

GDT 37

A. Scope

For a complete list of GDTs, see the Table of Contents.

Use this test method to determine the percentage of bitumen in a paving mixture through cold solvent extraction. All the aggregate must pass a 1-1/2 in (37.5 mm) sieve. Do not use the method to recover the bitumen for further testing. You can use the aggregate recovered from this test for sieve analysis.

Note: Although “bitumen” by definition is material soluble in carbon disulfide, this method uses 1.1.1 Trichlorethane (TCE) for safety reasons. TCE normally produces the same results. Substituting TCE with other solvents and solvent mixtures containing alcohol will give similar results.

B. Apparatus

The apparatus consists of the following:

1. Extraction Apparatus: Use an extraction apparatus with a bowl and an apparatus on which the bowl may be revolved at controlled variable speeds up to 3,600 revolutions per minute. The apparatus must have a shell for catching the solvent thrown from the bowl and a drain for removing the solvent.
2. Filter Paper
3. Filter Rings: Use rings to fit the rim of the bowl (WR-5).
4. Stove or Oven: Use a stove or oven capable of maintaining a temperature of 240° F (117° C).
5. Trowel or Quartering Device (WT-07).
6. Scales: Use scales with a 5.5 lb (2.5 kg) capacity, sensitive to 0.002lb (1.0 g).
7. Beaker or Small Container
8. 1-1/2 in or 2-in (37.5 mm or 50 mm) Paint Brush (OB-02).
9. Large Flat Pan or Paper: You can use blue print paper.
10. Spatula or Spoon (WS-10 or WS-14).

C. Sample Size and Preparation

1. Check the mixture to determine if it is soft enough to separate with a trowel or quartering device. If the mixture is not soft enough, place it in the oven at 240 ° F (117 °C) until it can quartered.
2. If the mixture is soft, quarter to desired test size and distribute it uniformly around the stem of the bowl. Minimum test sizes are:

Asphaltic Concrete Type	Minimum Test Size
25 mm Superpave mix	5.5 lbs (2500 g)
19 mm Superpave mix	4.4 lbs (2000 g)
12.5 mm Superpave mix	3.3 lbs (1500 g)
All other mixes	2.6 lbs(1200 g)

3. If the test specimen cannot be accommodated by one bowl, use two or more bowls.

D. Procedures

1. Place filter paper and filter ring around the edge of the bowl.
2. Tightly secure the cover over the bowl.
3. Place the bowl containing the sample in the machine.

4. Cover the sample in the bowl with solvent and allow sufficient time for the solvent to disintegrate the sample before testing (no more than 1 hour).

Note: When the centrifuge is calibrated for the Rotarex Correction Factor according to GDT 25, place the cover on the bowl and match the marks.

5. Start the machine revolving slowly, gradually increasing speed to a maximum of 3,600 revolutions per minute, or until solvent ceases to flow from the drain.
6. Stop the machine.
7. Add 6.8 oz (200 ml) of solvent and repeat the revolving procedure.
8. Add at least three 6.8 oz (200 ml) solvent washes so that the extract is clear. The extract should be a light straw color when viewed in a separate container.
9. Remove the bowl from the machine.
10. Remove the cover and filter paper from the bowl.
11. With a paintbrush or spatula, gently remove all mineral matter from filter ring and bowl into a suitable container for drying. Make sure you collect all the material.
12. Allow the aggregate to dry to constant weight. If you need the aggregate gradation, use GDT 38.

E. Calculations

Calculate the percent bitumen in the samples as follows:

$$\% \text{ Bitumen} = \frac{W1 - W2 \times (100 - W3)}{W1}$$

Where:

W1 = Weight of sample

W2 = Weight of extracted mineral matter

W3 = Correction factor of bowl as determined by GDT 25

F. Report

Report the bitumen content to the nearest 0.01 percent on Form 159-5.