

Gravel: Quick-Wash Test

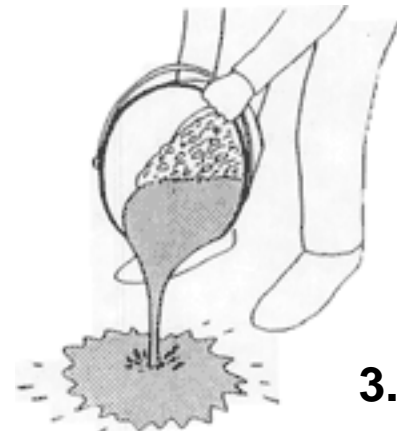
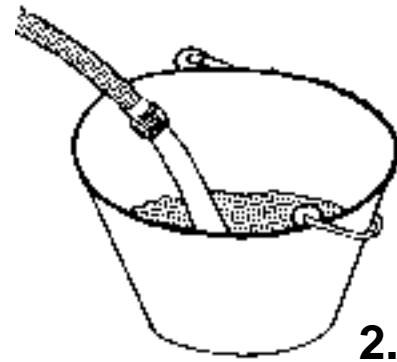
This test is recommended in as a quick way to determine the relative proportions of gravel, sand, and fine (silt and clay) sized particles in a gravel mixture. It is easy to perform, and because of its simplicity and the wide availability of the equipment needed, some agencies prefer this test to the standard sieve test. The test method is not as precise as a sieve analysis, but from a practical standpoint, it is entirely adequate. Here's the total list of equipment and supplies:

- clean pail
- flat pan or large cake tin
- piece of hardware cloth with 8 squares to the inch
- kitchen stove or a blowtorch
- kitchen scale
- source of water
- sturdy stick or stirring rod

1. After getting the empty weights of the pail and flat pan, place the gravel sample in the pail and dry it out completely. A stove, oven, or blowtorch may be used for drying the sample. Do not overheat the sample; just dry it. Weigh the pail of dry material and subtract the empty weight of the pail. This is the dry weight of the total sample.

2. Cover the sample with about 6 inches of water. Stir the sample vigorously until the water becomes muddy.

3. After waiting about 15 seconds for the sand particles to settle, carefully pour off the muddy water. Do not lose any of the sand. Repeat washing procedure until the wash water is no longer muddy. The material left in the pail is wet sand and gravel. Dry the material thoroughly and get its dry weight. This weight, subtracted from the dry weight of the total sample gives the weight of the silt and clay.



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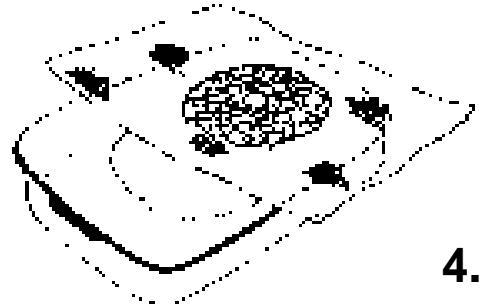
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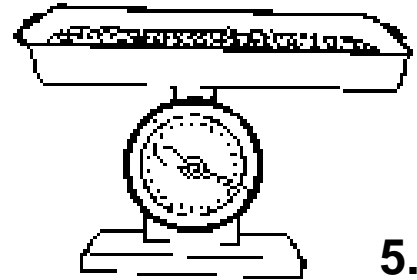
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4. Pour the dry sand and gravel on the piece of hardware cloth. Although the openings are somewhat larger than a No. 10 laboratory sieve, the hardware cloth will roughly separate the sand and the gravel. Material which can be worked through the hardware cloth is sand; the material retained is gravel.



5. Weigh the sand and weigh the gravel, remembering to subtract the weight of the pan. We can now compute the percentage of gravel, sand, and silt and clay in the total sample.



The computation is shown in the following example.

Assume we have learned from the quick-wash test that:

Total weight of dry sample (not including pail)	= 9lbs. 8oz.
Weight of dry sand and gravel	= 8 lbs. 6 oz.

Subtracting we learn that:

Weight of silt and clay	= 1 lbs. 2 oz.
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Weighing the material that was retained on the screen and that which passed the screen, we learn that:

Weight of gravel	= 5 lbs. 3 oz.
Weight of sand	= 3 lbs. 3 oz.

Notice that the sum of the weights of the gravel, sand, and silt and clay equals the weight of the total sample.

From the table we can convert our weights as follows:

Gravel	5 lbs. 3 oz.	= 5.2 lbs.
Sand	3 lbs. 3 oz.	= 3.2 lbs.
Silt and clay	1 lbs. 2 oz.	= 1.1 lbs.
Total Weight	9 lbs. 8 oz.	= 9.5 lbs.

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The percentage of gravel, sand, and silt and clay in the total sample may now be computed.

Gravel	(5.2lbs. of the total 9.5 lbs.)	$5.2/9.5 \times 100$	= 55%
Sand	(3.21lbs. of the total 9.5 lbs.)	$3.2/9.5 \times 100$	= 33%
Silt and Clay	(1.1 lbs. of the total 9.5 lbs.)	$1.1/9.5 \times 100$	= 12%
		Total	= 100%

On the basis of our general specification, the gradation of this material is suited for use as a gravel surface course, but is somewhat too dirty (too much silt and clay) for a base beneath bituminous surfacing.



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