

State of Nevada
Department of Transportation
Materials Division

**METHOD OF TEST FOR THEORETICAL MAXIMUM SPECIFIC GRAVITY OF BITUMINOUS
PAVING MIXTURES (FIELD METHOD)**

SCOPE

This test method covers the determination of the theoretical maximum specific gravity of uncompacted bituminous paving mixtures.

APPARATUS

1. Pycnometer, 2 L (2 qt) glass.
2. Balance, 5000 g minimum capacity, sensitive to 0.1 g.
3. Stop watch, or suitable timing device.
4. Vacuum pump capable of 27.5 ± 2.5 mm Hg, and miscellaneous equipment necessary to evacuate air from the pycnometer.
5. Manometer, capable of 27.5 ± 2.5 mm Hg
6. Oven, capable of maintaining temperatures up to $110 \pm 5^{\circ}\text{C}$ ($230 \pm 9^{\circ}\text{F}$).
7. Thermometer, to measure and maintain a water bath temperature at $25 \pm 3^{\circ}\text{C}$ ($77 \pm 5^{\circ}\text{F}$).
8. Sieve, 6.3 mm (1/4 in.).
9. Water bath, a minimum of 20 L (5 gal) maintained at $25 \pm 3^{\circ}\text{C}$ ($77 \pm 5^{\circ}\text{F}$).

SAMPLE PREPARATION

1. Obtain sample of bituminous mixture per Test Method Nev. T200, under PROCEDURE number 10.
2. Obtain a representative sample of 1250 ± 50 g in accordance with Test Method Nev. T203.
3. Cool the sample to room temperature.

4. After the sample has sufficiently cooled, separate the particles of the paving mixture sample by hand over a 6.3 mm (1/4 in.) sieve, taking care to avoid fracturing the aggregate, so that the particles of the fine aggregate portions will not be larger than 6.3 mm (1/4 in.). If the sample of the paving mixture is not sufficiently soft to be separated manually, place it in a large flat pan and warm in an oven until it can be separated as described above.

PROCEDURE

1. If needed, clean and lightly lubricate the pycnometer gasket with petroleum jelly.
2. Fill the pycnometer with water at $25 \pm 3^{\circ}\text{C}$ ($77 \pm 5^{\circ}\text{F}$) to the top of the opening on the conical lid. Remove entrapped air by placing a finger over the opening on the pycnometer lid while turning the pycnometer to a horizontal position, then rotating in the hands. After removing the entrapped air, add water at $25 \pm 3^{\circ}\text{C}$ ($77 \pm 5^{\circ}\text{F}$) to refill the pycnometer, dry the outside of the pycnometer and place on a tared scale. Form a meniscus at the top of the opening of the conical lid. Weigh and record the mass of the pycnometer and water as "B" on NDOT form 040-030.
3. Mark the pycnometer lid with a marker to register its position relative to the jar. Return the lid to this position after it is removed and replaced.
4. Drain the pycnometer to approximately half full.
5. Place the partially drained pycnometer on the scale and tare. Place the room temperature sample in the tared pycnometer and record the sample weight as "A" on NDOT form 040-030. Fill with water at $25 \pm 3^{\circ}\text{C}$ ($77 \pm 5^{\circ}\text{F}$) to 25 mm to 50 mm (1 in. to 2 in.) above the sample and slightly below the jar rim. Replace and tighten the lid to the marked position.
6. Remove entrapped air by subjecting the contents to a partial vacuum of 27.5 ± 2.5 mm Hg absolute pressure for 15 ± 2 minutes. Agitate the pycnometer and contents manually by vigorously shaking at intervals of approximately 2 minutes, while evacuating, to aid in the removal of entrapped air.
7. Place the pycnometer (with sample) in the temperature controlled water bath for 10 ± 1 minute to stabilize any temperature changes caused during evacuation.
8. Dry the outside of the pycnometer. Place the pycnometer on a tared scale. Top off the pycnometer with water at $25 \pm 3^{\circ}\text{C}$ ($77 \pm 5^{\circ}\text{F}$), forming a meniscus at the top of the opening of the conical lid. Weigh and record the mass of the evacuated sample, pycnometer and water as "C" on NDOT form 040-030.
9. Care should be taken to maintain a constant water temperature throughout the test procedure.
10. All weights shall be recorded to the nearest 0.1 g.

CALCULATIONS

Calculate the apparent specific gravity of the sample as follows:

$$\text{Apparent Specific Gravity} = A / [(A + B) - C]$$

where:

A = Mass of sample in air

B = Mass of pycnometer and water

C = Mass of evacuated sample, pycnometer and water

REPORT

Apparent Specific Gravity shall be calculated and reported to the nearest 0.001.

Density shall be calculated and reported to the nearest 0.1.