absorption of Fine Aggregate  
MT-205 Specific Gravity and Absorption of Coarse Aggregate

**3 Apparatus:**

- 3.1** *Balance* – The balance shall have sufficient capacity, be readable to 0.1 percent of the sample mass, or better.
- 3.2** *Source of Heat* – A ventilated oven capable of maintaining the temperature surrounding the sample at  $110 \pm 5^{\circ}\text{C}$  ( $230 \pm 9^{\circ}\text{F}$ ). Where close control of the temperature is not required, other suitable sources of heat may be used, such as an electric or gas hot plate, electric heat lamps, or a ventilated microwave oven.
- 3.3** *Sample Container* – A container not affected by the heat, and of sufficient volume to contain the sample without danger of spilling, and of such shape that the depth of the sample will not exceed one-fifth of the least lateral dimension.
- 3.4** *Precaution* – When a microwave oven is used, the container shall be non-metallic.

*Note 1* – Except for testing large samples, an ordinary frying pan is suitable for use with a hot plate, or any shallow flat-bottomed metal pan with heat lamps or oven. Note precaution in Section 3.4.

- 3.5** *Stirrer* – A metal spoon or spatula of convenient size.

**4 Sample:**

- 4.1** Sampling shall be in accordance with MT-201, except the sample size may be as stated in Table 1.

**4 Sample:** (continued)**Table 1 – Sample Size for Aggregate**

Nominal Maximum size of Aggregate mm (1n.)	Mass of Normal Weight Aggregate Sample, Min. kg. (lb)
4.75 (No. 4)	0.5 (1.1)
9.5 (3/8)	1.5 (3.3)
12.5 (1/2)	2 (4)
19.0 (3/4)	3 (7)
25.0 (1)	4 (9)
37.5 (1 ½)	6 (13)
50 (2)	8 (18)
63 (2 ½)	10 (22)
75 (3)	13 (29)
90 (3 ½)	16 (35)
100 (4)	25 (55)
150 (6)	50 (110)

**4.2** Secure a sample of the aggregate representative of the moisture content in the supply being tested and having a mass not less than the amount listed in Table 1. Protect the sample against loss of moisture prior to determining the mass.

**5 Procedure:**

**5.1** Determine the mass of the sample to the nearest 0.1 percent.

**5.2** Dry the sample thoroughly in the sample container by means of the selected source of heat, exercising care to avoid the loss of any particles. Very rapid heating may cause some of the particle to explode, resulting in loss of particles. Use a controlled temperature oven when excessive heat may alter the character of the aggregate, or where more precise measurement is required. If a source of heat other than the controlled temperature oven is used, stir the sample during drying to accelerate the operation and avoid local overheating. When using a microwave oven, stirring of the sample is optional.

**5.2.1** *Caution:* When using a microwave oven, occasionally minerals are present in aggregates that may cause the material to overheat and explode. If this occurs, it can damage the microwave oven.

**5.3** The sample is thoroughly dry when further heating causes, or would cause, less than 0.1 percent additional loss in mass.

**5.4** Determine the mass of the dried sample to the nearest 0.1 percent after it has cooled sufficiently not to damage the balance.

**6 Calculation:**

**6.1** Calculate total evaporable moisture content as follows:

$$P = 100(W - D)/D$$

where:

$P$  = total evaporable moisture content of sample, percent;

**6 Calculation:** (continued)

$W$  = mass of original sample, g;

$D$  = mass of dried sample, g.

**6.2** Surface moisture content is equal to the difference between the total evaporable moisture content and the absorption, with all values based on the mass of a dry sample.

*Note 2 - Absorption may be determined in accordance with MT-204, Specific Gravity and Absorption of Fine Aggregate, and MT-205, Specific Gravity and Absorption of Coarse Aggregate*