

State of Nevada
Department of Transportation
Materials and Testing Division

METHOD OF TEST FOR BULK SPECIFIC
GRAVITY (S.S.D.) AND ABSORPTION OF
COARSE AGGREGATE FOR CONCRETE

(FIELD METHOD)

SCOPE

This test method, which is a modification of AASHTO Designation T85, describes a rapid procedure used in the field for determining the bulk specific gravity (saturated surface dry condition) and absorption of coarse aggregate. The bulk specific gravity is the value desired for calculations in connection with portland cement concrete.

A. APPARATUS

1. A balance having a capacity of 20,000 grams and sensitive to 1 gram. A satisfactory balance is an "Ohaus" Metric Solution Balance.
2. A galvanized water pail of 12- to 14-quart (11.35 to 13.24 litres) sizes.
3. A suitable container for the immersion of the pail and sample in water. A 20-inch (508.0 mm) diameter garbage can about 24 inches (609.6 mm) high may be used.
4. A brass or galvanized rod about 3/16 inch (4.76 mm) in diameter with open hooks on each end. The rod should preferably be made in two detachable sections; the upper section is attached to the center of the balance pan and becomes part of the tare weight. This upper section is of such length that its lower end remains above the surface of the water in the container, and it is in a convenient position for attaching and removing the lower section from which the pail is suspended when weighing in water.
5. A bench or table to support the balance over the water container. Sufficient clearance between the table bottom and the top of the water container should be allowed to permit insertion of the pail into the water container. An opening shall be made in the bench to permit suspension of the hooked rod from the center of the balance pan.
6. A spoon, rod, or other suitable device for stirring and removing trapped air from the sample, when it is inundated in the pail. (The hand may be used if desired.)
7. A 3-square-yard (91.44 cm x 91.44 cm) piece of toweling.

B. PREPARATION OF SAMPLE

Select approximately a 4,000-gram sample representative of the coarse aggregate. If the sample is not visibly wet, cover with water at room temperature overnight.

C. PROCEDURE

1. Make all weighings to the nearest gram.
2. Water temperature in the container should be maintained between 65° and 75° F. (18.3° to 23.9° C.). Submerge the empty pail in the water container. Exercise care when immersing to see that no air is trapped under the pail. Adjust the water level in the container to intersect the straight portion of the lower section of the rod with the water surface. Adjust to this same water level (+ 1 inch) (25.4 mm) for all future "in water" weighings. Weigh and record as weight in water of pail and rod. Remove pail and lower hooked rod from water container.
3. After the test sample has absorbed overnight, pour off all excess water. Care should be taken to avoid any loss of aggregate particles.
4. Place the wet sample in the toweling, roll and pat to remove additional water. S.S.D. condition has been reached when all visible films of water are removed, although the surfaces of the particles may still appear to be damp. The larger fragments or particles may be individually wiped. Avoid as much as possible, evaporation of absorbed water during the operation of surface drying.
5. Place the sample (S.S.D.) on the balance and weigh immediately in air.
6. Remove the sample from the balance and place in the pail. Add enough water to the pail to completely inundate the sample. Stir the inundated sample with a spoon, rod or the hand in order to remove any air trapped between the aggregate particles.
7. Add enough water to almost fill the pail and attach the pail to the balance by means of the hook-ended rods. Lower and immerse the pail and sample into the water container and adjust the water level to within + 1 inch (25.4 mm) of the same reference level as determined in paragraph 2 above. Exercise care when immersing to see that no air is trapped under the pail. Weigh and record as weight in water of the pail, rod and sample.
8. The weight in water of the sample is equal to the weight in water of the pail, rod and sample minus the weight in water of the pail and rod.
9. Pour sample into suitable drying pan, dry sample to constant weight, cool to room temperature, pour sample into balance pan, use suitable tare weight and weigh to nearest gram. Record as dry weight for calculating the percent absorption.

D. CALCULATIONS

Bulk Specific Gravity

1. Calculate the bulk specific gravity (saturated surface-dry basis) from the following formula:

Bulk specific gravity (saturated surface-dry basis)=

$$\frac{W_a}{W_a - W_w}$$

Where:

W_a = Weight in grams, in air, of the sample in a saturated surface-dry condition, and

W_w = Weight in grams, in water, of the sample in a saturated condition.

2. Duplicate determinations should check to within ± 0.02 from the average specific gravity.

Absorption:

3. Calculate the absorption from the following formula:

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

Where:

A = Weight in grams of the sample in dry condition.

W_a = Weight in grams, in air, of the sample in a saturated surface-dry condition.

4. Duplicate determinations should check to within ± 0.31 from the average percent absorption 95 percent of the time.

REFERENCE

AASHTO Designation T85
Test Method No. Calif. 224

NUCLEAR COMPACTION REPORT FOR CONCRETE SURFACES

STANDARD COUNT DENSITY

CONTRACT NO. _____

DATE _____

STRUCTURE NO. _____

MATERIAL TYPE _____

SET NO. _____

TARGET DENSITY

COUNTS.....

COUNT AVERAGE.....

COUNT RATIO.....

WET DENSITY, Pcf.....

TEST LOCATIONS PLOT

TEST NO.

STATION.....

DISTANCE FROM ϵ

COUNTS.....

COUNT AVERAGE.....

COUNT RATIO.....

WET DENSITY, Pcf.....

% of TARGET.....

ACCEPTED or REJECTED.....

	1	2	3	4	5	6

REMARKS _____

TESTED BY _____

RES. ENG. _____