

State of Nevada
Department of Transportation
Materials Division

METHOD OF TEST FOR APPARENT SPECIFIC GRAVITY OF COARSE AGGREGATES

SCOPE

This test method is used to determine the apparent specific gravity of aggregate particles retained on the 4.75 mm (No. 4) and larger sieve sizes.

APPARATUS

1. Balance, having a capacity of 12000 g and sensitive to 0.1 g.
2. Pycnometer, 1 L (1 qt) glass jar fitted with a conical lid having a small opening at the top of the cone.
3. Sieve, U.S. Standard, 4.75 mm (No. 4).

CALIBRATION OF PYCNOMETER

The pycnometer shall be cleaned, dried, and the weight (p) recorded to the nearest gram. Fill the pycnometer with room temperature water $25 \pm 5^{\circ}\text{C}$ ($77 \pm 9^{\circ}\text{F}$). Dislodge any air bubbles clinging to the inside of the pycnometer by gently tapping on the outside of the jar. Top off the pycnometer, forming a meniscus at the top of the opening on the conical lid. Dry the outside of the pycnometer. Weigh the pycnometer + water (p + M) and record to the nearest gram. The weight of the (pycnometer + water) - pycnometer = (M). Record (M) to the nearest gram.

PREPARATION OF SAMPLE

Use the 4.75 mm (No. 4) sieve to obtain a large enough wet sample that will allow for 500 g of dry + 4.75 mm (+ No. 4) material. Thoroughly wash the sample over a 4.75 mm (No. 4) sieve and dry in accordance with Test Method Nev. T112. Obtain 500 g of + 4.75 mm (+ No. 4) dry material (A) and record to the nearest gram.

PROCEDURE

1. Fill the pycnometer to approximately one third full of water before the sample is introduced, this will decrease the chances of breaking the jar. Place the sample in the pycnometer. Use caution not to lose any of the sample while transferring it to the pycnometer. Fill the pycnometer with room temperature water $25 \pm 5^{\circ}\text{C}$ ($77 \pm 9^{\circ}\text{F}$) to the top of the opening on the conical lid.
2. Remove entrapped air by placing a finger over the opening on the pycnometer lid while turning the pycnometer to a horizontal position, then rotating it in the hands. Set the pycnometer aside for a few minutes and repeat the rolling procedure. Removal of air bubbles clinging to the inside of the jar is facilitated by moving the jar so that aggregate particles slide across the side of the jar, dislodging the bubbles during the rolling process and by tapping the side of the jar after rolling is completed.
3. After removing entrapped air, add room temperature water $25 \pm 5^{\circ}\text{C}$ ($77 \pm 9^{\circ}\text{F}$) to refill the pycnometer, forming a meniscus at the top of the opening of the conical lid. Dry the outside of the pycnometer. Weigh the pycnometer + water + aggregate ($p + M + A$) and record to the nearest gram. The weight of the (pycnometer + water + aggregate) – (pycnometer + aggregate) = (M_1). Record (M_1) to the nearest gram.
4. Place a straw into the opening of the lid and pour off the water into a tared container, recovering as much of the water as possible. Weigh the water recovered from the pycnometer (M_2) and record to the nearest gram.
 - a. If the difference between the amount of water added (M_1) and the amount of water recovered (M_2) is 14 g or less, use Formula No. 1 under the “CALCULATIONS” Section, to calculate the apparent specific gravity.
 - b. If the difference between the amount of water added (M_1) and the amount of water recovered (M_2) exceeds 14 g, use Formula No. 2 under the “CALCULATIONS” Section, to calculate the apparent specific gravity.

CALCULATIONS

1. When $M_1 - M_2$ is less than or equal to 14 g:

$$\text{Apparent Specific Gravity} = \frac{A}{M - M_1}$$

2. When $M_1 - M_2$ is greater than 14 g:

$$\text{Apparent Specific Gravity} = \frac{A}{(M - M_1) + 0.5 (M_1 - M_2 - 14)}$$

Where:

A = Weight of dried aggregate

p = Weight of pycnometer

M = Weight of water used to calibrate pycnometer

M_1 = Weight of water used in pycnometer with sample

M_2 = Weight of water recovered from pycnometer and aggregate

REPORT

Report apparent specific gravity to the nearest 0.01.