



TEX-101-E, PART 1

Preparing Samples for Liquid Limit, Plastic Limit, & Gradation Testing



Why

Preparing soil and flexible base samples for various testing.



When

Specifications require testing on untreated road-mixed materials. Method A is used for preparation for multiple tests including liquid limit, plastic limit, and gradation, involving oven-drying. Method B, for liquid and plastic limits only, doesn't require oven-drying. Method A is mandatory for referee testing and preferred for preparation; both methods are for untreated samples.



How

Equipment

- Scale, minimum 80 lbs.
- Crusher (optional)
- Dispenser cup
- Filter paper
- Mechanical stirring device
- Mortar and pestle
- Oven, maintain 140°F.
- Plaster of Paris molds (optional)
- Set of standard sieves
- Sample splitter



Preparing Samples

- Dry Preparation, Method A
 - Prepare sample from embankment, flexible base, or salvaged roadway materials according to Tex-100-E standards.
 - For liquid and plastic limit or linear bar shrinkage testing, split or quarter the material to ensure a minimum of 300 g passes through the No. 40 sieve.
 - For gradation testing, split or quarter enough material based on Tex-110-E, Table 1, ensuring it represents the sample. This split can also serve for liquid and plastic limit tests.
 - Dry the sample in an oven at $140 \pm 9^\circ\text{F}$ until it reaches a constant weight.
 - Dry sieve the material over a No. 40 sieve by hand or with a mechanical shaker, separating finer particles from coarser ones.
 - Slake the material retained on the sieve in water for at least 12 hours.
 - Decant or siphon off the clear water without losing any material.
 - Place an empty No. 40 sieve into a clean pan and pour the liquid from the soaked sample through it.
 - Transfer the soaked sample to the sieve gradually to prevent overloading. Pour water over the sieve, agitating to pass fines through and ensuring lumps are broken down.
 - Repeat the washing procedure until all the soaked sample has been washed.


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Preparing Samples (cont.)

- Dry the retained aggregate portion of the sample in an oven until it achieves a constant weight.
 - Determine the gradation of the material retained on the No. 40 sieve according to Tex-110-E, Part I.
 - Set aside the wash water and material passing the No. 40 sieve until the soil settles and the water is clear.
 - Decant the water off the settled soil, ensuring no material is lost, and dry the remaining soil in an oven as before.
 - If the soil doesn't settle within 24 hours, follow the procedures outlined in Section 3.11.
 - Evaporate the water either by oven drying or using a plaster of Paris mold lined with filter paper. Once dried, collect soil adhering to the filter paper and transfer it to the fines.
 - Break down the dried soil completely with a mortar and pestle or suitable crusher to ensure uniformity.
 - Combine this material with the material previously set aside.
 - Thoroughly mix the combined materials to produce a uniform sample suitable for further testing.
- Wet Preparation Method B - used for liquid and plastic limit only.
 - Prepare the sample by splitting or quartering to get at least 300 g passing No. 40 sieve, then soak in water for 12 hours to fully saturate.
 - Sieve the wet sample using a No. 8 sieve to remove large particles, then wash the remaining material with a small amount of water and discard the waste.
 - Samples with a low plasticity index ($PI \leq 12$), proceed to Section 4.12.
 - Samples with a higher PI (> 12), use a mechanical mixer,
 - Do not fill the cup no more than half-full.
 - Mix the material until the soil binder separates, ensuring proper dispersion.
 - Pour the mixture through a No. 40 sieve into a plaster of Paris bowl lined with filter paper.
 - Agitate the sieve to encourage the passage of fines through the sieve, returning any remaining lumps to the mixer if necessary.
 - Ensure that at least 95% of the soil binder has passed through the sieve.
 - Reduce the water content of the material in the plaster of Paris bowl to below the liquid limit.
 - When the sample can be divided into pie-like wedges and each wedge can be easily removed, it's ready for liquid and plastic limit testing.
 - If the liquid and plastic limits are not to be determined immediately, store the material in an airtight container to prevent moisture loss.