

Study of Fluid Energy Mill and Disintegrator

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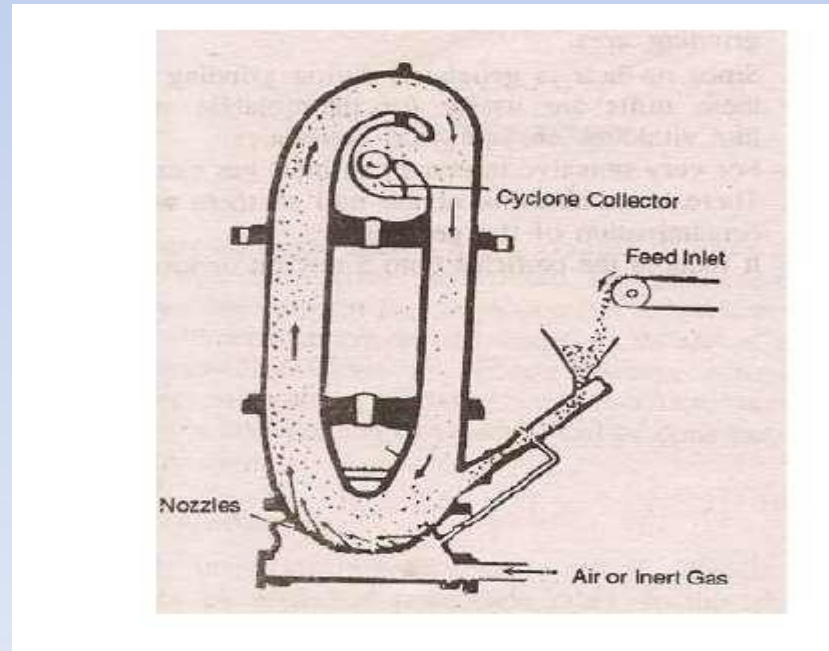
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Fluid energy mill:

Principle- It works on the principle of impact and attrition.

It consists of a loop of a pipe, which has a diameter of 20 to 200 mm, depending on the overall height of the loop which may be up to about 2 meters, a fluid, usually air, is injected at high pressure through nozzles at the bottom of the loop, giving rise to a high velocity circulation in a very turbulent condition. Solids are introduced into the stream and, as a result of the high degree of turbulence, impact and attritional forces occur between the particles. A classifier is incorporated in the system, so that particles are retained until sufficiently fine.



The feed to the mill needs to be pre-treated to reduce the particles size to the order of 100 mesh, enabling the process to yield a product as small as 5 micrometers or less. Despite this, mills are available which are capable of outputs up to 4 mg per hour.

Advantages:

1. The particle size of the product is smaller than that produced by any other method of size reduction.
2. Expansion of gases at the nozzles leads to cooling, counteracting the usual frictional heat which can affect heat-sensitive materials.
3. Since the size reduction is by inter-particulate attrition there is little or no abrasion of the mill and so virtually no contamination of the product.
4. For special cases with very sensitive materials it is possible to use inert gases.
5. Having a classifier as an integral part of the system permits close control of particle size and of particle size distribution.

USES:-

1. The mill is used to grind heat sensitive material to fine powder.
2. The mill is also used to grind those drugs in which high degree of purity is required.

DISINTEGRATOR

Principle:- The size reduction in disintegrator is done by impact.

Construction:-

It consists of a steel drum having a shaft in the centre. The shaft contains a disc, on which four beaters are fixed. The shaft rotates with a speed of 5000-7000 rev. /min. The side and upper inner surface of the drum is rough and undulating. The lower part of the drum has a detachable screen or sieve.

Working:-

The beaters are mainly responsible for grinding but are helped by the undulation of the inner surface and roughness of drum. The material is fed in beaters, through hopper which is fitted to the drum. The material is broken into small particles by impact of the beaters.

Due to high velocity of beaters the air velocity inside the chamber is increased. The air is allowed to pass through an outlet on which dust bag is tied, which retains the fine particles of powder.

USES:-

The mill is used to powder all types of powder all types of drugs including very hard drugs. The drug should be dried before feeding into the disintegrator to get fine powder. To avoid the jamming of the beaters of the disintegrator use moderately small pieces.

