

3. Submerge the pail, as shown in Figure 1, and 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 hook-ended rod. Place a reference mark at this intersection of the rod with a water surface or insert an overflow spout through the side of the water container at this level. Adjust to this same water level within ± 25 mm for all future "in water" weighings. Weigh the pail and rod in water and record as mass, M_2 . Remove pail from the water container and place upside down to dry, as it will be used later as a container for the sample when weighed in air.
4. Spread the wet sample on a flat surface, expose it to a gently moving current of warm air (a porous surface and artificial air circulation are advantageous), and stir or roll the sample frequently to secure uniform drying. Continue this drying operation and make tests at frequent intervals by one of the two following methods until the tests indicate that the fine aggregate has reached a surface-dry condition.
 - a. Method 1. Place a portion of the drying fine aggregate in a dry 1 L glass jar and shake the jar. If the sand grains adhere to the dry surface of the jar, pour out the sample, and renew drying operations. Make jar shaking tests at frequent intervals. When the grains of a sample of the drying fine aggregate just cease to adhere to the dry surface of the jar, the sample has reached the saturated surface-dry condition.
 - b. Method 2. Place the drying fine aggregate loosely to overflowing in the conical mold and lightly tamp the surface of the aggregate 25 times with the metal tamping rod. Do not add additional aggregate after the rodding is completed. Lift the mold vertically. If free moisture is present, the cone of fine aggregate will retain its shape. Continue drying with constant stirring and make tests at frequent intervals until the cone of fine aggregate slumps upon the removal of the mold. This indicates that the fine aggregate has reached the saturated surface-dry condition.
5. Place the fine aggregate in the dry pail immediately after it has reached a saturated surface-dry condition and record this mass as M_3 .
6. Remove the pail and sample from the balance and add enough water to the pail to completely inundate the sample. Stir the inundated sample with the spoon, rod or hand in order to remove any entrapped air.
7. Add enough water to almost fill the pail and attach the pail to the balance by means of the hook ended rod. Lower and immerse the pail and sample to within ± 25 mm of the same level where the pail submerged when filled with water only (see Paragraph 3 under D). Exercise care when immersing to see that no air is trapped under the pail. Weigh the pail, rod and sample in water and record as mass, M_4 .

E. CALCULATIONS

1. The mass of the sample in water, M_w , is equal to the mass of the pail, rod and sample in water minus the mass of the pail and rod in water $M_w = M_4 - M_2$.
2. The mass of the sample in a saturated surface-dry (SSD) condition in air, M_a , is equal to the mass of the SSD sample and the dry pail minus the mass of the dry empty pail $M_a = M_3 - M_1$.
3. Calculate the bulk specific gravity (saturated surface-dry basis) from the following formula:
$$\text{Bulk Sp. Gr. (SSD)} = M_a / (M_a - M_w)$$
4. Duplicate determinations should check to within ± 0.02 .

F. NOTES

Although Method 2 (Paragraph 4b under D – Test Procedure) is an AASHTO standard method for determining the end point in drying to a saturated surface-dry condition, it tends to result in over-drying rough-textured or angular aggregates. Method 1 is preferred for aggregates of such characteristics. Judgment is required in determining the end point by either method. The sand should be free flowing when the end point is reached. A small part of the grains should have turned from dark to light color with the remainder apparently at the turning point. If the end point has not been exceeded, a few drops of water mixed into the sample should destroy the free-flowing characteristics.

G. SAFETY AND HEALTH

Prior to handling, testing or disposing of any waste materials, testers are required to read: Part A (Section 5.0), Part B (Sections: 5.0, 6.0 and 10.0) and Part C (Section 1.0) of Caltrans Laboratory Safety Manual. Users of this method do so at their own risk.

REFERENCE:
AASHTO Designation: T 84

End of Text (California Test 224 contains 3 pages)

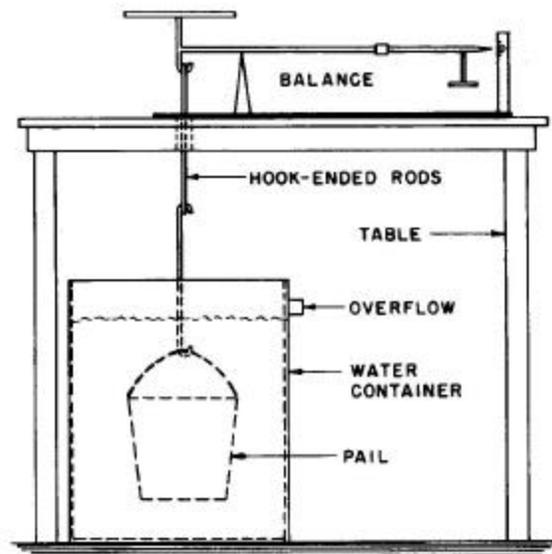


FIGURE 1