EXPERIMENT NO.- 10

EXPERIMENT NAME:

SPECIFIC GRAVITY & ABSORPTION CAPACITY OF COARSE AGGREGATE

INTRODUCTION

- This test method covers the determination of specific gravity and absorption of coarse aggregate.

- All the terminologies and their uses are same as for the specific gravity and absorption of fine aggregate (see experiment 9).

REFERENCED DOCUMENT
ASTM C127.

APPARATUS

Balance:

Sensitive to 0.05 % of the sample weight at any point within the range used for the test, or 0.5 g, whichever is greater.

Sample container:

- A wire basket of 3.35 mm (No.6) or finer mesh ,or a bucket of approximately equal breadth and height ,with a capacity of 4 to 7 liter for 37.5 mm(1.5 in.) nominal maximum size aggregate .

- The container shall be constructed so as to prevent trapping air when the container is submerged.

Water tank:

A watertight tank into which the sample container may be placed while suspended below the balance.

Sieves:

A 4.75 mm (No. 4) sieve or other sizes as needed.

SAMPLING

- Thoroughly mix the sample of aggregate and reduce it to the approximate quantity needed.

- Reject all material passing a 4.75 mm (No.4) sieve by dry sieving and thoroughly washing to remove dust or other coatings from the surface.

- If the coarse aggregate contains a substantial of material finer than the 4.75 mm sieve, use the 2.36 mm (No.8) sieve in place of 4.75 mm sieve.

- **The minimum weight of test sample to be used is given below:**

Nominal Mximum size mm(Inch)	Minimum Weight of test sample Kg (Ib)
12.5 (1/2) or less	2(4.4)
19.0(¾)	3(6.6)
25.0(1)	4(8.8)
37.5(1 ½)	5(11)
50(2)	8(18)
63 (2½)	12(26)
75(3)	18(40)
90(3½)	25(55)
100(4)	40(88)
112(4 ½)	50(100)
125(5)	75(165)
150(6)	125(276)

PROCEDURE

- Dry the test sample to constant weight at a temperature of 110±5°C(230±9°F),cool in air at room temperature for 1 to 3 hr. for test sample of 37.5 mm(1.5 in) nominal maximum size, or longer for larger sizes until the aggregate has cooled to a temperature that is comfortable to handle (approximately 50°C).

- Subsequently immerse the aggregate in water at room temperature for a period of 24±4 hr.

- Remove the test sample from the water and roll it in a large absorbent cloth until all visible films of water are removed.

- Wipe the large particles individually.

- A moving stream of air may be used to assist in drying operation.

- Take care to avoid evaporation of water from aggregate pores during the operation of surface drying.

PROCEDURE (Contd..)

- Weigh the test sample in the saturated surface-dry condition.

- Record this and all subsequent weights to the nearest 0.5 gm or 0.05% of the sample weight, whichever is greater.

- After weighing, immediately place the saturated surface-dry test sample in the sample container and determine its weight in water at **23±1.7° C (73.4±3° F)** , having a density of **997±2 kg/m³** .

- Take care to remove all entrapped air before weighing by shaking the container while immersed.

- Dry the test sample to constant weight at a temperature of **110±5° C (230±9° F)** , cool in air at room temperature 1 to 3 hours, or until the aggregate has cooled to a temperature that is comfortable to handle (approximately 50°C), and weigh.

CALCULATION

Bulk Specific Gravity (Oven-dry basis), S_d

- Calculate the bulk specific gravity, 23/23⁰C(73.4/73.4⁰F), as follows:

$$S_d = \frac{A}{B - C}$$

Where,

$A = weight\ of\ oven\ dry\ specimen\ in\ air\ (gm)$

$B = weight\ of\ the\ saturated\ surface - dry\ specimen\ in\ air\ (gm)$

$C = weight\ of\ saturated\ specimen\ in\ water\ (gm)$

Bulk Specific Gravity (Saturated Surface-dry basis), S_s

- Calculate the bulk specific gravity, 23/23°C(73.4/73.4°F), on the basis of weight of saturated surface-dry aggregate as follows:

$$S_s = \frac{B}{B - C}$$

Apparent Specific Gravity, S_a

- Calculate the apparent specific gravity, 23/23°C(73.4/73.4°F), as follows:

$$S_a = \frac{A}{A - C}$$

Absorption, A

- Calculate the percentage of absorption as follows:

$$A\ (\%) = \frac{B - A}{A} \times 100$$

Or

$$A\ (\%) = \frac{S_a - S_s}{S_a(S_s - 1)} \times 100$$

RESULT

- Report specific gravity results to the nearest 0.01, and indicate the type of specific gravity, whether bulk, bulk (saturated surface-dry) or apparent.

- Report the absorption result to the nearest 0.1%.

QUESTIONS??

- Discuss the influence of the fineness of the aggregate upon its bulking characteristics when damp.

- Discuss the effect of damp aggregate upon the cement of the mix, the proportions of which were computed for saturated surface dry aggregates (a) if the materials are batched by weight and (b) if batched by stated bulk volume.

- What difficulties arise in the use of aggregates which absorb water? How are they overcome (a) in the laboratory and (b) in the field?

EXPERIMENT 10
Data Sheet
Specific Gravity & Absorption Capacity of Coarse Aggregate

Weight of Basket in Air (gm)	Weight of Basket in Water (gm)	Weight of S.S.D. Sample, B (gm)	Weight of S.S.D. Sample in Water, C (gm)	Oven-dry Weight of Sample, A (gm)	Air-dry Weight of Sample, H (gm)

Results:

Tests	Formulae	Calculations	Results
Apparent Specific Gravity, S_a	$\dfrac{A}{A-C}$		
Bulk Specific Gravity (Oven-dry basis), S_d	$\dfrac{A}{B-C}$		
Bulk Specific Gravity (S.S.D. basis), S_s	$\dfrac{B}{B-C}$		
Absorption Capacity (%)	$\dfrac{B-A}{A} \times 100$		

Signature of Course Teacher

Student No. :
Group :
Date :