

**DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF ENGINEERING SERVICES**  
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## METHOD OF TEST FOR SPECIFIC GRAVITY AND ABSORPTION OF COARSE AGGREGATE

**CAUTION:** Prior to handling test materials, performing equipment setups, and/or conducting this method, testers are required to read “**SAFETY AND HEALTH**” in Section H of this method. It is the responsibility of the users of this method to consult and use departmental safety and health practices and determine the applicability of regulatory limitations before any testing is performed.

### A. SCOPE

This test method, which is a modification of AASHTO Designation: T 85, specifies procedures for the determination of the bulk and apparent specific gravities and absorption of coarse aggregate.

### B. APPARATUS

1. A balance having a capacity of at least 5500 g sensitive to 1 g or less.
2. A wire mesh basket made of No. 8 mesh, and of sufficient capacity for samples weighing up to 5500 g.
3. Immersion tank of sufficient size to allow the wire mesh basket to be completely immersed. The immersion tank and balance shall be arranged in a manner that will allow weighing the wire mesh basket and test sample while immersed.
4. Corrosion-resistant containers with a capacity of approximately 2-gallons.

### C. PREPARATION OF SAMPLE

1. Rock Slope Protection: Crush the submitted sample to pass the 1½ inch sieve. Then sieve the crushed material over the 1½ inch, 1 inch, and ¾ inch sieves. Prepare a

test specimen weighing 5000 ± 500 g by combining equal mass of the 1½ inch by 1 inch and 1 inch by ¾ inch sieve size fractions of material.

2. All Other Materials: Prepare a representative 5000 ± 500 g portion of the retained No. 4 sieve size material for testing.

### D. TEST PROCEDURE

1. Place sample in 2 gallon container, cover with water at a temperature of 60°F to 80°F, and soak for a minimum period of 15 h.
2. Transfer the sample to the wire basket and rinse clean with fresh water.
3. Suspend the wire basket from the balance immersing the basket and sample completely in water and weigh to the nearest gram.
  - a. Record the mass as “Mass of Sample in Water.”
4. Transfer the sample onto a large absorbent cloth and remove all visible films of water.

- a. Surface water can be removed by rolling the sample in the cloth or by blotting with a towel.
  - b. Large aggregate particles may be individually wiped with a cloth towel.
5. Weigh the sample to the nearest gram.
- a. Record the mass as "Mass of saturated surface-dry sample in air."
  - b. Avoid loss of absorbed water by drying the sample to surface dry condition as rapidly as possible and then weighing immediately.
6. Transfer the sample to a suitable container and dry to constant mass at  $230 \pm 9^\circ\text{F}$ .
7. Cool to room temperature and weigh to nearest gram.
- a. Record the mass as "Oven-dry mass."

#### E. CALCULATIONS

1. Description of factor:  
  
A = mass in grams of sample in oven-dry condition,  
B = mass in grams of sample in saturated surface-dry condition, and  
C = mass in grams of saturated sample immersed in water.
2. Bulk specific gravity (oven-dry basis).
  - a. Use this procedure for bituminous mix aggregates, aggregate base and cement treated base aggregate.
  - b. Specific Gravity =  $A/(B-C)$
3. Bulk specific gravity (saturated surface-dry basis).
  - a. Use this procedure for portland cement concrete aggregates.

- b. Specific Gravity =  $B/(B-C)$
4. Bulk specific gravity (apparent).
  - a. Use this procedure for rock slope protection.
  - b. Specific Gravity =  $A/(A-C)$
5. Absorption
  - a. Percent Absorption =  $[(B-A)/A] \times 100$

#### F. PRECAUTIONS

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

#### G. REPORTING OF RESULTS

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

#### H. SAFETY AND HEALTH

Aggregates may contain bacteria and/or organisms, which can be harmful to one's health. The wearing of dust masks and protective gloves when handling materials is advised.

Dust, noise, lifting, and the operation of equipment are encountered in this testing procedure. It is not possible to completely eliminate these risks, but steps should be taken to minimize them as much as possible.

The use of dust collection units and the spraying of workroom floors with dust palliatives are very effective methods of reducing dust conditions.

The use of earplugs or earmuffs is recommended when operating noisy equipment. Enclosures built around noisy equipment can eliminate much of the noise. The use of sound deadening material should be utilized when appropriate.

Guards or shields should be provided around dangerously exposed moving parts of machinery. Also, personnel should be instructed in the proper operation of each machine and in proper lifting methods. The use of back support braces and table-height carts to move materials can eliminate much of the lifting.

It is also required that heat resistant gloves/mitts or potholders be used to remove samples from the ovens.

Prior to handling, testing or disposing of any materials, testers are required to read the following portions of Caltrans Laboratory Safety Manual: Part A, Section 5.0, Hazards and Employee Exposure; Part B, Sections: 5.0, Safe Laboratory Practices; 6.0, Chemical Procurement Distribution and Storage; and 10.0, Personal Protective Apparel and Equipment; and Part C, Section 1.0, Safe Laboratory Practices. Users of this method do so at their own risk.

**REFERENCES:**

**AASHTO Designation: T 85**

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**(California Test 206 contains 3 Pages)**