TOTAL MOISTURE CONTENT OF AGGREGATE BY DRYING

AASHTO T 255

SCOPE

The moisture content in aggregate is used to determine the binder content for HMA during production of the mixture in a plant. The procedure requires that a known amount of aggregate be obtained, the aggregate heated to remove the moisture, and the percentage of moisture determined. Ovens, hot plates, heat lamps or microwave ovens are used for heating the sample.

SUMMARY OF TESTS

Apparatus

Balance, general purpose class G_2 (AASHTO M 231)

Source of Heat, oven capable of maintaining a temperature of 239 ± 9°F (110 ± 5°C), electric or gas hot plate, electric heat lamps, or microwave oven

Sample Container, suitable for method of heating

Heat Sources for Aggregate Drying

There are several alternatives to chose from when drying aggregates.

Hot Plate

The hot plate is an excellent choice for heating when in a hurry; however, care should be taken to avoid excessive localized overheating and fracturing of aggregates. If fracturing of the aggregate occurs, another sample is required. When a hot plate is used, the sample is stirred repeatedly while observing the state of the aggregate. Some types of aggregate will not tolerate the high localized heat and may fracture despite the best of care. In this case, an oven should be used.

Oven

The most common heat source is an oven set at 230 ± 9°F (110 ± 5°C). An oven is a good choice when time is not of the essence. Samples dried in the oven, depending on the type of container used and the moisture content of the sample, may take anywhere from one to several hours to dry to a constant weight. The benefit of using an oven is that sensitive aggregates will not likely overheat and fracture.

Microwave

The microwave oven is a quicker solution than a hot plate, except that microwave drying will often fracture and pop the aggregate particles. Some experimentation will be necessary to ensure the best settings for the material, to avoid this situation. The microwave should not be used where there is metal or metal oxides present in the aggregate.

Sample

The aggregate sample shall be obtained in accordance with AASHTO T 2 and protected against loss of moisture prior to determining the weight. An air-tight container or plastic bag is best for this purpose. The size of sample shall be as follows:

Nominal Maximum Size	Minimum Sample Weight lb(kg)
No. 4 (4.75 mm)	1.1 (0.5)
3/8 in. (9.5 mm)	3.3 (1.5)
1/2 in. (12.5 mm)	4.4 (2)
3/4 in. (19.0 mm)	6.6 (3)
1 in. (25.0 mm)	8.8 (4)
1 1/2 in. (37.5 mm)	13.2 (6)
2 in. (50.0 mm)	17.6 (8)

Procedure

1. Weigh the sample and record the weight (W)

2. Dry the sample until there is less than 0.1% change in weight over subsequent weighings.

3. Record the weight (D) or the sample after the sample has cooled sufficiently not to damage the balance.

Calculations

The calculation for moisture content (P) is as follows:

$$P = 100 \frac{(W - D)}{D}$$

where:

P = moisture content of sample, %
W = original wet weight of sample, gms
D = dry weight of sample, gms

Example:

W = 546.2 gms. D = 541.2 gms

$$P = 100 \frac{(546.2 - 541.2)}{541.2}$$

$$P = \frac{500}{541.2}$$

P = 0.92%, record as 0.9%

The moisture content is calculated to the nearest first decimal place (0.0).