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

### **A. SCOPE**

This test method describes the procedures for the determination of the bulk and apparent specific gravities and absorption of coarse aggregate.

### **B. REFERENCES**

California Test 226 – Moisture Content of Soils and Aggregates by Oven Drying  
AASHTO T 85 – Specific Gravity and Absorption of Coarse Aggregate  
ASTM C 127 – Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate

### **C. APPARATUS**

1. Balance: a balance or scale having a capacity of at least 5500 g and sensitive to 1 g or less.
2. Wire Mesh Basket: a wire mesh basket made of No. 6 or finer mesh, and of sufficient capacity for samples weighing up to 5500 g.
3. Immersion Tank: immersion tank of sufficient size to allow the wire mesh basket to be completely immersed. The immersion tank and balance must be arranged in a manner that allows weighing the wire mesh basket and test sample while immersed. The tank must be equipped with an overflow outlet for maintaining a constant water level.
4. Containers: corrosion-resistant containers with a capacity of approximately 2 gal.

### **D. PREPARATION OF SAMPLE**

1. Rock Slope Protection: crush the submitted sample to pass the 1½ in. sieve. Then sieve the crushed material over the 1½ in., 1 in., and ¾ in. sieves. Prepare a test specimen weighing 5000 g ± 500 g by combining equal portions of the 1½ in. × 1 in. and 1 in. × ¾ in. sieve size fractions of material.
2. All Other Materials: prepare a representative 5000 g ± 500 g sample of the material retained on the No. 4 sieve.

### **E. TEST PROCEDURE**

1. Dry the sample in a suitable pan or vessel to constant weight at 230°F ± 9°F in accordance with California Test 226.

NOTE: Where the absorption and specific gravity values are to be used in proportioning concrete mixtures in which the aggregates will be in their naturally moist condition, the requirement for initial drying to constant

weight may be eliminated; and, if the surfaces of the particles in the sample have been kept continuously wet until test, the 24-hr soaking may also be eliminated.

2. Allow the sample to cool to comfortable handling temperature, place in a suitable container and cover with water at  $70^{\circ}\text{F} \pm 10^{\circ}\text{F}$ , and soak for a period of  $24 \text{ hr} \pm 4 \text{ hr}$ .
3. Transfer the sample to the wire mesh basket and rinse clean with fresh water.
4. Suspend the wire mesh basket from the balance immersing the wire mesh basket and sample completely in water (with density of  $62.24 \text{ lb/ft}^3 \pm 0.12 \text{ lb/ft}^3$ ) at  $73^{\circ}\text{F} \pm 3^{\circ}\text{F}$ , and weigh to the nearest gram. Take care to remove all entrapped air before determining the weight by shaking the container while immersed.
  - a. Record the weight to the nearest gram as "Weight of Sample in Water."
5. 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.
6. Weigh the sample to the nearest gram.
  - a. Record the weight as "Weight 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.
7. Transfer the sample to a suitable container and dry to constant weight at  $230^{\circ}\text{F} \pm 9^{\circ}\text{F}$  in accordance with California Test 226.
8. Cool to room temperature or until the aggregate has cooled to a temperature that is comfortable to handle and weigh to nearest gram.
  - a. Record the weight as "Oven-dry Weight."

## F. CALCULATIONS

1. Description of factors:

A = oven-dry weight, in grams

B = saturated surface-dry weight, in grams

C = weight of saturated sample immersed in water, in grams

2. Bulk specific gravity (oven-dry basis),  $G_c$ .

Use this procedure for hot mix asphalt aggregates, aggregate base, and cement treated base aggregate.

$$\text{Specific Gravity} = \frac{A}{(B - C)}$$

3. Bulk specific gravity (saturated surface-dry basis).

Use this procedure for portland cement concrete aggregates.

$$\text{Specific Gravity} = \frac{B}{(B - C)}$$

4. Bulk specific gravity (apparent).

Use this procedure for rock slope protection.

$$\text{Specific Gravity} = \frac{A}{(A - C)}$$

5. Absorption

$$\text{Percent Absorption} = \left[ \frac{(B - A)}{A} \right] \times 100$$

#### **G. PRECAUTIONS**

When tare weight is used to compensate for the weight of the suspended basket, be certain the correct tare weight is used.

#### **H. REPORTING OF RESULTS**

Report specific gravities to the nearest hundredth (i.e., 2.65, 2.52, etc.), and absorptions to the nearest tenth (i.e., 0.8, 1.3, etc.).

#### **I. HEALTH AND SAFETY**

It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Prior to handling, testing or disposing of any materials, testers must be knowledgeable about safe laboratory practices, hazards and exposure, chemical procurement and storage, and personal protective apparel and equipment.

Caltrans Laboratory Safety Manual is available at:

[http://www.dot.ca.gov/hq/esc/ctms/pdf/lab\\_safety\\_manual.pdf](http://www.dot.ca.gov/hq/esc/ctms/pdf/lab_safety_manual.pdf)

**End of Text**  
**(California Test 206 contains 3 pages)**