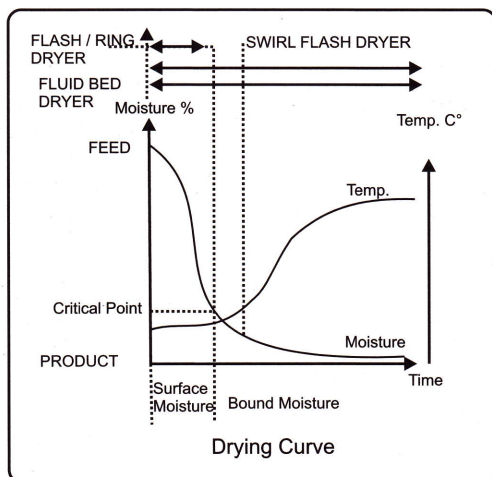


AIR DISPERSION DRYERS

**FLASH, FLUID BED, SWIRL- FLASH, RING DRYER
VIBRATED FLUID BED DRYER, ROTARY DRYER**

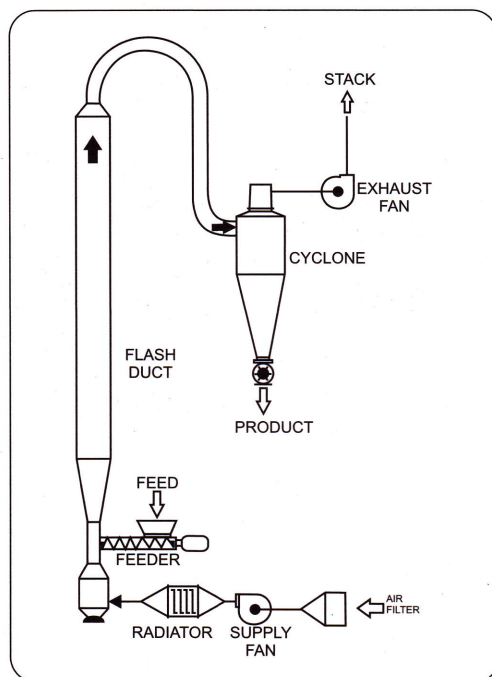
Air Dispersion Dryers

Drying of wet cakes, pastes and sludges.



When producing powders from aqueous suspension, it is a distinct advantage to first mechanically dewater so as to reduce the plant installation and operating costs of the final drying stage. During dewatering suspensions are converted to either filter cakes, pastes or sludges.

Drying of such material thereafter is ideal in Air Dispersion Dryers. The selection of a particular dryer depends on the nature of wet feed cake particle size distribution of final powder and the drying nature is usually characterised by **Drying Curve** as shown. The selection of the most suitable dryer depends upon nature of the wet feed cake.



FLASH DRYER

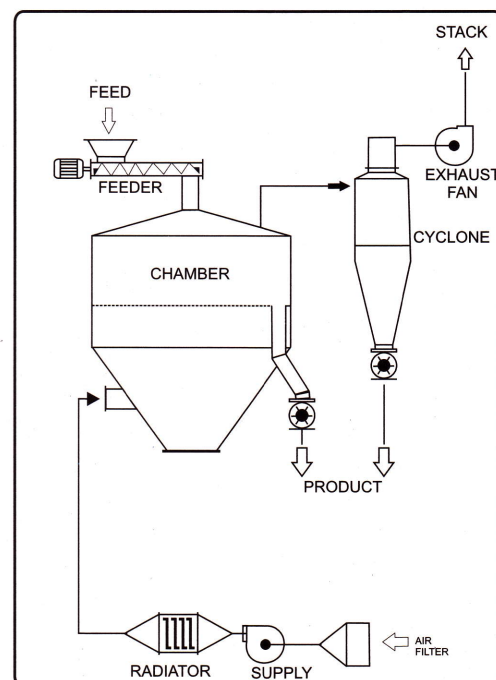
The simple **Flash Dryer** is designed to handle materials that can be suspended directly in air. The drying process usually is completed in 0.5-2 secs, and the final moisture is generally in the constant rate drying zone. Various types of **Flash Dryer** designs are available based on uniform / non uniform particle size of the feed / product.

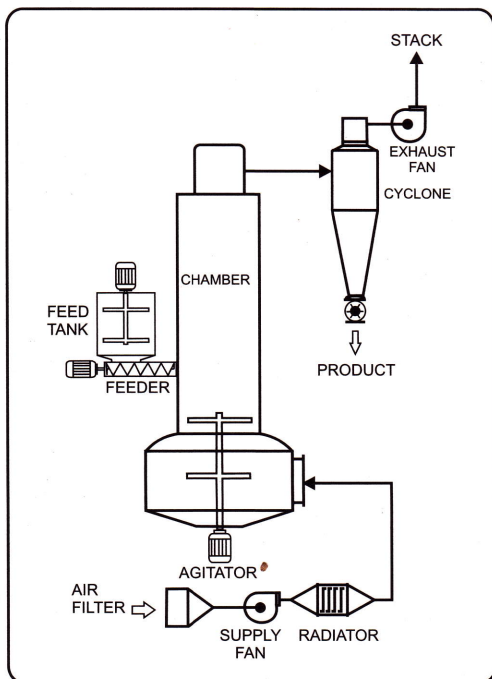
The feeding of cake is through specially designed paddle mixer / screw conveyor with / without rotary injector depending on rheology of feed material. For difficult to handle feed materials part of dried powder can be re-cycled. **Flash Dryers** are suited for filter cakes, semi dried powders.

FLUID BED DRYER

Fluid Bed Drying offers advantages over other drying techniques and is well suited for constant and falling rate drying. The principle is based on the phenomenon that solids having a well defined particle size distribution behave as liquid when fluidized by air. By preheating the air, the residual moisture can be reduced.

Fluid Bed Dryer is suited for powder, granules with average particle size 50 - 2000 microns, If the feed material is sticky and having wide particle size distribution. **Vibro Fluid Bed Dryer** is the most suited, where vibration helps the movement of solids and drying.





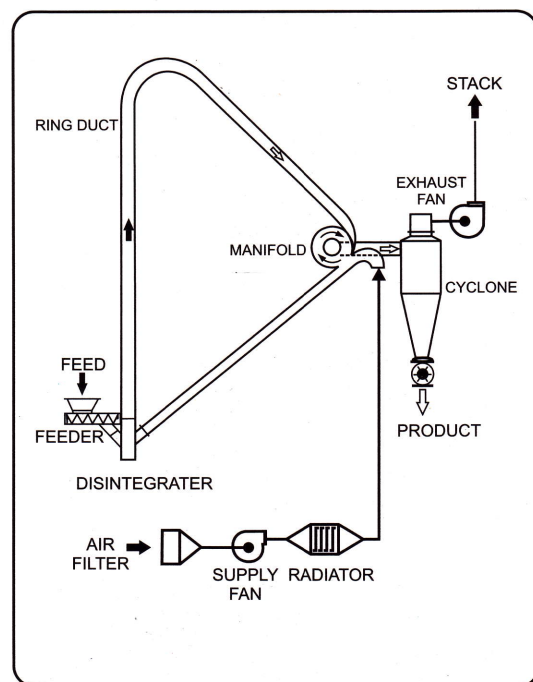
● SWIRL - FLASH DRYER

If the wet cake is a paste or sludge, **Swirl-Flash Dryer** is the most suited for drying application. The dryer is fitted with a mechanical agitator which helps to disperse the wet cake without any need for back mixing of the dry powder.

The feeding system includes a feed tank with agitator and a screw feeder for feeding into the drying unit. The heart of drying process is cylindrical drying chamber, where the drying air enters the air distributor. The tangential air distributor of special design introduces the air as an intense Swirl flow.

Ring Dryer is pneumatic dryer of advanced design, in which solid particles are held air borne in controlled circulation, while the drying air is constantly renewed.

The internal circulation in the **Ring Dryer** is obtained by means of the manifold, a special centrifugal classifier designed to separate dry and fine particles while holding the moist and large particles for longer circulation. This enables the Ring Dryer to dry efficiently many materials that could not otherwise be flash dried and also to obtain exceptionally good control of the final product moisture.



● RING DRYER

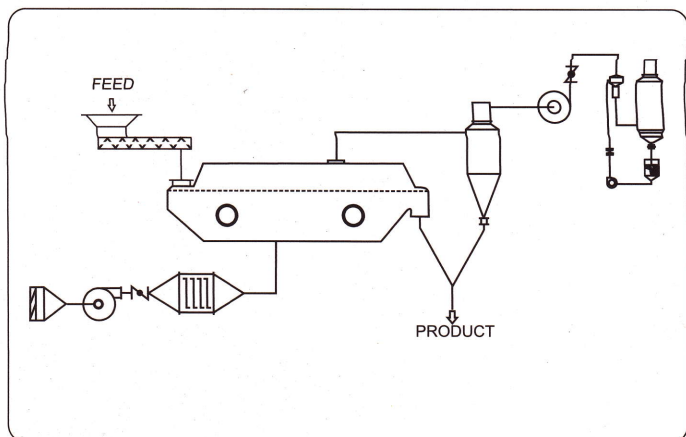
● Materials Suitable for flash / Swirl - Flash Dryer / Ring Dryer

- | | |
|-----------------------|-----------------------|
| ○ ABS | ○ Polystyrene |
| ○ Adipic Acid | ○ Precipitated Silica |
| ○ Aluminium Hydroxide | ○ Sodium Chloride |
| ○ Ammonium Chloride | ○ Sodium Perborate |
| ○ Ammonium Sulphate | ○ Sodium Sulphate |
| ○ Boric Acid | ○ Sulfanilic Acid |
| ○ CMC | ○ Salicylic Acid |
| ○ Dyes & | ○ Starch |
| ○ Dye intermediates | ○ Stearates |
| ○ Edta Salts | ○ VS Intermediate |
| ○ Flourspar | ○ Gluten |
| ○ Fumaric Acid | ○ Gypsum |
| ○ Polyethylene | ○ H. Acid |
| ○ Polypropylene | ○ R. Acid |

● Materials Suitable for Fluid Bed / Vibro Fluid Bed Dryer

- | | |
|-----------------------------|----------------------|
| ○ ABS | ○ Paracetamol |
| ○ Acetoacetanilide | ○ Sodium Sulphate |
| ○ Ammonium Nitrate | ○ Sulfamic Acid |
| ○ Ammonium Sulphate | ○ Sodium Bicarbonate |
| ○ Bon Acid | ○ Sodium Chloride |
| ○ Dicalcium Phosphate | ○ S. PVC |
| ○ Detergents | ○ Silica Gel |
| ○ Granular dye stuff | ○ Sugar |
| ○ HOPE | ○ UF |
| ○ Malic Acid | ○ MF Resin |
| ○ Ortho Benzyl Benzoic Acid | ○ Zinc Sulphate |

Air Dispersion Dryers
Drying of wet cakes, pastes and sludges.



● ROTARY DRYER

Rotary dryers are custom built for each application. They are classified as direct or indirect (air heating method), co-current or counter current (material air contact).

The material to be dried is uniformly dispersed over the entire cross-section, by use of internals designed based on the material properties. Heated air then passes through the falling material, resulting in uniform drying. The dryer is driven through a girth gear and tyre arrangement. Seals are provided at the ends to ensure minimum air leakage.

The advantages of rotary dryers are :

- Low operation costs
- Low maintenance costs
- Ideally suited for high volumes
- High thermal efficiency

Typical products handled :

- | | |
|---------------|----------------------|
| ➤ Sand | ➤ Coal |
| ➤ Clays | ➤ Ores |
| ➤ Maize germs | ➤ Industrial sludges |

● VIBRATED FLUID BED DRYER

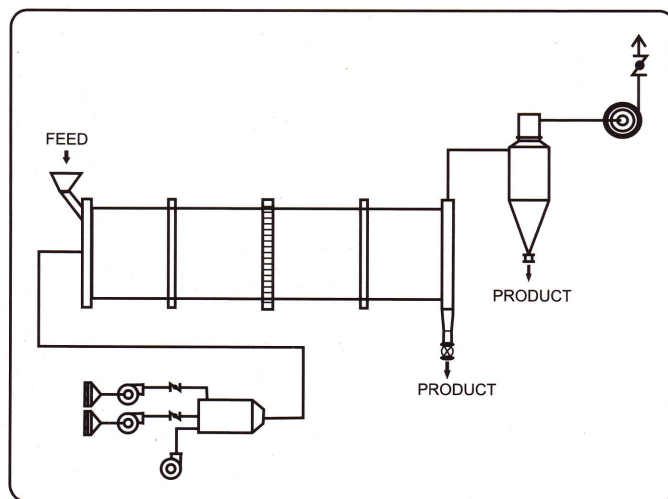
The vibrated fluid bed dryer is used for fluidization of materials which are difficult to handle in a static fluid bed dryer. These materials are often characterized by having one or more of the following physical properties.

- Wide particle size distribution
- Low strength of wet or dry particles
- Stickiness or thermoplasticity of the particles
- Pasty properties of the wet feed

In the vibrated fluid bed dryer, the materials is easily transported through the dryer by the combined effect of fluidization and vibration. the fluidization velocity can be judiciously selected, to minimize entrainment of the smaller particles, to avoid gas bubbling in the fluid bed thereby minimizing attrition. The residence time can be adjusted, by varying the bed height, through the overflow weir position. A cooling section can also be provided, by partitioning of the plenum chamber.

Typical products handled :

- Salt
- Milk products (used as a secondary dryer)
- Chemicals
- Tea



ADVANCED DRYING SYSTEMS

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