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Subject Name	-	Pharmaceutical Engineering
Course	-	B.Pharm
Course duration	-	4 year
Subject topic Name	-	Size reduction
Content type	-	Pdt
Search keyword	-	Size reduction



## Process of size reduction:

- Size reduction may be achieved by two methods:

1. *Precipitation method*
2. *Mechanical method*

1. Precipitation method: Substance + solvent  $\longrightarrow$  Mixture + another solvent  $\longrightarrow$  Precipitation of material  $\longrightarrow$  reduced size

( e.g. calcium carbonate, yellow mercuric oxide, bulk drugs etc.)


2. Mechanical process: Substance + mechanical force (grinding equipments like Ball mill, Colloid mill etc.)  $\longrightarrow$  reduced size

( e.g. *Dry grinding* in tables and capsules, *Wet grinding* in suspension, emulsion and ointments etc.)




## **OBJECTIVES OF SIZE REDUCTION**

- **In the materials processing industry, size reduction or comminution is usually carried out in order to:**
  - **Increase the surface area because, in most reactions involving solid particles, the rate of reactions is directly proportional to the area of contact with a second phase.**
  - **Break a material into very small particles in order to separate the valuable amongst the two constituents.**
  - **Achieve intimate mixing.**
  - **To dispose solid wastes easily .**
  - **To improve the handling characteristics.**
  - **To mix solid particle more intimately.**



**Advantages/ Applications/Significance and objectives of size reduction:**

- **Content uniformity**
- **Uniform flow**
- **Effective extraction of drugs**
- **Effective drying**
- **Improved physical stability**
- **Improved dissolution rate**
- **Improved rate of absorption**



## Disadvantages of size reduction

- Drug degradation
- Contamination

# FACTORS AFFECTING ON SIZE REDUCTION

- 1) Hardness
- 2) Toughness
- 3) Abrasiveness
- 4) Stickiness
- 5) Softening temperature
- 6) Material structure
- 7) Moisture content
- 8) Physiological effect
- 9) Purity required
- 10) Ratio of feed size to product ratio
- 11) Bulk density

Reference 1- <https://www.slideshare.net/mobile/AmarRaval1/size-reduction-67081485>