



TEX-110-E, PART 1

Sieve Analysis of Soils and Base Materials



Why

Particle size is a requirement for soil classification, compaction assessment, geotechnical engineering, and pavement design.



When

Retaining wall, untreated/treated base materials and when the specification requires:

- Specification 247 - Flexible Base
- Specification 423 - Retaining Walls



How

Equipment

- Balance, minimum capacity of 35 lb.
- Bowls
- Mechanical sieve shaker
- Standard U.S. sieves, meeting the requirements of Tex-907-K
- Scoop

Procedure

- Prepare a sample of the material by Tex-101-E, Part I, Dry preparation, Method A.
- When the gradation requires the No. 200, determine the percent passing the No. 200 sieve by Tex-111-E.
- Stack the required sieves from largest to smallest on top of a pan.
- Use the total dry sample weight determined from Section 3.2 of test procedure Tex-101-E, Part I.
- Pour the sample into the top sieve and cover the stack of sieves with a lid.
- Shake the sample using a mechanical sieve shaker for a minimum of 5 minutes.
- Remove the stack of sieves from the shaker and hand sieve each sieve-size to refusal.
 - Weigh the material retained on sieve and calculate 1% of the weight by multiplying it with 0.01.
 - Return the material removed into the empty sieve and hand sieve it for approximately 1 minute.
 - Remove the sieve and weigh the material in the bowl or pan.
 - If the weight is less than the calculated 1%, add the material from the bowl to the material in the next smaller sieve size.
 - When the weight in the bowl or pan is more than 1% add the material from the bowl to the material in the next smaller sieve size recalculate the 1% and hand sieve it again.
 - Weigh the material retained on the individual sieve to the nearest 0.1 g or lb. and record it.
- Move on to the next sieve size and repeat steps. Keep hand sieving until all the sieves have been shaken to the point of refusal.




QUICK FACTS: SB 101 DRAFT

Action
Calculations

- Use the following equation to calculate the percent (%) retained for the largest sieve:

$$\%Retained_{Largest\ sieve} = \left(\frac{W_{Largest}}{W_{Total}} \right)$$

$W_{Largest}$ - Weight of material retained on the largest sieve size.

W_{Total} - Total dry sample weight.

- Use the following equation to calculate the cumulative percent retained for sieves smaller than the largest sieve size:

$$Cumulative\%Retained = 100 \times \left(\frac{W_{Sum}}{W_{Total}} \right)$$

W_{Sum} - Total dry sample weight.

W_{Total} - Total dry sample weight.

- Use the following equation to calculate the individual percent retained for each sieve:

$$Individual\%Retained = 100 \times \left(\frac{W_{Retained}}{W_{Total}} \right)$$

W_{Sum} - Total dry sample weight.

W_{Total} - Total dry sample weight.

Sieve Size	Cumulative Weight Retained (g)	Individual Percent Retained	Cumulative Percent Retained
½ in.	108.4	2.8	2.8 = 3
3/8 in.	412.5	8.0	10.8 = 11
No 4	2285.0	48.8	59.6 = 60
No. 8	3523.0	32.3	91.9 = 92
Pan – Total material including the minus No. 40	3832.0	8.1	100.0

- Report the cumulative percent retained on each sieve to the nearest whole number.