

Method of particle size determination:

There are different methods for estimation of particle size, these are optical microscopic, sieving method, sedimentation and conductivity method.

Optical microscopic method:

⇒ In this method the particle size in the range of $0.2 - 100 \mu\text{m}$ can be measured.

⇒ In this method the particle size is expressed as projected diameter i.e. d_p .

⇒ This optical microscopic method is used for the determination of particle size analysis in suspension, floccule-globule size distribution in emulsion and particle size analysis in aerosol.

Method

Eye piece of microscope is fitted with a micrometer called eye-piece micrometer.

- another micrometer called stage micrometer.
- Simultaneously stage micrometer & eye piece micrometer appear at a same time in the microscope. The no. of lines of co-incidence is calculated and the calibration factor is measured.
 - The stage micrometer is standardised but the eye-piece micrometer is not standardised.
 - One division of stage micrometer is 10 micrometers or 10 microns.
 - The powder sample is to be taken in a slide then is mixed with a suitable vehicle such as diluted paraffin to prepare a suspension.
 - Then this suspension will be placed on stage then by the help of eye-piece micrometer the no. of lines will be counted on each particle.
 - Now these lines will be multiplied with calibration factor to know the size of each particle.
 - Now about 625 particles are counted and the different graphs are plotted like normal distribution curve, frequency polygon distribution curve etc.

Practical consideration

The diameter obtained in this meter is actually the diameter of the circle whose area is equivalent to projected area of the particle.

(ii) Another easy process is double image microscope where 2 identical images are observed.

Advantage

Microscopic method allows the observer to view the particle.

(agglomeration)
Agglomeration can be observed in time & place
→ Particles in the dispersion must be in a state of
motion so a collision & contact of particles
is possible.

→ Preparation of sample is simple & easy.

Disadvantage:—

→ Here 2D size can be observed.

→ The depth of the particle is not

measured.

→ This method is slow and time taking.

→ Large no. of particles is needed for good
result.

→ Large sample is required, training of a
operator is required for handling of the
microscope.

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Sieving method:

The particle size or size range set 50-1500 μ m
are estimated by this method.

→ The diameter obtained by this method is expressed
as ~~microns~~ microns.

Application

It is used in the development of tablets &
capsules.

→ It is also used for determination of flow property.

→ To find out the coarse particles & fine
particles this method is best to be estimated.

Method

→ One standard sieve or different sieve no. are
used.

→ The coarse sieve having lesser sieve
number will be arranged first & according

Accordingly, sieve number they are arranged

- The arrangement done is next then it is shaken for 15-20 mins keeping a constant weight of powder on the sieve or at first.
- The each sieve contain some powder which shall be weighed to get the weight distributed.
- The diameter will be calculated as per the formula for example if a powder pass through the sieve no-36 & retain sieve no-44 then the diameter of powder will be calculated by arithmetic mean by apparatus size of sieve no 36 & 44. This process is followed to get the sieve diameter for each sieve and the sieve diameter.
- By getting the data frequency distribution curve, normal distribution curve, log normal distribution curve & probability curve can be obtained.
- sieve no & apparatus size of different sieve.

<u>sieve number</u>	<u>Aperture size (mm)</u>	
10	1700	85 → 135
12	1400	120 → 36
16	1000	150 → 18
22	710	170 → 08
25	600	
30	500	
36	425	
44	325	
	250	