Standard Method of Test for

Specific Gravity and Absorption of Aggregate by Volumetric Immersion Method

AASHTO Designation: T 354-17[1]

Technical Section: 1c, Aggregates

Release: Group 3 (August 2017)

AASHTO

American Association of State Highway and Transportation Officials
444 North Capitol Street N.W., Suite 249
Washington, D.C. 20001

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1. SCOPE

1.1. This method covers the determination of bulk and apparent specific gravity and absorption of fine and coarse aggregate at 20 ± 1°C (70 ± 2°F) for dry and saturated aggregates.

1.2. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user of this procedure to consult and establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to its use.*

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- M 231, Weighing Devices Used in the Testing of Materials
- R 76, Reducing Samples of Aggregate to Testing Size
- T 2, Sampling of Aggregates
- T 19M/T 19, Bulk Density ("Unit Weight") and Voids in Aggregate
- T 84, Specific Gravity and Absorption of Fine Aggregate
- T 85, Specific Gravity and Absorption of Coarse Aggregate
- T 255, Total Evaporable Moisture Content of Aggregate by Drying

3. SIGNIFICANCE AND USE

3.1. Bulk specific gravity is the characteristic generally used for calculations of the volume occupied by the aggregate in various mixtures containing aggregate including portland cement concrete (PCC), bituminous concrete, and other mixtures that are proportioned or analyzed on an absolute volume basis. Bulk specific gravity is also used in the computation of voids in aggregate in T 19M/T 19. Bulk specific gravity determined on the saturated surface-dry basis is used if the aggregate is wet, that is, if its absorption has been satisfied. Conversely, the bulk specific gravity determined on the oven-dry basis is used for computations when the aggregate is dry or assumed to be dry.

3.2. Apparent specific gravity pertains to the relative density of the solid material making up the constituent particles not including the pore space within the particles that is accessible to water. This value is not widely used in construction aggregate technology.

3.3. When it is deemed that the aggregate has been in contact with water long enough to satisfy most of the absorption potential, the absorption values are used to represent the change in the mass of an aggregate due to water absorbed into the pore spaces within the constituent particles, compared to the dry condition. The laboratory standard for absorption is that obtained after submerging dry aggregate for approximately 15 h in water. Aggregates mined from below the water table may have a higher absorption when used, if not allowed to dry. Conversely, some aggregates when used may contain an amount of absorbed moisture less than the 15-h soaked condition. For an aggregate that has been in contact with water and that has free moisture on the particle surfaces, the percentage of free moisture can be determined by deducting the absorption from the total moisture content determined by T 255 drying.

3.4. Users of this method are encouraged to be cautious in applying the results. Unadjusted values achieved for specific gravity and absorption can be significantly different from those achieved from T 84 and T 85. Results from this method will affect the calculated results for volumetrics in hot mix asphalt (HMA) and absorption in PCC. When using the results from this test for pay factor and/or compliance purposes, the user is required to adjust the absorption and specific gravity values in accordance with Section 13. A graphical method and source/aggregate specific correlation method are shown in Annex B that can be used to correlate results to T84 and T85.

4. APPARATUS

4.1. *Flask with Plug for Coarse Aggregate*—A glass flask with a bulb volume of 3000 to 4000 mL and a separate plug. The neck of the flask shall be marked with 5 mL graduated increments that correspond to a precision of at least 0.1 percent of the sample volume. Overall length of the flask is approximately 760 mm (30 in.) (see Note 1 and Figure 1).

4.2. *Flask for Fine Aggregate*—A glass flask with a bulb volume of 2000 mL. The neck of the flask shall be marked with 1 mL graduated increments that correspond to a precision of at least 0.1 percent of the sample volume. Overall length of the flask is approximately 760 mm (30 in.) (see Note 1 and Figure 1).

Note 1—The flask to be used for fine aggregate will have a neck approximately 25 mm (1 in.) in diameter. The flask used for coarse aggregate will have a neck approximately 51 mm (2 in.) in diameter.

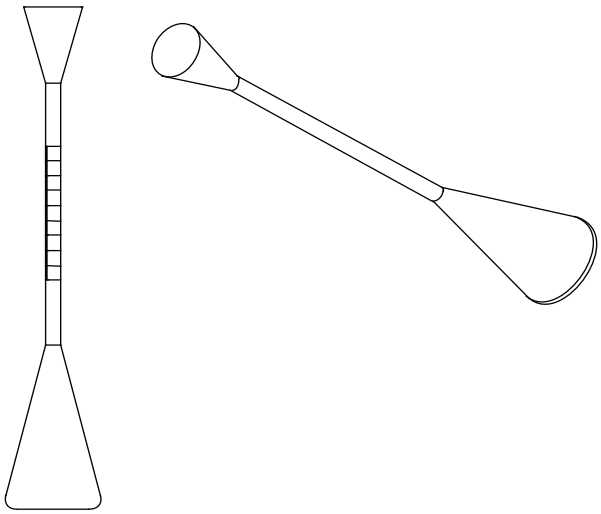

Figure 1—Typical Flask