

ND T 85 – SPECIFIC GRAVITY AND ABSORPTION OF COARSE AGGREGATE

Conduct this procedure according to ND T 85.

The AASHTO standard test procedure soaks the sample for 15 to 19 hours. The NDDOT modification soaks the sample for 17 ± 1 hours.

AASHTO specifies the calculated specific gravities be recorded to the hundredth and the calculated absorption be recorded to the tenth of a percent. NDDOT specifies the calculated specific gravity to be recorded to the thousandths and the calculated absorption to the hundredth of a percent.

Consult the current edition of AASHTO for procedure in its entirety and equipment specification details.

SCOPE

This test method for coarse aggregate covers the determination of bulk specific gravity, bulk specific gravity saturated surface dry, apparent specific gravity, and water absorption of coarse aggregates. Material retained on the No. 4 sieve and above is considered coarse.

REFERENCED DOCUMENTS

ND T 2 and AASHTO T 2, Sampling of Aggregates
ND T 27 and AASHTO T 27, Sieve Analysis of Fine and Coarse Aggregate
AASHTO T 85, Specific Gravity and Absorption of Coarse Aggregate
ND T 248 and AASHTO T 248, Reducing Samples of Aggregate to Testing Size
ND T 255 and AASHTO T 255, Total Evaporable Moisture Content of Aggregate by Drying

APPARATUS

Balance, equipped with apparatus for suspending sample container
Suspended apparatus of the smallest practical size
Water tank with overflow outlet
Sieves: No. 4 (4.75 mm) or other sizes as needed
Oven
Thermometer
Absorbent towels
Sample container, either a wire basket made with No. 6 wire or finer mesh, or a bucket

TEST SPECIMEN

Obtain sample according to ND T 2. Thoroughly mix and reduce according to ND T 248.

Determine sample size needed from the following table.

Nominal Maximum Size	Minimum Mass of Test Sample
1/2" (12.5 mm)	4 lbs (2 kg)
3/4" (19.0 mm)	7 lbs (3 kg)
1" (25.0 mm)	9 lbs (4 kg)
1½" (37.5 mm)	11 lbs (5 kg)
2" (50 mm)	18 lbs (8 kg)

PROCEDURE

Record all information on SFN 10081. All weights are recorded to the nearest 0.1 g.

Dry sieve all material on the No. 4 sieve. Discard all material passing the No. 4 sieve. Wash the remaining sample to remove any dust or other coatings from the surface.

Dry the sample according to ND T 255 at a temperature of $230 \pm 9^{\circ}\text{F}$ ($110 \pm 5^{\circ}\text{C}$). Then allow the sample to cool to a comfortable handling temperature. Immerse the aggregate in water at room temperature for a period of 17 ± 1 hour.

Remove the sample from the water and roll in a large absorbent cloth until all visible films of water are removed. At this point the sample is in a saturated surface dry condition (SSD). Place the sample in a container. Weigh, and record as weight of saturated surface dry sample in air. Record to 0.1% of sample mass.

After weighing, place the saturated surface dry sample in the sample basket. Immerse in water that is at a temperature of $73.4 \pm 3^{\circ}\text{F}$ ($23.0 \pm 1.7^{\circ}\text{C}$). Take care to remove all entrapped air before weighing by shaking the basket while immersed. Determine the weight and record as weight of saturated sample in water.

Remove the sample from water and place in a pan.

Dry the sample according to ND T 255 at a temperature of $230 \pm 9^{\circ}\text{F}$ ($110 \pm 5^{\circ}\text{C}$). Allow the sample to cool until comfortable to handle. Weigh and record as weight of oven dry sample in air.

CALCULATIONS AND REPORTING

- To calculate bulk specific gravity, divide the dry weight in air by the results of the saturated surface dry weight minus the weight in water.

The equation is as follows:

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

A = Weight of oven dry sample in air

B = Weight of saturated surface dry sample in air

C = Weight of saturated sample in water

Report the result to 0.001.

- To calculate bulk specific gravity SSD, divide the saturated surface dry weight by the results of the saturated surface dry weight minus the weight in water.

The equation is as follows:

$$\text{Bulk Specific Gravity SSD} = B/(B - C)$$

Report the result to 0.001.

- To calculate apparent specific gravity, divide the dry weight in air by the results of the dry weight in air minus the weight in water.

The equation is as follows:

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

Report the result to 0.001.

- To calculate absorption, subtract the weight of oven dry sample in air from the saturated surface dry sample in air and divide result by the weight of oven dry sample in air. Multiply this result by 100.

- The equation is as follows:

$$\text{Absorption} = [(B - A)/A] \times 100$$

Report the result to the nearest 0.01%.

NOTES

If the sample is for use in concrete mixtures in which they will be used in their natural condition, the initial drying requirement is eliminated. Also, if the surfaces have been kept continuously wet until the test, the soaking time may also be eliminated.

CALIBRATION

A calibration check of the equipment should be performed annually as a minimum, or whenever damage or repair occurs.