

Method of Test for Linear Shrinkage of Filler for Bituminous Surfacing

1. Scope:

This procedure is for calculating linear shrinkage of filler.

2. Apparatus:

- 2.1 A rigid collapsible mold, made of wood or metal, with a smooth plain, waxed, varnished or polished interior surface. The interior surface shall form an oblong 1" x 1" x 10" within a tolerance of ± 0.05 ". The base shall be separate and unattached from sides and ends. The base may be plate glass, wood or metal that is smooth and plain.
- 2.2 Waxed or varnished wood or hard rubber tamper approximately 3/4" x 3/4" x 12" or 1/2" x 1" x 12" with a square cut end.
- 2.3 Spatula or pointing trowel with a 3" or 4" blade.
- 2.4 Electric drying oven, adjustable from 140° to 230°F.
- 2.5 Glass graduates, 150 mL capacity or similar container.
- 2.6 Non-absorptive slab or table top.
- 2.7 A #40 sieve conforming to ASTM E11.
- 2.8 Eye dropper.
- 2.9 Ruler, 12" in length, 1/10" divisions.

3. Procedure:

- 3.1 Obtain a dry sample of approximately 500 grams of - #40 material that has been prepared in accordance with SD 101.
- 3.2 Heap approximately 400 grams of prepared sample on the clean slab or tabletop. Make a crater in the middle of the sample. Pour 50 mL of water into the crater, fold in dry soil, allow 30 seconds to a minute for absorption, and mix vigorously by squeezing and kneading with the hands until the material becomes pliable. Add additional water, as needed.
- 3.3 Smooth off a portion of the surface with the trowel or spatula. Place a drop of water on the surface of the material, if the drop does not disappear in 30 seconds but leaves a shiny surface without free water, the material is ready for molding. If the drop of water disappears in less than 30 seconds, add more water, re-mix the sample and repeat the above process. If the free water remains on the surface, add dry filler and repeat mixing procedure above.

- 3.4 Place the mixed material in the mold in approximately 2 equal layers. Tamp each layer 25 times with a tamper. Tamp firmly enough so that there are no air pockets. Heap the top layer slightly higher than the mold. Strike off surface with dampened trowel. Avoid pulling the ends inward. Remove side and end forms.
- 3.5 Dry to constant weight in an oven at approximately 140°F. If experience with the material shows that cracking does not occur at a higher temperature, the temperature may be increased up to 230°F.

4. Report:

- 4.1 Calculate the linear shrinkage as follows:

$$\% \text{ linear shrinkage} = (10'' - \text{oven dry length}) \times 10\%$$

- 4.2 Report the linear shrinkage to the nearest 0.1%.

5. References:

ASTM E11
SD 101