

Experiment No. 1

Aim: - To determine particle size, and particle size distribution by using the sieving method.

Reference:

Requirements: -

Chemical and Reagents: -

A sample of any powder granules, OR a powder like calcium carbonate, aspirin, calamine powder etc.

Equipment's: - Sieve set having sieve number. (12, 40, 60, 100), electromagnetic laboratory sieve machine, oven, and weighing balance.

Theory: - A sieve analysis is a practice or procedure used to assess the particle size distribution of a granular material by allowing the material to pass through a series of sieves of progressively small mesh size and weighing the amount of material that is stopped by each sieve as a fraction of the whole mass.

This method is applicable for dry powders or granules and the diameter is a sieve diameter, in this method the particle size is measured in between 50 to 1500 microns. In this method, the different sieves are arranged one below the other so that the coarse sieve is present at the top and the fine is present at the end.

The weighed amount of powder sample is placed on the top sieve and the whole set of sieves is shaken using mechanical method at a particular rate at a particular time. The amount of powder retained on the different sieves is collected and weighed and converted into number distribution and calculated the particle size.

Procedure: -

1. Clean all the sieves using a cleaning brush if any particles are stuck in the openings.
2. Dry the specimen in oven for 3 to 4 minutes to get dry specimen (ignore, if the specimen is already dried)
3. Weigh the powder sample is about 100 gm.
4. Arrange all the sieves in descending order means 12 no. sieves at the top below which place sieves no.40, 60,100 respectively.

5. Pour the dried powder sample with weighting 100 gm. On the top sieve.
6. To start sieve shaking and shake them for 10 minutes
7. Stop the sieve shaking and collect the powder material retained on each sieve and weigh the same.
8. Calculate %frequency of each size of particle and plot the graph of arithmetic mean size VS % weight retained
9. Determine the average diameter of the powder sample.

Observation: -

Total weight of sample = 100 gm

Time of shaking = 10 minutes

% Weight retained (frequency) = $\frac{\text{Weight of sample retained on sieve}}{\text{Total weight of the sample}} \times 100$

Sr. No.	Sieve no.	Mesh size (micrometre)	Arithmetic mean size of opening	Weight retained on sieve (gm)	% Weight retained (Frequency)	Cumulative % weight retained	
						Undersize (gm)	Oversize (gm)
1	12	4000					
2	40	420					
3	60	250					
4	100	150					

Result: - The average diameter of the powder sample was found to be micrometer.