

State of Nevada  
Department of Transportation  
Materials and Testing Division

METHOD OF TEST FOR SPECIFIC GRAVITY  
AND ABSORPTION OF COARSE AGGREGATE

SCOPE

This test method, which is a modification of AASHTO Designation T85, specifies procedures for the determination of the bulk and apparent specific gravity, and absorption of coarse aggregates, and is designed for the use in the Headquarters, Progress, and Field Laboratories.

The oven-dry basis calculation for bulk specific gravity shall be used for the determination of the specific gravity of riprap aggregates, and is also used for bituminous mix aggregates. The saturated surface-dry basis calculation for bulk specific gravity is used for portland cement concrete aggregates. The apparent specific gravity is used in determining the calculated maximum density, Nev. T101

A. APPARATUS

1. A balance having a capacity of at least 5,500 g. and sensitive to 0.5 g. or less and accurate within 0.1 percent of the test load at any point within the range used for the test.
2. A wire basket made of 3.35mm (No. 6) or 2.36mm (No. 8) mesh, and dimensions such that the basket will have sufficient capacity for samples up to 5,500 g. maximum. A generally satisfactory size is 203.2mm x 203.2mm x 114.3mm (8 x 8 x 4-1/2 in.) deep.
3. A container of sufficient size to allow the wire mesh basket to be completely immersed. A copper tank, 292.1mm x 355.5mm x 203.2mm (11-1/2 x 14 x 8 in.) deep is satisfactory for the 203.1mm sq. (8-in. sq.) basket described above.
4. Suitable apparatus for suspending the immersed basket from the balance so that the weight of the aggregate in water can be obtained.
5. Vessels, each of approximately 7.6 liters (2-gallon) capacity, that are deep enough to permit immersing entire sample during soaking period.

B. TEST RECORD FORM

Record the test data on worksheet

C. PREPARATION OF SAMPLE

Obtain approximately 5,000 g. of the coarse aggregate (retained on 4.75 mm (No. 4) sieve) either by careful quartering or by the use of an accurate mechanical sample reducer. (Refer to Test Method Nev. T203.)

D. TEST PROCEDURE

1. Place sample in vessel, cover with water at a temperature of  $23 \pm 1.7^\circ$  C. ( $73.4 \pm 3^\circ$  F.) and allow to soak for a minimum period of 15 hrs.
2. Pour sample into wire basket, rinse clean, suspend the wire basket from the center of the balance scale pan, immerse basket completely in the water at  $23 \pm 1.7^\circ$  C. ( $73.4 \pm 3^\circ$  F.) use suitable tare weight, and weigh to nearest gram. Record weight as Weight of Sample in Water.
3. Remove basket, drain off free water for a few seconds, then pour sample out of basket onto large absorbent cloth, and roll the sample in the cloth until all visible films of water are removed, although the surface of the particles may still appear to be damp. Large aggregate particles may be individually wiped in lieu of rolling in cloth. In order to avoid evaporation of absorbed water, perform this surface drying operation as rapidly as possible and then immediately weigh to the nearest gram. Record weight as Weight of Saturated Surface-dry Sample in air.
4. Pour sample into suitable drying pan, dry sample to constant weight in oven at a temperature of  $110 \pm 5^\circ$  C. ( $230 \pm 9^\circ$  F.), cool to room temperature, for 1 to 3 hours, pour sample into balance, use suitable tare weight, and weigh to nearest gram. Record weight as Oven-dry Weight.

E. CALCULATIONS

1. Calculate the bulk specific gravity, oven-dry basis, from the following formula:

$$\text{Bulk specific gravity (oven-dry basis)} = \frac{A}{B - C}$$

Where:

A= weight in grams of sample in oven-dry condition

B= weight in grams of sample in saturated surface-dry condition, and

C= weight in grams of saturated sample immersed in water

2. Calculate the bulk specific gravity, saturated surface-dry basis, from the following formula:

$$\text{Bulk specific gravity (saturated surface-dry basis)} = \frac{B}{B - C}$$

3. Calculate the apparent specific gravity from the following formula:

$$\text{Apparent specific gravity} = \frac{A}{A - C}$$

4. Calculate the percentage of absorption from the following formula:

$$\text{Percent absorption} = \frac{B - A}{A} \times 100$$

F. PRECAUTIONS

When tare weights are used to compensate the weight of the basket and/or apparatus used to suspend the basket from the balance, be certain the correct tare weight is used.

G. REPORTING THE RESULTS

Report the specific gravities to the nearest hundredth (2.65, 2.52, etc.), and absorptions to the nearest tenth (1.4, 2.3, etc.).

Test Method Rev. T111D

REFERENCE

AASHTO Designation T85